

SAS Bulletin

Society for Archaeological Sciences

Volume 24 number 1/2

Saving SCMRE: Preventing the Dismantling of a Significant National Resource

On 4 April 2001 the Secretary (CEO) of the Smithsonian Institution Lawrence M. Small announced plans to reorganize the Smithsonian and eliminate the Smithsonian Center for Materials Research and Education (SCMRE) located in Suitland, Maryland. SCMRE is the former Conservation Analytical Laboratory (CAL) renamed in 1998 that was established in 1963 to provide technical support to the Smithsonian's museums. SCMRE is currently one of the world's leading centers for research on the conservation and analysis of art, artifacts, and scientific specimens, and for preservation, education, and training. The range of research and training done by the SCMRE staff is not duplicated anywhere else in the United States. The 37-member SCMRE staff (only 29 slots are filled currently due to the federal hiring freeze) includes paper, textile, painting, and furniture conservators; organic chemists; biochemists; ceramic scientists; archaeometrists; metallurgists; and information specialists. Among the staff members are well-known colleagues: Ron Bishop, Jim Blackman, Dave Erhardt, Martha Goodway, Noreen Tuross, Dianne van der Ryden, Pam Vandiver, and Dave von Endt.

Mentoring pre- and postdoctoral fellowships in archaeology, conducting trace element analysis of 25,000 artifacts, teaching 500 workshops, and disseminating primary research (a 77-page list of SCMRE staff publications is on the center's website) are among some achievements of this dedicated staff over 28 years. However, following Small's dictum, Lambertus van Zelst (Director, SCMRE) wrote that the "staff has been urged to pursue alternative employment opportunities. Phase-out of ongoing programs will start immediately."

Small also planned to close the National Zoo's world-class research center in Front Royal, Virginia, but an international outcry from zoologists, other scientists, the panda-loving public, and members of Congress, persuaded him to withdraw this proposal. Nonetheless, three branches of the Smithsonian Libraries, the Smithsonian Productions (an audio, video, and multimedia production center), and the institution's photographic and imaging office, along with SCMRE, remained on the list for elimination by 31 December 2001. Overall, 180

Summer 2001

staff positions are involved and there are also to be further staff reductions in the Museum of American History perhaps paralleling the loss of 105 staff members in the Museum of Natural History during the past decade. The reallocation of internal resources for higher priority issues is central to Small's argument, but the White House has approved a Smithsonian budget increase of 9 percent to \$494 million for FY 2002 (which begins 1 October 2001).

On 7 May the SI's Board of Regents, chaired by Chief Justice William H. Rehnquist, approved the adoption of this "new strategic direction for Smithsonian science" but also recommended the formation of a Scientific Advisory Panel to advise the Secretary and Board of Regents. The members of the panel were announced officially on 16 July by J. Dennis O'Connor (SI's Undersecretary for Science, previously Biology, U. of Pittsburgh) and include three anthropologists and nine biologists, only two physical scientists, and six SI staff: Jeremy A. Sabloff (Archaeology; Director, U. of Pennsylvania Museum) as panel Chairman; Alice Alldredge

(continued on page 2)

In This Issue

AIA & SAA Awards	3
Luminescence Dating (J. Rink)	5
Remote Sensing & GIS (A. Sarris)	5
Laboratory Profile: Archaeometry at MURR	8
Archaeological Ceramics (C.C. Kolb)	10
Book Reviews (M. Glascock)	
King Croesus' Gold (M. Hall)	21
Elsevier's Dictionary of Arch. Materials	
and Archaeometry (L. Lozny)	23
Expanding the View of Hohokam Platform	
Mounds (M.D. Pool)	24
Determining Geologic Sources of Artifact	
Copper (K. Ehrhardt)	25
Spanish Colonial Silver Coins in the	
Florida Collection (D.A. Parks)	27
The Ferrous Metallurgy of Early Clocks	
and Watches (E.F. Heite)	28
Looking Into the Earth (J.W. Weymouth)	29
Meetings Calendar (S. Mulholland)	30

(Ecology, Evolution, and Marine Biology; U. of California, Santa Barbara); Francisco Ayala (Biological Sciences; U. of California, Irvine); James D. Baker (former administrator, National Oceanic & Atmospheric Administration); Peter R. Crane (Director, Royal Botanical Gardens, UK); Stephen Hubbell (Botany; U. of Georgia); Simon Levine (Biology; Princeton U.); Jeremy B.C. Jackson (Oceanography; U. of California, San Diego); Yolanda T. Moses (Cultural Anthropology; American Association for Higher Education [and former President of AAA]); Peter H. Raven (Director, Missouri Botanical Garden); Beryl B. Simpson (Botany; U. of Texas, Austin); and Marvalee H. Wake (Biology; U. of California, Berkeley). The Smithsonian Institution members are Bruce Campbell (Geophysics), Douglas Erwin (Paleontology), Ilka Feller (Animal Ecology), William Fitzhugh (Anthropology, as Chairman of the SI's Senate of Scientists), Robert B. Kirchner (Astronomy), and Warren Wagner (Biology).

Beginning in mid-April articles questioning the impending closures appeared in Science and in Nature. Oral protests and letters to Small, the Regents, and members of the House and Senate appropriations committees about the SCMRE have come from a variety of scientific organizations. These include the Executive Director of the American Institute for Conservation of Historic and Artistic Works (Elizabeth F. Jones), the President of the American Anthropological Association (Louise Lamphere), the Chair of the AAA's Archaeology Division (Deborah L. Nichols), the President of the Society for American Archaeology (Robert L. Kelly), the President of the Archaeological Institute of America (Nancy C. Wilkie), and the SAS President (Arleyn W. Simon). In mid-June the Council of the 61,000-member American Library Association passed a resolution urging the funding and continuation of the SCMRE which provides education and outreach through its Research. Libraries, and Archives Collections Conservation Task Forces (RELACT). Likewise the American Historical Association's Council passed a resolution that expressed concern about intellectual integrity and scholarship, and their Executive Director (Arnita Jones) urged that the SCMRE not be closed. The Organization of American Historians has also requested that the Regents review staff cuts in American History and the questionable agreements Small has made recently with donors.

Maryland Senators Paul Sarbanes and Barbara Mikulski opposed the closing and the Senate Appropriations Committee agreed on 28 June that the center should remain open pending a review by the Science Commission. Among other issues, Sabloff's panel will consider the proposed closing and the questions raised by members of Congress. Nonetheless, the center's fate is yet uncertain. Because this saga is ongoing and dynamic, readers are invited to view materials posted on several websites (SCMRE, SAA, AAA, and an independent site):

http://www.si.scmre/closing_scmre.html http://www.saa.org/Government/smithsonianmat.html http://www.aaanet.org/gvt/actsi.htm http://crcforever.50megs.com/scmre/index_1.htm

Submitted by Charles C. Kolb 17 July 2001

Archaeological Science at USF

The University of South Florida, Department of Anthropology, is now accepting applications for a newly designed PhD track in archaeology, including specializations in archaeological science, European archaeology, American archaeology, and museum studies. USF is the largest metropolitan university in the southeastern United States, and one of the top public research universities in the nation. Anthropology, Chemistry, and Geology have been recognized as three of the top departments in Arts and Sciences. There are currently 17 full-time faculty in Anthropology, and about 125 graduate students (of whom 25% are in archaeology). Other faculty with active teaching and research in archaeology are based in the departments of Chemistry, Geography, Geology, History, Marine Science, and Religious Studies.

Facilities include dedicated laboratories for archaeological materials analysis, bone chemistry, and geographic information systems (GIS), with access to instrumentation including ICP and DCP spectrometers, ICP and stable isotope mass spectrometers, microprobe, scanning electron microscopy, x-ray diffraction, amino acid racemization, palynology, ground penetrating radar, and proton magnetometry. Research projects are active on all continents and include provenance studies of obsidian, marble, and ceramics; dietary studies of fossil hominids and Holocene human populations in the Old and New Worlds; geoarchaeology in North America and the Middle East; and underwater archaeology in the Mediterranean. Fieldschools are offered in archaeology and in geoarchaeology.

To enter the Master's program, which emphasizes a broad curricular approach to archaeology, an undergraduate degree (BA or BS) is required which includes at least one course in each of the four subfields of anthropology (1-2 of these courses can also be taken after coming to USF). The MA degree includes 10 formal courses plus an internship and thesis. Full-time students may complete the degree in less than two years, and will qualify for the Registry of Professional Archaeologists upon graduation. MA graduates regularly find employment with private cultural resource management firms and various state and federal agencies (e.g. Dept. of Environmental Protection, National Park Service, Florida Division of Historical Resources).

To enter the PhD program, an MA or MS degree is required in archaeology, anthropology, or a related discipline. The degree program includes 14 formal courses plus internship and dissertation. In addition to method, theory, geographical and topical courses, the following 'tools of research' have recently been offered: Advanced Remote Sensing; Archaeological Science; Archaeology in Chemistry; Environmental Archaeology; Forensic Anthropology; Principles of Applied Geophysics; Quaternary Environments.

The application deadline for admission for fall 2002 is January 15, 2002. Several types of graduate fellowships are available for both MA and PhD programs.

For further information, contact Robert H. Tykot, Deputy Chair, Department of Anthropology, University of South Florida, 4202 E. Fowler Ave., SOC 107, Tampa, FL 33620- USA; tel 813 974-7279; email: rtykot@chuma1.cas.usf.edu; department website: http://cas.usf.edu/anthropology/index.html

Curt W. Beck Wins Pomerance Award



Professor Curt W. Beck, the world's expert on the analysis of amber and its archaeological interpretations in the Mediterranean world, Europe and western Asia, received the 20th annual Pomerance Award for Scientific Contributions to Archaeology at the 102nd

Annual Meeting of the Archaeological Institute of America in San Diego. As a professor of Chemistry at Vassar College, he established the Amber Research laboratory and has championed the cause of archaeological sciences as an editor for many journals, including the *Journal of Archaeological Science* and the *Journal of Field Archaeology*. Although he retired from his post at Vassar, Prof. Beck still remains very active in the field he likes to refer to as "organic archaeometry." He has started a new area of archaeological amber research in China and other countries in the Far East.

Society for American Archaeology Awards

Excellence in Archaeological Analysis

The society for American Archaeology's 2001 Excellence in Archaeological Analysis award is presented to George L. Cowgill in recognition of his pioneering and enduring contributions to fundamental problems in archaeology, including the logic and methods of archaeological inference using quantitative and formal approaches to data, central questions regarding the role of the ideational realm in archaeological theory, and the understanding of population dynamics. George Cowgill is internationally recognized for his extraordinary corpus of influential and rigorous scholarship that has helped define the terrain of contemporary archaeology, particularly on issues of sampling, statistical inference, typology, seriation, and spatial analysis. His current interest in ideational aspects of ancient societies, and on developing a "middle range theory of mind and social agency," attests to his exemplary open-mindedness and tireless enthusiasm for new ideas - qualities worthy of praise, respect, and emulation. His more than four decades of work in Mesoamerica is testimony to the fact that explicitly human-centered understandings of the past and rigorous quantitative analysis can go hand-in-hand, and that the gulf between theory and data can and must always be bridged. Anyone who has had the fortune to know him will tell you that George Cowgill's preeminent body of scholarship is only surpassed by his collegiality, generosity, and genuine respect for colleagues and students alike.

Fryxell Award

The winner of the SAA's Fryxell Award for Interdisciplinary Excellence in Archaeology is Melinda A. Zeder. She has been

at the forefront of developing new ways of using archaeozoological data to address significant anthropological questions. She has consistently reassessed the value of accepted archaeozoological approaches and assumptions while advocating the highest scientific standards. In her 1992 volume, Feeding Cities, she employed faunal assemblages to examine the economic and social restructuring of early urban and Bronze Age societies in Iran. In 1997, her interpretive analysis of the economic responses open to early food producing societies of the Near East earned her the American Anthropological Association's Gordon R. Willey Prize. In three revolutionary articles appearing in 2000, Zeder demonstrated that sex specific age curves, rather than the widely employed measure of overall size reduction, provide the best archaeological marker of animal domestication. Zeder is also a devoted teacher, using her laboratory as a classroom to train many of the next generation of archaeozoologists. For her theoretical and substantive contributions to archaeozoology and archaeology and her dedication to education, The Society for American Archaeology is honored to present this award to Melinda A. Zeder.

Lifetime Achievement Award

The 2001 Lifetime Achievement Award is presented to Jeffrey S. Dean, in recognition of his innovative and rigorous analyses that represent extraordinary achievements in research, for his important contributions to archaeological theory, and for his invaluable service to the discipline in all aspects of tree-ring research.

Dean's generosity in providing information, insight, and sage counsel are legendary. Few individuals have made such valuable contributions to so many other scholars' research. He has provided tree-ring dates and expert interpretations for virtually every significant archaeological project in the northern Southwest for more than three decades. He has also played a leading role in developing the regional sequences needed for precise dating and dendroclimatology. Dean's works are widely used to teach the methods of tree-ring research.

As a researcher, Dean has produced a corpus of work of rare quantity and quality. His use of tree-ring data in the analysis of chronology, social dynamics, and paleoclimatology has been both innovative and meticulous, marked equally by theoretical sophistication and empirical rigor. Included in his more than 100 publications are several archaeological classics. It is rare indeed for a single individual to have enriched a field of study as much as Dean has enriched archaeology.

SAS Poster Award at SAA

Amy Margaris, a PhD student at the University of Arizona, was awarded the SAS Student Poster Award at the Society of American Archaeology meeting held in New Orleans in April, 2001. Her poster, "A Mineralogical Analysis of Sediments from Israel's Tabun Cave Using Fourier Transform Infrared Spectrometry," was an excellent application of scientific techniques to significant archaeological problems, in this case Runner-ups included Jeffrey R. Ferguson (University of Colorado, Boulder), "Archaeometry to the Rescue at Bone Cave: The Interpretation of a Severely Disturbed Lava Tube Site in Central Oregon," and Jennifer Kelly (University of South Florida), "Integrating Analytical, Archaeological and Ethnographic Subsistence Data: A Case Study from Patagonia, South America" (with coauthors).



Amy Margaris with her SAA Poster

IAOS Student Grants

The International Association for Obsidian Studies is offering two \$500 grants for students. The first is to organize a conference session on obsidian studies, the second is for obsidian research. Contact Michael Elam (jme@utkux.utcc.utk.edu) or Mike Gottesman (mgottesm@ucla.edu) for more information, including deadlines, proposal format, etc. Please also visit the IAOS website: http://www.peak.org/obsidian

Volcanic Glasses of the Russian Far East

Volcanic Glasses of the Russian Far East: Geological and Archaeological Aspects, edited by Yaroslav V. Kuzmin and Vladimir K. Popov, was recently published by the Geological Institute, Far Eastern Branch of the Russian Academy of Sciences, at Vladivostok, Russia.

This book is the first systematic attempt to reveal the sources of archaeological obsidian in the Russian Far East, Primorye (Maritime) Province and Sakhalin Island, on the basis of instrumental geochemical analyses (INAA, XRF). There is an extended English Summary describing the main results, and the figures have both Russian and English captions. All the primary data (geochemical composition of volcanic glass, etc.) are presented as tables and supplements in Russian and English.

The studies summarized in the book were conducted during

1992-2000 by a group of scholars from Russia, USA, and Japan. Among the chapter authors are Yaroslav V. Kuzmin (Vladivostok, Russia), Vladimir K. Popov (Vladivostok), Michael D. Glascock (Columbia, MO, USA), M. Steven Shackley (Berlekey, CA, USA), Andrei V. Tabarev (Novosibirsk, Russia), Sergei V. Gorbunov (Tymovsky, Sakhalin District, Russia), Aleksander A. Vasilevsky (Yuzhno-Sakhalinsk, Russia), Olga A. Shubina (Yuzhno-Sakhalinsk), Victor I. Zaitsev (Yuzhno-Sakhalinsk), and Hiroyuki Sato (Tokyo, Japan).

The book is available on request without charge, but Western scholars are kindly requested to pay the airmail fee (\$6.00). The number of books is limited, and preference will be given to those who contact us first. Please contact: Dr. Vladimir K. Popov, Geological Institute, Far Eastern Branch of the Russian Academy of Sciences, 100-Letiya Vladivostoku Ave. 159, Vladivostok 690022, Russia; email: vladpov@hotmail.com; vladpov@mail.ru

EU Large Scale Geochemical Facility

Applications are invited for access to the EU Geochemical Facility at Bristol University. The Geochemical Facility contains a large number of modern analytical instruments that allow the user to carry out investigations across the earth, environmental and material sciences: electron probe microanalyser; scanning electron microscopy; ICP-MS & ICP-AES; laser ablation ICP-MS; XRF; Fourier transform infra-red spectrometry; XRD; LECO carbon/sulphur analyser; thermal ionisation mass spectrometer; nuclear magnetic resonance spectrometer; Auger electron, secondary ion mass and X-ray photoelectron spectrometers. The Facility also contains the following experimental apparatus: piston-cylinder presses; cold-seal pressures vessels; 1 ATM gas mixing furnaces.

Visits are usually expected to last between 1 week and 1 month. Priority will be given to research teams who have not previously used the infrastructure and who do not normally have access to such facilities. Selection of projects will be on the basis of scientific merit taking into account the interests of the Community. The Facility will pay all travel, subsistence and laboratory expenses. This program is supported by the European Commission Access to Research Infrastructures action of the IHP Programme.

Applications

15th September 2001, 15th December 2001, 15th January 2002. Access is restricted to research teams from institutions in EU countries (except UK) plus Bulgaria, the Czech Republic, the Republic of Cyprus, Estonia, Hungary, Iceland, Israel, Latvia, Liechtenstein, Lithuania, Norway, Poland, Romania, Slovakia and Slovenia. Application forms can be downloaded from http: //eugf.gly.bris.ac.uk. For further information see http:// eugf.gly.bris.ac.uk or contact Dr. John A. Dalton, Scientific Co-ordinator EU Geochemical Facility, Department of Earth Sciences, University of Bristol, Wills Memorial Building, Bristol BS8 1RJ, UK; tel 44 (0)117 954 5247; fax: 44 (0)117 925 3385; email: john.dalton@bristol.ac.uk

Luminescence Dating & LED 2002

Jack Rink, Associate Editor

Since the advent of thermoluminescence dating of archaeological ceramic materials in the 1960s, great advances have taken place in the use of radiation exposure dating for archaeological and anthropological samples. Dating of the time of last light exposure of sediment grains has moved on from the thermoluminescence technique in the 1970s to that of optical luminescence dating in the 1980s and 1990s, which has led to great improvements in both the resolution and accuracy of luminescence dating. Known-age samples as young as 100 years have now been dated securely dated, extending the time range of the method to below that of the radiocarbon method, while the long-range limit is generally about 300 to 400 thousand years. Tooth enamel and carbonate materials are now routinely used to determine the burial age of their host sediments using the electron spin resonance technique, with a dating range of between about 10,000 and 300,000 years for carbonates (e.g. mollusk shell) and between about 10,000 to 2,000,000 years for tooth enamel. The great value of all of these techniques is that they can be used where volcanic materials are absent beyond the 40,000 year longrange limit of radiocarbon, and that they can be used to calibrate geomagnetic polarity timescale studies of sediments.

New developments in the application of electron spin resonance and luminescence dating in the field of archaeology will be a highlight of an upcoming conference that is open to all, and which is being held for the first time ever in North America. The Desert Research Institute invites you to the 10th International Conference on Luminescence and Electron Spin Resonance Dating (LED 2002), to be held at the University of Nevada-Reno, in Reno, 24-28 June, 2002. LED 2002 continues the series begun in 1978 in Oxford, and follows LED99 (Rome, 1999), and LED96 (Canberra, 1996).

LED 2002 will bring together experts from around the world in the field of trapped-electron dating (luminescence and electron spin resonance dating). The topics range from novel and original applications to the dating of heated and unheated Quaternary geological/ geomorphological and archeological materials, through fundamental studies of the basic physical phenomena and related dosimetry, to advances in equipment technology.

All interested persons can access information at the conference WEB site, http://www.dri.edu/DEES/LED2002/ led2002-home.html.

Fourth Int'l Radiocarbon Intercomparison

A brief report on the results from FIRI have been posted to the Radiocarbon web page (www.radiocarbon.org). The report summarizes the preliminary findings and consensus values for the samples. Please note these are preliminary findings and further analysis of the results is underway and will be reported in a special issue of the journal *Radiocarbon*. **Remote Sensing & GIS**

Apostolos Sarris, Associate Editor

Center for Archaeological Sciences & Technology (CAST), Institute of Archaeology, Chinese Academy of Social Sciences (C.A.S.S.) Research Activities

The Institute of Archaeology-Chinese Academy of Social Sciences (CASS) was set up in 1950. Its main task is to conduct archaeological study of the society and history of ancient China on the basis of field work, making full use of various material objects and combining ancient records with scientific and technological methods. Currently, there are six divisions within the Institute: *Research Section for Primitive Society, Research Section for Shang-Zhou Period, Research Section for Han-Tang Period, the Archaeological Press, the Center for Archaeological Material and Information* and *the Center for Archaeological Science & Technology (CAST).*



GEM-300 survey in Shangqiu project

The Center for Archaeological Sciences & Technology (CAST) was set up in 1995 based on the former Laboratory of Archaeological Technology. Currently, there are 22 staff members working at the Center including 4 persons with Ph.D., 4 with Masters and 5 with Bachelors. There still are one postdoctoral research fellow and three retired senior researchers working at the Center. The research activities of CAST include



GPR survey in the Shangqiu project

projects related to Zooarchaeology, Geoarchaeology, Environmental Archaeology, Paleo/Archaeobotany, Physical Anthropology, Radiocarbon-14 Dating, Preservation and Conservation Sciences, Structural and Elemental Analysis, Photography and Drawing Archaeological Remains/Artifacts, Geophysical Prospecting, Geographical Information Systems (GIS) and Remote Sensing (RS) studies with emphasis in the research, assessment, protection and management of archaeological sites and environment.

Technical Support

Equipment and computer facilities of C.A.S.T. include two units of ground penetrating radar (EKKO IV with 100 and 200MHz antennas & EKKO 1000 with 225, 450 and 900MHz antennas), an S-530 Scanning Electron Microscope, a PE 310 Atomic Absorption Spectrometer, CHNOS Elemental Analyzer and Radiocarbon-14 dating systems. The Centre also includes a number of digitizing boards, scanners, plotters and printers. Processing packages include MapInfo, CityStar-GIS, Surfer, SPSS, ArcView and others.

Current Research Activities and Projects

The Centre has been involved in a number of research projects all over China. The following are among the most important projects/activities of the Centre:

The Integration of Geophysical Survey in the Shangqiu Area, North China (1992-1999) that constituted part of the collaborative project "Archaeological Investigation of Early Shang Civilization in China" between Harvard University's Peabody Museum and the Institute of Archaeology, CASS. Magnetometry, multi-frequency electromagnetic induction measurements, multi-point electrical resistivity prospecting and ground-penetrating radar techniques, together with coring and satellite remote sensing resulted in the discovery of a fairly major buried Eastern Zhou (770-450 B.C.) city near the modern Shangqiu city, Henan Province. (communication: Libing Gao).



Soil sampling at the Midden sites in Jiaodong Peninsula, South-east China

The Use of GIS for Settlement Pattern Analysis in Shu River Valley, East China (1999-2001), which is based on the collaboration with the Institute of Geography of the Chinese Academy of Sciences, and jointly funded by the Youth Foundation of CASS and the National Natural Science Foundation of China (NSFC), exploits systemic survey, pollen analysis, geological study and GIS for dealing with the Paleoenvironment, the location of archaeological sites, management and spatial analysis of the archaeological data at Shu River valley, Shangdong Province, including settlement pattern analysis, prediction modeling, and the reconstruction of the ancient environment in virtual reality. (communication: Wuyun Qi and Libing Gao).

Resistivity Tomography and Its Application in Archaeological Survey (1997-1999). A cooperative project between CAST and Institute of Geophysics of the Chinese Academy of Sciences, funded by the National Natural Science Foundation of China (NSFC). During this project, several new algorithms for resistivity tomography were developed and have been successfully employed in the processing and interpretation of resistivity pseudosection from the Shangqiu project. (communication: Libing Gao).

Remote Sensing Survey of Ancient Gaochang and Beiting Cities in Xinjiang, West China (1995-1997). The project, funded by the State Key Lab for Information Engineering in Surveying, Mapping and Remote Sensing, of Wuhan Technological University of Surveying and Mapping, aimed towards the investigation of the wider region of Gaochang and Beiting cities through the analysis of aerial imagery (different periods) and coring techniques. (communication: Jianguo Liu)

Regional Archaeological Research in the Huanhe Drainage Basin, Central China (1997-1999). The campaign, in collaboration with the Archaeometry Lab of the University of Minnesota, focused on the evolution of landscape of the Huanhe drainage basin, in Shanxi Province and its impact on the archaeological sites of the region. More than 150 Neolithic and Bronze Age sites have been located in the region during the 1997, 1998 and earlier archaeological surveys. The project is based on the analysis of the 3-dimensional DEM and Landsat TM imagery. A similar study was also carried out in Yinxu site, Anyang (1997-1999), in an effort to identify palace foundation structures and tombs through processing of satellite imagery and coring techniques for verification. (communication: Jianguo Liu).

A joint research and technology programme between China and Greece, titled "Satellite Remote Sensing & Archaeological Research of Semi-Arid & Desertification Affected Regions" (2001-2003) has been initiated as a result of the continuing collaboration of the Centre for Archaeological Science and the Institute for Mediterranean Studies (F.O.R.T.H.). The aim of the research project is the investigation of the use of satellite remote sensing in archaeological prospection of semi-arid regions with desertification phenomena, which in turn have direct consequences in the conservation of ancient monuments. Two pilot regions have been chosen for the particular study, one in Greece (Lasithi district) and one in China (Xinjiang district). Dealing with a variety of archaeological sites (in terms of extent, building materials, conservation conditions, etc) and their environmental context, it is possible to examine the extraction of generalized conclusions regarding the mapping, detection and management of archaeological sites in these regions. (communication: Jianguo Liu & Libing Gao)

Summer 2001

page 7

Elemental Analysis of Bronze Artifacts from Yinxu Site, Anyang (1998-1999). Copper, Tin, Lead, Zinc, Iron, Nickel, Silver and Bismuth of over 220 bronze artifacts from Yinxu site have been analyzed with PE 310 Atomic Absorption Spectrometry, to be corellated with the cultural character (function, type, chronology) of the artifacts. The study resulted important information regarding the technology and provenance of the artifacts and it is expected to become the initiative for the construction of a data base related to the elemental analysis of bronze artifacts from China (communication: Dr. Chunyan Zhao). A similar project (The Study of the Corrosion Status of the Bronze Artifacts from Yinxu Site and the Treatment Methods for "Bronze Disease" (1997-1999)), funded by the Zhongliu Foundation and CASS, employed different analytical methods, such as X-ray analysis, AAS, Metalloscope, XRD and SEM for studying the type, degree and mechanism of corrosion of the bronze artifacts from the Yinxu site. Both mechanical and chemical methods were employed to take off the "bronze disease" of those bronze artifacts. BTA and B72 were used to make the rate of corrosion slowly. Storing environment was also considered in these treatment procedures. The achievements of this study could be adopted to treat bronzes from other sites. (communication: Ms. Yu Liu).



Preservation of human and horse bones

The Phytolith Analysis of the Agricultural Remains from the Yuchisi site, Anhui Province (1997-1998) was carried out by Associate Prof. Zenglin Wang, resulting in the discovery of millet and rice, originating from the late Neolithic site (46000 B.P.) of Yuchisi, which is located at the north of Huaihe River, Anhui province, where is generally attributed as the demarcation of northern and southern climate in China. Dr. Zhijun Zhao has been also active in phytolith studies, focusing on the origin of rice agriculture in southern China (a joined Sino-American archaeological project). He is also involved in the environmental reconstruction for the *Qixinhe* site, a group of settlements located in NE. China and dated to the Han-Wei period, the phytolith study for the Yangping site, a large Neolithic site of late Yangshao Culture located at *Henan Province*, and the study of plant macroremains for the *Liangchengzhen* site, a late Neolithic site of the Longshan Culture located at Shandong Province. His past work, especially from data collected from the *Poyang and Dongting lakes*, provided a vegetational and climatic history up to 14,000 BP around the coring area and contributed to the issues of plant domestication, the transition to early agriculture and the emergence of complex society. Similar research has been conducted by Dr. Jing Yuan (Qiba University, Japan), who has studied the relationship between humans and environment during the Neolithic, based on archaeological and environmental data from the midden sites (shell mounds) in *Jiaodong peninsula, south-east China* (1997-1999).

The State Committee of Science & Technology of China has funded a large-scale project dealing with the definition of the *chronology of Xia, Shang and Zhou dynasties* (ca. 21c-221 BC), in which a number of institutes have been involved in the archaeological, astronomical, radiocarbon dating and AMS methodological research modules of the project. CAST has participated in the radiocarbon-14 dating.

Prof. Kangxin Han and Associate Prof. Jun Zhang are currently involved in *Physical Anthropology* research, being responsible for the analysis of all the skeletal remains, which have been excavated by the Institute. Their research includes the investigation of metric and nonmetric traits of cranial variation and dental morphology for elucidating their sex, age and population affinity, paleodemography, diet analysis and disease analysis.

The Preservation/Conversation research group, consisting of Mr. Yingyi Wang, Haotian Wang and Cunxin Li, is responsible for the restoration and preservation of the archaeological artifacts/sites excavated by the Institute. They are involved in a co-operative program with Japanese, German and Italian institutes, focusing on the treatment of wood ware, bronze artifacts and the conversation of archaeological sites on-site.

The Research Work on Dendrochronology is carried out mainly by Ms. Chuzhi Wang, who in collaboration to Eurasien Abteilung, Deutsches Archaeologisches Institut aim toward the creation of a master chronological sequence of China for the calibration of radiocarbon time-scale, paleoclimate research, a.o.



Mr. Yingyi Wang is repairing bronze artifacts

Major Researchers of CAST

- Jing YUAN, Ph.D. (Qiba University, Japan), Research Associate and Director of the Center. Specialized in Zooarchaeology, Environmental archaeology
- Zhijun ZHAO, Ph.D., Research Associate. Specialized in Anthropology, paleoethnobotany
- Chunyan ZHAO (female), Ph.D. (Jilin University), Research Associate. Specialized in Inorganic Chemistry, Elemental analysis
- Wuyun QI (female), Ph.D. (Beijing University), Research Assistant. Specialized in Geoarchaeology, Environmental Evolution
- Jun Zhang (female), MA (the Graduate School of CASS), Research Associate. Specialized in Physical Anthropology
- Libing GAO, MS (China University of Geosciences), Research Assistant. Specialized in Applied Geophysics, GIS and Archaeological Computing
- Yu LIU (female), MA (Beijing University), Research Assistant. Specialized in Preservation/Conservation Sciences
- Shuzhi WANG (female), MA (Beijing Forestry University). Specialized in Forestry Genetics and Tree Breeding, Treering Chronology
- Zenglin WANG, Bachelor (Qinghua University), Research Associate. Specialized in Physical analysis, Phytolith Analysis
- Jianguo LIU, Bachelor (Wuhan Technical University of Surveying and Mapping), Research Assistant. Specialized in Survey & Mapping, RS and GIS
- Jinxia WANG (female), Bachelor (Beijing University Branch Campus). Specialized in Applied Chemistry, AMS
- Lei ZHANG (female), Bachelor (Central Institute of Fine Arts). Specialized in History of Fine Arts, Computer drawing of artifacts
- XueLian ZHANG (female) Post-doctor fellow (the Graduate School of CASS). Specialized in Radiocibation-14 dating, Conversation Sciences

Major Technicians of CAST

- Cunxin LI, YinYi WANG and Haotian WANG. Specialized in preservation and conversation of archaeological sites and artifacts with different material.
- Miao LI, Huijuan HAN (female), Fang LIU and Lei ZHANG (female). Specialized in Drawing of archaeological remains/ artifacts
- Yabing ZHANG . Specialized in photography of archaeological remains/artifacts
- Jian ZHONG, Guancheng Bo and Ziqiang XI. Specialized in Radiocarbon-14 dating system

Address

Center for Archaeological Sciences & Technology (CAST) Institute of Archaeology Chinese Academy of Social Sciences (C.A.S.S.) 27 Wangfujing Street, Beijing, 100710 China Tel: ++86-10-65275979, Fax: ++86-10-65135532

Email: Mr. Libing Gao: Gaolb@history.cass.net.cn; Mr. Jianguo Liu: liu.jg@history.cass.net.cn

Laboratory Profile

Archaeometry Laboratory University of Missouri Research Reactor

The Archaeometry Laboratory at the University of Missouri Research Reactor (MURR) in Columbia, Missouri provides archaeologists and other researchers with high quality elemental characterizations of archaeological materials. The 10-Megawatt reactor at MURR is the largest university-owned research reactor in the United States. Since 1988, the Archaeometry Lab has received continuous support from the National Science Foundation (NSF). This support permits academic-based researchers to submit archaeological samples for characterization by instrumental neutron activation analysis (INAA) at significantly reduced rates. Our NSF grant was recently renewed for another three years (through Feb 2005).

The main personnel in the Archaeometry Lab at MURR are Dr. Michael D. Glascock (Sr. Research Scientist and Group Leader), Dr. Hector Neff (Sr. Research Scientist), and Mr. Jeffrey Speakman (Research Specialist). Our current graduate students are Julie Farnum (Ph.D. candidate in Anthropology) and Rachel Popelka (Ph.D. candidate in Chemistry). Our current undergraduate student employees are Candace Sall, Kyra Lienhop, Andrea Kampanien, Nicole Little, Robert McNulty and Douglas Burgess.

At MURR we analyze about five thousand samples annually using INAA. To date, we have analyzed more than 50,000 samples (pottery, obsidian, chert, copper, turquoise, etc.) for about 200 researchers affiliated with more than 75 institutions in the United States and other countries. More than one-third of these projects are in direct support of graduate student research. Since 1988, more than 130 professional publications and 180 professional presentations have resulted from research conducted at the Archaeometry Lab. A total of 45 graduate dissertations and theses involving INAA of archaeological materials have been completed and another 50 are in progress.



Dr. Hector Neff analyzing Plumbate pottery samples using LA-ICP-MS

In addition, the number of provenance-based research projects from cultural resource management firms (non-NSF supported) has grown over the past five years.

We have characterized approximately 15,000 obsidian artifact and source samples and have identified the locations of more than 300 distinct obsidian sources in the western hemisphere. The size of our obsidian database provides us with a 99% success rate for sourcing artifacts in most regions. For obsidian artifacts from Mesoamerica and some other regions, we have developed an abbreviated procedure for INAA that permits classification of artifacts into sources using a single short irradiation instead of a full analysis. The abbreviated procedure means that less sample is required for analysis, the data is obtained much more quickly, and the cost is much less than a full elemental characterization.

Our ceramic database contains INAA data for nearly 30,000 raw material and ceramic samples. The majority of the ceramic samples result from research projects in Mesoamerica, the Southwestern and Midwestern U.S., and the Mediterranean. The size of the ceramics database is such that it is now possible in some regions to obtain useful archaeological information from analyses of a few samples to be compared to the database.

Although more challenging than obsidian or ceramics, we have characterized approximately 5000 chert source and artifact samples primarily from the Midwest, Great Plains, and Eastern U.S. In addition, we have analyzed several hundred copper and turquoise samples, steatite, basalts, and other archaeological materials.

While the MURR Archaeometry Lab is best recognized for INAA research, we recently acquired a VG Axiom high resolution magnetic sector inductively coupled plasma-mass spectrometry (ICP-MS) and Merchantek 213nm laser ablation system. MURR also purchased a Spectro X-Lab 2000 energy dispersive X-ray fluorescence (ED-XRF) spectrometer. Thus, researchers desiring characterization of materials at MURR have a variety of methods from which to choose. XRF can also be used initially to scan a material and help to decide the most appropriate technique between INAA and ICP-MS.

We believe our newest analytic method, ICP-MS, holds great promise for chemistry-based provenance research. In fact, it is quite possible that ICP-MS will eventually replace



Damage to a chert artifact resulting from LA-ICP-MS analysis. Note that the damage to the artifact is minimal and barely visible without magnification.

INAA as the preferred method for chemistry-based compositional analyses of archaeological materials as research reactors become less available. ICP-MS is a highly sensitive analytic method, which permits measurement of elements at the parts-per-billion and part-per-trillion level. Whereas INAA typically provides data for about 35 different elements, ICP-MS easily provides data for 50-60 elements. Some elements such as Pb, Nb, Y, Bi which cannot be measured by INAA but can be measured by LA-ICP-MS may prove important for separating materials into different compositional groups. And for many elements ICP-MS and ED-XRF have lower detection limits than INAA (e.g., Sr, Ba, Zr).

We offer two types of ICP-MS analyses at MURR; microwave digestion (MD-ICP-MS) which provides a bulk analysis of the sample and laser ablation (LA-ICP-MS) which provides point-specific analyses. Sample material is introduced into the ICP-MS via an argon gas plasma torch that atomizes and ionizes the sample. The resulting ions are then accelerated by a high voltage and passed through a series of focus lenses before they are passed through an electrostatic analyzer and finally a magnet. By varying the strength of the magnet, ions of different masses are separated and passed through a slit into the detector.

MD-ICP-MS is used for liquid introduction of the sample. For this method, approximately 100 mg of powdered sample is sealed in a closed digestion vessel containing a mixture of acid, and microwaved for a short period of time. The resulting combination of heat and pressure permit the acids to effectively dissolve the sample much more efficiently than open-container hot plate digestion methods. MD-ICP-MS provides greater sensitivity and precision than many other analytic methods.

In LA-ICP-MS a laser is used to ablate a small area on the surface of a sample. The laser can be targeted on spots as small as 5 microns (up to 400 microns). The area ablated is usually smaller than 1000 X 1000 microns (1 mm²) and less than 30 microns deep. The small spot size and the very high sensitivity of magnetic sector ICP-MS to a wide range of elements makes LA-ICP-MS a very powerful microprobe. The major advantages of LA-ICP-MS is that a relatively small sample can be analyzed, sample preparation is minimal, and the analysis is reasonably quick. Since a small diameter laser is being used in the analysis (>200 microns), damage to artifacts is minor and barely visible without magnification (see figure at left). On larger artifacts, only a small sample needs to be removed from the artifact for analysis.

We have used LA-ICP-MS to characterize a variety of archaeological materials during the last year. Some of these projects include characterization of paints on pottery from the Mesa Verde region, Mexico, and Turkey; analysis of glazes on Mesoamerican Plumbate pottery and historic Euroamerican pottery; characterization of glass beads, Midwestern cherts, North American and Mesoamerican obsidian sources, and turquoise; and determination of inclusions in pottery. To a lesser extent, we have utilized ED-XRF to characterize North American and Mesoamerican obsidian sources, and glass beads. The figure on page 10 presents data obtained using INAA, LA-ICP-MS, and INAA for three Jemez Mountain obsidian sources. Each group determined by each method is



Comparison of samples from three Jemez Mountain, NM obsidian sources using INAA, XRF, and LA-ICP-MS.

compositionally distinct. While the INAA data best characterize the source groups, we are optimistic that in time we will develop better methods that will optimize LA-ICP-MS and ED-XRF analysis.

While we will still continue to offer INAA as our primary method for characterization, we encourage researchers to take advantage of our newest analytic methods. The Archaeometry Laboratory welcomes the submission of collaborative research and CRM projects in which elemental characterizations would be beneficial to the project. Support for academic-based projects is available and interested researchers should contact the lab for full information regarding submission of projects. MURR website: www.missouri.edu/~glascock/archlab.htm



Archaeological Ceramics Charles C. Kolb, Associate Editor

The column in this issue of the *SAS Bulletin* includes six topics: 1) Internet publications; 2) videotapes; 3) research projects; 4) professional meetings held; 5) forthcoming professional

meetings; and 6) Internet sites (ceramics and preservation/ ceramics care). New books, journal articles, and book chapters on ceramics will appear in the next issue.

Internet Publications

Internet Archaeology (ISSN 1363-5387) edited by Judith Winters (Department of Archaeology, University of York, York YO1 7EP, UK, e-mail editor@intarch.ac.uk), has been published by the Council for British Archaeology since the autumn of 1996. To date, nine issues have been posted on the website at http://intarch.ac.uk Among these are several issues that have articles which are of interest to the readers of this column. These include two from the initial posting: Internet Archaeology, Issue One (Autumn 1996): Alan Peacy "The Development of the Tobacco Pipe Kiln in the British Isles" and Paul Tyers "Roman Amphoras in Britain"; Issue Three

(Autumn 1997): Stephane Pradines "Ceramique en pays serees et tumulus senegambians"; and Issue Four (Spring/Summer 1998): Phil Perkins "Etrucan Pottery from the Albegna Valley/ Ager Cosanus Survey."

A substantial portion of Internet Archaeology Issue Nine (Autumn/Winter 2000) is devoted to the "Near Eastern Petrology Special Section," which includes eight papers: 1) Louise Joyner "Editorial: Production and Distribution of Pottery in the Eastern Mediterranean: Applications of Ceramic Petrography"; 2) T. Affonso and E. Pernicka "Pre-Pottery Neolithic Clay Figurines from Nevali Cori"; 3) Y. Goren "Petrographic Characteristics of Several Key Southern Levantine Ceramic Materials"; and 4) L.M.V. Smith, J.D. Bourriau, and M. Serpico "The Provenance of Late Bronze Age Transport Amphorae found in Egypt." The other contributions are: 5) Carl Knappett "The Provenance of Red Lustrous Wheel-made Ware: Cyprus, Syria, or Anatolia?"; 6) A.P. Middleton, P. Magrill, and S. Humphrey "A Late Bronze Age Potter's Workshop at Lachish, Israel"; 7) L. Joyner and K.D. Politis "Catering for Pilgrims: Petrographic Analysis of Late Antique Kitchenware from the Monastery of St Lot at Deir 'Ain 'Abata, Jordan"; and 8) R. Mason and J. Gonnella "The Petrology of Syrian Stonepaste Ceramics: The View from Aleppo." The illustrations and color thin sections are excellent and overall the papers provide unique contributions to ceramic studies.

Internet Archaeology Issue Nine also contains "Excavations on a Roman Extra-Mural Site at Brough-on-Humber, East Riding of Yorkshire, UK" by Kurt Hunter-Mann, Margaret J. Darling, H.M. Cool, et al. (a total of 19 authors). This excavation report of Roman settlement (not a military camp) and field system is significant because of substantial quantities of animal bones and its pottery assemblage. The presence of wasters in the large ceramics assemblage indicates the presence of a previously unknown pottery industry based in the immediate vicinity. The ceramics show strong affinities to wares from Continental Europe, particularly the southern part of the Upper Rhine Valley, and may indicate the presence of immigrant potters. The report also includes a pottery dataset and catalog of small finds. The report is accessible at http:// intarch.ac.uk/journal/issue9/brough_index.html

Videotapes

"Women Potters of Cyprus" is a 26-minute ceramic ethnoarchaeological study of traditional craft specialist who coil-build utilitarian vessels on a slow moving turntable, using techniques reminiscent of ancient potters. The tape, made by Gloria London (University of Washington), is based on seven months of field work in 1986 and a follow up study in 1999-2000. It features women potters from the settlement of Koronos and three Troodos Mountain villages on the island of Cyprus who fabricate cooking pots, jugs, jars, ovens, and other clay containers; use incised decorations; and fire their work in woodburning kilns. Quantitative data is presented on the numbers of vessels fired together and the loss rate. This video is available in PAL (European) or NSTC (US) video formats for \$24.00 each plus \$3.00 for shipping and handling, from Tetraktys Film Productions Ltd., 95 Kyrenia Avenue, Aglanjia 2113, Nicosia, Cyprus; FAX +357 3 339 286, e-mail tetraktys@cytanet.com.cy or from the Moufflon Bookshop, e-mail moufflon@ spidernet.com.cy

The "Potters of the World Film Series: Films and Videotapes by Ron du Bois" (emeritus professor of art at Oklahoma State University) presently has four items available in VHS format: "Program I: Yoruba Potters: Mothers and Daughters" (videotaped in 1987, 30 min., rental \$40.00, purchase \$350.00), "Program II: The Working Processes of the Potters of India: Massive Terra-Cotta Horse Construction" (recorded in 1979-1980, 19 min., rental \$30.00, purchase \$250.00), "Program III: The Working Processes of the Potters of India: Bindapur - A colony of 700 Potters" (made in 1979-1980, 30 min., rental \$37.00, purchase \$350.00), and Program IV: The Working Processes of the Korean Folk Potter" (filmed in 1973-1974, 28 min., rental \$37.00, purchase \$350.00). Handling and postal charges are additional. Further information about these four programs (some are available as 16 mm color films) and special offers are listed on the Internet at http://www.angelfire.com/ ok2/dubois/ Ron du Bois may also be contacted by mail at 612 S. Kings Street, Stillwater, OK 74074; telephone 405/377-2425, e-mail duboisr_osu@osu.net

Research Projects

Yuval Goren, Israel Finkelstein, and Nadav Na'aman (Department of Archaeology and Ancient Near Eastern Cultures, Tel-Aviv University) are conducting a major project entitled "Mineralogical and Chemical Study of the Amarna Tablets." Goren is an archaeologist, Finkelstein a field archaeologist and geographer, and Na'aman an expert in epigraphy, philology, and geographical history. The historical background, the research objectives, methods of examination, and preliminary results are posted on an informative web site, http://www.tau.ac.il/~archpubs/projects/amarna.html The Amarna archives of 380 clay tablets written, in the main, in Akkadian cuneiform, discovered initially in 1887 at Tell el Amarna, Egypt, date to the reign of Amenophis IV (Akhenaten), ca 1375-1325 BCE. Provenance studies of 220 tablets from the Vorderasiatisches Museum (Berlin), British Museum (London), and Ashmolean Museum (Oxford) are reported and help elucidate Egyptian-Levantine connections. Full research results are to be published in the Monograph Series in Archaeology of the Tel-Aviv University.

Jim Graves, Librarian of the International Brick Collectors Association (IBCA), has been compiling "Brick Brands of the United States" and "Brick Manufacturers of the United States." Brickmaking data entries begin in 1856 and run to over 500 pages, while the brick brand list is about 200 pages. This research is not conventionally available in print or electronic versions but Jim graciously provides information to interested colleagues and is always looking to expand his database with additional new entries. Jim lives in Wichita Kansas and is best reached via e-mail at jgraves@dtc.net The IBCA's "Brick Collectors Homepage" may be found at http:// www.zoomnet.net/~stevenb/index.html

The association was started by a small group of collectors in 1983 and has about 500 active members. Annual membership is \$15.00, payable to the ICBA Treasurer. The current President is Steve Blankenbeker, stevenb@zoomnet.net, and the Treasurer is Ken Jones (100 Manor Drive, Columbia, MO 65203).

Since September 2000, Neal L. Trubowitz has been the Hrdy Visiting Research Curator in North American Archaeology at the Peabody Museum of Archaeology and Ethnology at Harvard University. His research project, "Smoking Pipes: An Archaeological Measure of Native American Cultural Stability and Survival in Eastern North America, A. D. 1500 to 1850," will expand upon prior work he did on the Great Lakes-Riverine Region. That research showed that the retention of traditional smoking pipes during the eighteenth century reflected the stability or survival of Native American cultural traditions while they adopted analogous European trade goods in substitution for other Native technology. He is studying both Native American and European sites with pipes in the Peabody collections and pertinent collections at other institutions. After September 1, 2000 he will be at the Peabody Museum in Cambridge, and may be reached at 51 Argilla Road, Andover, MA 01810-4725, telephone 978/749-9774 or by e-mail at rosenwitz@juno.com (e-mail without attachments).

Professional Meetings Held

$50^{th} ICA$

The 50th International Congress of Americanists (ICA) was held in Warsaw, Poland, 10-14 July 2000. Tom Myers (University of Nebraska State Museum) reports that there were very few papers on ceramics presented at the meeting. "Artifacts and Society in Amazonia/Artefactos y sociedad en la Amazonia" was a session with 15 papers organized by Myers and Maria Susana Cipolletti (Universitat Bonn). Myers's paper, the only one presented in the session, is entitled "The Florescence of Conibo/Shipibo Art during the Rubber Boom" and concerned ethnographic pottery produced ca. 1880-1910. One other paper on pottery was scheduled for this session. Tom has posted the session abstracts on the University of Nebraska at Lincoln website http://www-museum.unl.edu/ research/anthropology.ica.html

Thai Art and Ceramics

"The Glorious Arts of Thailand" was the title of a Smithsonian Institution Associates' program held on 21 October 2000 in Washington, DC. Papers were presented by Robert Brown on "Early Hindu Art" and Sarah Bekker on "Buddhist Art in Thailand," plus a presentation by Roxanna Brown (Art History, UCLA) entitled "Sawakhalok and Sukhothai Ceramics "and by Leedom Lefferts (Anthropology, Drew University) on "Thai Art: A View from the Village." Roxanna Brown considered Thai, Vietnamese, and Chinese ceramics recovered from shipwecks dating 1300-1600 CE, emphasizing the Gulf of Thailand — the Hoi An hoard, the Hatcher junk, and Turiang shipwreck, as well as several land sites in the Thai-Burma border area which produced Burmese wares. Lefferts emphasized the anthropological perspective in considering contemporary village arts and crafts including textiles, tie-dying, basketry, and pottery in relation to village social structure and ceremonial activities.

"Voyage to the Black Sea" was a Smithsonian Institution Associates program held 3-4 November in Washington, DC which featured five papers. The keynote paper by Fredrik Hiebert (University of Pennsylvania) was entitled "The Black Sea: A Lively Maritime Crossroads for Ancient Peoples and Places," in which he considered trade amphora produced at Sinop located on the central Turkish coast of the Black Sea. Specimens have been found on at least four shipwrecks in 95 m of water during deep water side-scan surveys undertaken by Bob Ballard (Woods Hole Oceanographic Institute) and David Mindell (MIT) with National Geographic financial support. These distinctive "carrot shaped" amphora were used for shipping olives and olive oil. Ceramics from Hellenistic, Roman, Byzantine, and Ottoman stratigraphic levels at the Sinop Citadel were also considered. Owen Doonan (University of Pennsylvania) gave a paper "Sinop and the Cities of the Anatolian Turkish Coast" in which he also considered amphora production, olive cultivation, kilns, ceramic tuyeres used in smelting copper and gold (2300 BCE), and ceramic relationships with the Crimea. A ceramic manufactory — "industrial site" - measuring 1.5 x 1.0 km excavated previously by French archaeologists was noted. Douglas Edwards' paper "Chernomesus and the Cities of the North Coast" emphasized commerce for north shore wine and wheat in exchange for southern olives and olive oil.

Hauge Ceramics

"Speaking of Ceramics: An Afternoon of Lectures in Conjunction with the Exhibition, Asian Traditions in Clay: The Hauge Gifts" was the title of a colloquium held at the Freer Gallery of Art in Washington, DC on 4 November 2000 to commemorate the recent gifts of ancient Iranian, Islamic Near Eastern, and Southeast Asian Khmer ceramics to the Arthur M. Sackler Gallery. These ceramics, given by Osborne and Gratia Hauge and Victor and Takako Hauge, are documented in a book and titled Asian Traditions in Clay: The Hauge Gifts co-authored by curators Louise Cort, Ann Gunter, and Massumeh Garhad (Washington, DC: Smithsonian Institution, Freer Gallery of Art and Arthur M. Sackler Gallery, 2000, Catalog number 00-044758, no ISBN). The first of four lectures was presented by St John Simpson (Assistant Keeper, Department of the Ancient Near East, The British Museum) and entitled "Ceramic Traditions in Ancient Iran: Observations on Technology, Style, Form, and Function." Simpson, a contributor to the volume Pottery in the Making (1997), considered Early Iron Age pottery and its relationships to metallurgy from 1400 BCE though the Median and Achaemenid periods (Iron III and IV). Simpson examined ecozone differences in Iran (a range of desert and steppe to tropical coastline) and overlapping regional traditions (northwest, north, central, and southwest). He identified a series of themes: the evolution of vessel form in different media (metal and pottery), the regional traditions, technical constraints of the raw materials (clays, slips, and glazes), and the importance of radiographic and replication analyses in documenting the methods of vessel construction.

Helen Philon (Independent Scholar), the author of Early Islamic Ceramics: Ninth to Late Twelfth Centuries (1980) and the editor of Art and Archaeology Research Papers, was scheduled to give a paper entitled "Fourteenth-century Syrian Blue-and-White: A Reconsideration" but presented instead "Research on the Bidarian Ceramics from India" in which she discussed underglazed decorated tiles recovered from excavations in the palace, fortress, town, and necropolis of Bidar, in the Deccan, dating 1424-1426. She postulated the existence of a royal workshop staffed by Iranian artisans working in the Timurid style. Sugiyama Hiroshi (Nara National Cultural Properties Research Institute, Nara, Japan) presented "Uncovering Khmer Ceramic Production: Excavation of the Tani Kiln Site" in which he discussed the production of 9th to 15th century Khmer ceramics, emphasizing the green and brown glaze traditions. He also considered the Kulen kiln site located northeast of Angkor and the Burian kiln site in northeast Thailand and reported that 38 kiln sites in eight areas are now known and recorded. In the area of Tani, 20 km northeast of Angkor Wat, six kilns were recorded in Group A and seven others in Group B. The results of excavations at Tani kiln site A6, a climbing tunnel kiln, were also presented. Large quantities of stoneware (bowls, jars, and wide-rimmed vessels), roof tiles (including eave tiles and roof ridge decorations), and some green glazed ware (cylindrical and round covered vessels) were made during the 10th century. Significantly, brown glazed ceramics were not produced there. Rita Wright (New York University) was the discussant. She presented an excellent overview of the Iranian, Islamic, and Khmer ceramic traditions using examples from the Hauge exhibition and she commented extensively on the three papers. Wright emphasized ceramics in their social and economic contexts, pottery producers and consumers, production types and locations (independent household producers and those attached to royal courts, etc), shared traditions, mental templates, and revived interests in pyrotechnology, especially the relationships of ceramics and metallurgy.

AAA 2000

The American Anthropological Association's 99th annual meeting was held in San Francisco from 15-19 November 2000. There were 5,379 persons registered for this meeting and 2,850 papers were presented of which only 13 were on ceramics or pottery. The majority of these papers were given in Ceramic Ecology XIV: Current Research on Ceramics 2000, coorganized by Charles C. Kolb (National Endowment for the Humanities) and Louana M. Lackey (Maryland Institute, College of Art), and chaired by Kolb, which was held on Friday afternoon, 17 November. Papers were given by Kolb, "Introduction to Ceramic Ecology XIV: Ceramics at the New Millennium"; Sandra L. Lopez Varela (Universidad Autonoma del Estado de Morelos) "Material Evidence of Ceramic Production in the Ethnographic Record of a Pottery Community in Cuentepec, Morelos"; James J. Sheehy (Pennsylvania State University) "Quantifying Teotihuacan Ceramics"; Elin C. Danien (University of Pennsylvania Museum of Archaeology) "Pots, Politics, and Propaganda at Chama" [Maya

polychromes]; and Judy Voelker (State University of New York at Buffalo) "Ceramic Production in Prehistoric Thailand with Emphasis on Phimai Black Pottery." Other presentations were by Christophe Descantes (Saint Mary's University, Halifax, Nova Scotia) "The Loss of Ceramic Technology: A Yapese Example"; Michael O. Sugerman (Harvard University) "Pots, Ports, and Power: Trade and Transport in the Late Bronze Age East Mediterranean"; Effie Athanassopoulos (University of Nebraska at Lincoln) and Ian Whitbread (British School of Archaeology, Athens) "Pottery Production, Agriculture, and Trade: The Amphora Workshop at Tsoukalia, Greece, 4th Century BCE"; Kostalena Michelaki (University of Michigan) "Craft Production in Tribal Societies: A Ceramic Case from Bronze Age Hungary"; Linda Ellis (San Francisco State University) "Demographic Transformations and Ceramic Ecology on the Periphery of the Roman Empire in the Balkans"; and Louana M. Lackey (Maryland Institute, College of Art) "More to Come: Recent Research in Ceramic Studies." Miriam T. Stark (University of Hawai'i) served as the discussant. A presentation by Robert K. Harding and Colin Shell (both, University of Cambridge, Cambridge, UK) entitled "New Research on the Manufacture of NBP" [Northern Black Polished ware from the Indian Subcontinent], was withdrawn.

Two other ceramics-related papers were given. Myriam Huet (Tulane University) authored "Earth, Wheel, and Fire: Making and 'Re-making' Sense of Folk and Fine Art Potters' Worlds through an Alice Walker Short Story" [Walker's "Everyday Use" (1973)], while Lynn Rainville (University of Michigan) presented "Northern Mesopotamian Households in Early Bronze Age (ca 3300 to 2300 BCE) Communities: An Approach Using Micro Debris Analysis" which emphasized analyses at the sites of Tiris Hoyuk and Kazane Hoyuk in southeastern Turkey.

Simposia Arqueometrica 2000

El Colegio de Michoacan, A.C. and Instituto de Investigaciones Nucleares in Mexico organized "Simposio Arqueometrica: Proyectos y Technicas de Investigacion Arqueologica" which was held at the Colegio de Michoacan, Zamora, Michoacan, Mexico, 16-17 November 2000. Among the 16 papers on archaeometric projects and archaeological investigations were: "Estudio de difraccion de Rayos X en ceramicas" (Agapi Filini, Jose Luis Ruvalcaba, and Laura Bucio); "Estudios de ceramicas coloniales con tecnicas nucleares" (Fabiola Monroy); "Estudios PIXE y de difraccion de Rayos X en ceramicas autoctonas y de comercio de la Cuenca de Cuitzeo" (Laura Bucio, Agapi Filini, and Jose Luis Ruvalcaba); and "Estudios de ceramica por espectroscopia Mossbauer" (Agustin Cabral). Further information was posted on the Humanities Mexico website at Universidad Nacional Autonoma de Mexico, h-mexico@servidor.unam.mx Listed as contacts are Rodrigo Esparza rodriesparza@hotmail.com, Dolores Tenorio dtc@nuclear,inin.mx, and Efrain Cardenas cardenas_e@yahoo.com

AIA 2001

The Archaeological Institute of America's 102nd annual

meeting was held 3-6 January 2001 in San Diego at the Marriott Hotel and Marina. Among the 257 presentations (oral papers and posters) there were 19 concerning ceramics. Andrea M. Berlin (University of Minnesota) was the organizer of a colloquium entitled "Pottery 2001" in which six 6 thematic papers were presented. The authors and their contributions: Carla M. Antonaccio (Wesleyan University) "Pottery as Cultural Artifact: Greeks and Natives in Interior Sicily, 700-450 B.C."; Kathleen M. Lynch (Washington University in St. Louis) "Pottery as Social Artifact: Evidence for increased Sympotic Activity in Late Archaic Athens"; Andrea M. Berlin (University of Minnesota) "Pottery as Ritual Artifact: A Late Classical Deposit from Troy"; Susan I. Rotroff (Washington University at St. Louis) "Pottery as Historical Artifact: Hellenistic Athens"; Mark L. Lawall (University of Manitoba) "Pottery as Economic Artifact: Amphoras from Hellenistic Ephesos"; and J. Theodore Pena (University of Buffalo, SUNY) "Pottery as Political Artifact : Transport Amphoras and Late Imperial Rome."

The other presentations were given by: Alexander A. Bauer (University of Pennsylvania) "The Prehistoric Pottery of Sinop Province, Turkey: Observations on Pre-Greek Interaction in the Black Sea"; Brice Erickson (University of Texas at Austin) "A New Ceramic Deposit from Aphrati: Continuity, Trade, and Cult in Classical Crete"; Kevin T. Glowacki (Indiana University) "Terracotta Figurines from the North Slope of the Acropolis of Athens, 1931-1939"; Donald C. Haggis (University of North Carolina at Chapel Hill) "Random Distinction: Spatter Ware and Elite Pottery Consumption in Middle Minoan Eastern Crete"; Eleni Hasaki (American School of Classical Studies at Athens, University of Cincinnati) "Rectangular Ceramic Kilns in Greece" Issues of Technology and Production"; Stacy C. Jordan (R. Christopher Goodwin & Associates, Inc.) "The Development of Colonial Culture at the Cape of Good Hope: Examining the Many 'Functions' of Utilitarian Ceramics"; and Martin Kilmer and Pierre Derochers (Universite d'Ottawa) "Inscriptions on Attic Archaic Pottery: Analytical Techniques" [poster]. The additional papers or posters were by: Carl Knappert (Christ's College, University of Cambridge) "The Pottery from Quartier Mu, Malia: Insights into Minoan Craft, Trade, and Ritual"; Mary F. Owenby (University of Arizona), Charlotte L. Owenby (Oklahoma State University), and Elizabeth J. Miksa (Center for Desert Archaeology, Tucson) "Using Scanning Electron Microscopy to Look at Schist as a Temper: An Experimental Exercise" [poster]; Nicholas K. Rauh (Purdue University), Kathleen Slane (University of Missouri at Columbia), Elizabeth Lyding-Will (University of Massachusetts at Amherst), and Richard Rathaus (St. Cloud State University) "Amphora Production in Western Rough Cilicia"; Patrick M. Thomas (University of Evansville) "Mycenaean Pottery from Panakton, Greece" [poster]; Ioulia Tzonou-Herbst (University of Cincinnati) "Mycenaean Terracotta Figurines: Systems of Activities, Systems of Settings"; and Mariah F. Wade (Institute of Classical Archaeology, University of Texas at Austin) "Human and Chemical Fingerprints: Potters and Pots from Pantanello, Southern Italy."

Australasian Archaeometry 2001

The Australasian Archaeometry Conference 2001: Australasian Connections and New Directions, held every four years, had as its theme "Issues and Developments in Australasian Chronology: New Directions for the New Millennium." Seven sessions were held 5-9 February 2001 at the University of Auckland, Auckland, New Zealand, among these were "Sourcing/Characterization" organized by Marshal Ewisler (Anthropology, University of Auckland) and "Residue/ Useware" convened by Peter Sheppard (Anthropology, University of Auckland). Conference proceedings are to be published in an edited monograph, Research Papers in Anthropology and Linguistics (ISBN 0-9583686-0-0). Information is posted on the website http:// www.car.auckland.ac.nz/car/archconf/archaeometry.html or may be obtained from Dr. Peter Sheppard, Department of Anthropology, University of Auckland, Private Bag 92019, Auckland, New Zealand; telephone 64-9-373-7599, ext. 8572, http://arts.auckland.ac.nz/ant/

Freer Gallery

On 13 February 2001, Louise Allison Cort (Curator for Ceramics, Freer Gallery of Art, Washington, DC) presented a gallery discussion-tour of the exhibition "Storage Jars of Asia," which was on display in Gallery 19 at the Freer from 29 October 2000 through 10 March 2001. She discussed stoneware storage jar vessel production in East Asia with emphasis on China, Japan, Thailand, and Burma. Among the topics considered were the folk tradition of producing these vessels for domestic use and long-distance transport, the reuse of vessels, many of which acquired heirloom status and became visible proof of family wealth. Louise also pointed out that when insufficient numbers of jars were available to pack and ship tea from tea plantations, local non-glazed stoneware products were pressed into service. In addition, she discussed concepts of "beauty" in ceramic vessels (hidden versus subtle beauty); regional variations in style; the use of local raw materials and kilns; and contemporary pottery production in Thailand. Among the two dozen vessels on display were Sue Ware Japanese stoneware (550-600 CE), Yuan and Ming dynasty Chinese vessels (1300-1500), and Burmese stoneware jars (1500-1600).

8a Giornata "Le Scienze della Terra e l'Archeometria"

Archaeometry and Classical Archaeology was the theme of the Eighth Annual Science and Archaeometry conference organized by Claudio D'Amico (Bologna) and held at Roma Museo dell'Arte Classica, Sala dell'Emiciclo, Facolta di Lettere dell'Universita 'La Sapienza,' 22-24 February 2001. A list of the 44 oral presentations and the 36 poster papers given appear on the Internet at http://www.geomin.unibo.it/ORGV/aiar/ avvisi/8agriornc2.htm There were ten papers (nine in Italian) given in Sessione Ceramiche, chaired by Professors Mannoni and Picon. Nearly all of these presentations concerned chemical or archaeometric ceramic characterization. The paper in English, "The Choice of Methods for the Determination of Origin: The example of Roman Wine Amphora," was presented by Gisela Thierrin-Michael. One poster (in Italian) by Giulio Palumbi concerned archaeometric problems in ceramic analysis of materials from Transcaucasia to Georgia.

SOMA 2001

The Symposium on Mediterranean Archaeology: Fifth Annual Meeting of Post-Graduate Researchers was held 23-25 February 2001 at the University of Liverpool. The program and abstracts of 53 papers and 6 poster presentations are posted on the website http://www.pcweb.liv.ac/uk/soma2001/ There were six papers on ceramic topics: "The Anatomical Votive Terracotta Phenomenon: The Corinthian Connection." (Alexandra L. Lesk Blomerus); "Ceramics and Social change in Mid-Second Millennium Cyprus" (Lindy Crewe); "White Slip I and the Dating of the 'Minoan' Eruption of Thera (Santorini)" (Stuart Dunn); "Minoan Cooking Pots from Miletus" (Ivone Kaiser); "The Potters' Quarter at Late Minoan IIIB Gouves, Crete: A Preliminary Petrological and Technological Assessment" (Paraskevi Stamataki); and "Byzantine Kitchen Ware in Syria: Preliminary Results of a Technological Study" (Agnes Volaer).

Society for California Archaeology 2001

The symposium "Material Culture and Site Interpretation in California Historical Archaeology," chaired by Amy Ramsay, Stephen Silliman, and Barb Voss (University of California at Berkeley) was held at the Society for California Archaeology 2001 Annual Meeting on 24 March. Among the presentations were four related to ceramics. Rita Hirata (University of California at Berkeley) presented "Spanish-Colonial Unglazed Earthenwares from an Artist's Perspective." "Chemical Characterization of Earthenwares on the Alta California Frontier" was co-authored by Russell K. Skowronek (Santa Clara University), Ronald L. Bishop (Smithsonian Center for Materials Research and Education), James Blackman (Smithsonian Center for Materials Research and Education), Sarah Ginn (Colorado State University), and Manuel Garca Heras (Smithsonian Center for Materials Research and Education. A second paper by Ronald V. May (Legacy 106, Inc.) was entitled "Mexican Majolica Stylistic Tradition Change between 1790 and 1830: Harbinger of Culture Change on the California Frontier." Barb Voss (University of California, Berkeley) presented "Thinking about Galera: The Interpretive Potential of Spanish-Colonial Lead-glazed Earthenwares." The abstracts of these and other papers may be found at http:// www.scanet.org/2001-material-sym.html

Linceo Archaeometry in Europe

Convegno Archeometria Centro Linceo, "Archaeometry in Europe in the Third Millennium" was a conference held 29-30 March 2001 at Accademia Nazionale dei Lincei, Centro Linceo Interdisciplinare "Benjamino Segre" in collaboration with Universita degli Studi de Roma "La Sapienza," Dipartimento de Energetica. Invited lectures were presented by Michael S. Tite (Research Laboratory for Archaeology and the History of Art, University of Oxford), Marius Vendrell (Crystallography and Mineralogy, University of Barcelona), Yannis Maniatis (Laboratory of Archaeometry, National Centre for Scientific

page 15

Research "Demokritos"), Gunther Wagner (Max Planck Institute, Heidelberg), and Henk Kars (Archaeological Institute, Amsterdam). A round table, "Progress in Scientific Methods for Solving Problems in Research Concerning the Cultural Heritage" was also held. The program is posted on the Linceo website http://www,lincei.it/CONVEGNI.2001/ PROGRAMMI/ARCHAEOMETRIA/PRG.

MAAC 2001

Forty-seven papers were presented at the annual Middle Atlantic Archaeological Conference held in Ocean City, Maryland, 23-25 March 2001. Among these was one paper related to ceramics, "Observations on Early Woodland Ceramics and Points from Deep Excavations in the Virginia Potomac River Floodplain between Goose Creek and Selden Island," presented by Charles Goode and William M. Gardner.

RAC 2001

The Roman Archaeology Conference, RAC 2001, was held at Glasgow, Scotland, 29 March-1 April 2001. One conference theme was "Rome Beyond the Imperial Frontiers," an assessment since Sir Mortimer Wheeler's evaluation published in a book with the same title in 1954. Among the seven major sessions were five with ceramic content: "Rome Beyond the Imperial Frontiers" (five papers), "Roman Dacia" (six), "The Roman Province of Dalmatia" (nine), "Cultural Hegemony and Local Identities under the Expanding Roman Republic" (five), and "Ports of the Roman World" (eight), and "The Perceptions and Presentation of Space in the Roman World" (five). Much of the relative chronology and the distribution of Roman culture depended upon pottery analyses and numismatics. The organizers of a number of sessions intend to publish the papers in various venues - British Archaeological Reports or the supplementary series of the Journal of Roman Archaeology. The abstracts of the sessions and the individual paper titles and their authors are listed on the conference website http://www2.arts.gla.ac.uk/RAC2001/ Abstracts/Abstracts.htm

Society for Pennsylvania Archaeology

One of the 33 papers presented at the 71st annual meeting of the Society for Pennsylvania Archaeology in Bartonsville, PA, 4-6 May 2001, related specifically to pottery: William C. Johnson (Michael Baker Jr., Inc.) "Cordage Twist Direction and Ethnicity in the Potomac River Basin: The Luray Complex Conundrum." The meeting theme was "2001: A Spatial Odyssey." Additional information is available at http:// www.siftings.com/spapremt.html

Medieval Pottery Research Group

The MPRG's Annual Conference 2001 was held 11-13 May 2001 at Edinburgh City Arts Centre and had as its focus "Scottish Medieval Ceramic Studies." Ten papers were presented on various topics including Scottish Redwares (separate presentations by George Haggerty and Simon Chenery) and on the Scottish White Gritty Project (papers by Haggerty, Chenery, Bob Will, and Richard Jones). Introductory presentations were made by Olwyn Owen, "Historic Scotland and the Study of Scottish Medieval Ceramics?," while "Scottish Fabrics and Production Centres" was read by Derek Hall. Alan Vince and Lynn Blackmore presented "Shell-tempered Wares in Scotland," while Ewan Campbell considered "Medieval Hebridean Pottery, Current Research." English and Continental ceramic experts viewed recently excavated ceramics from Scottish sites, and a round table discussion concluded the second day of the conference. Additional information is on the Internet at http://www.pmiles.demon.ac.uk/mprg/conf2001.htm

First International Conference on Soils and Archaeology

The conference organized by the Szent István University Gödöllo, was held at Hotel Oktan, Százhalombatta, Hungary (30 kms south of Budapest), 30 May-3 June, 2001. The objectives were to provide opportunity for soil scientists and archaeologists to meet and discuss the common problems and to organize the first worldwide meeting on this field. Second, to provide a forum for soil scientists to discuss the methodology used on excavations. And third, discover further field of cooperation where soil science and archaeology can support useful information to each other. "The conference will be the first forum declaring and discussing one of the functions of soil memory — preserving the valuable relics of human beings and former events."

There were eleven major subject areas: 1) Terminology (paleopedology, archaeopedology, etc.) and classification of soils at excavations; 2) morphology; 3) sampling; 4) methods (chemical, physical, geophysical, etc.); 5) interpretation and demonstration; 6) comparison of soil and archaeological data; 7) case studies; 8) anthropogenic and environmental effects; 9) time of soil forming processes; 10) human-made formations in soil; and 11) teaching about soils for archaeologists. The conference included a visit to the excavation of a Bronze Age tell at Százhalombatta and two pre-conference and one postconference field tours. The main objective of these tours was to inform the participants about the pedagogical aspects of excavations in Hungary and to show some periglacial soil formations.

The official language of the conference was English and the invited papers of the proceedings are to be published in full along with all contribution abstracts "after reviewing according to the standards of international journals." Additional information may be obtained from Prof. Dr. György Füleky, Szent István University, H-2103 Gödöllo, Páter K. u. 1., Hungary (Fax (36) 28-410-200, e-mail: elaib@jht.gau.hu) and on the conference website http://www.szie.hu/aktualis/Soils_archaeology/ conference_format.htm

Forthcoming Professional Meetings

The Ceramics Gordon Research Conferences 2001

"Solid State Studies in Ceramics" is a 2001 Ceramics Gordon Conference to be held 12-17 August 2001 at the Kimball Union Academy, Meriden, NH. The conference theme is "Layered, Textured & Functionally Graded Microstructures." The goal of this conference is to explore the basic science behind the function of such microstructures in selected important materials technologies. The final list of speakers and talks can be found at the American Ceramic Society's website http://members.acers.org/basicscience/grc_2001_program.htm

Anyone may apply to attend a Gordon Research Conference but the number of attendees for a conference is limited to approximately 135 participants. Additional information is available on the Gordon Conference Home Page http:// www.grc.uri.edu/ Early application is strongly encouraged. All participants must register, including chairs, speakers and discussion leaders, ideally before 12 June 2001. A poster session is planned in order to give all attendees the opportunity to present current research results. Those who wish to present a poster should send the title and a brief (one-paragraph) abstract to Steve Bennison at the e-mail address that is listed below. The due date is 12 June. The list of contributed posters will be posted on the website http://members.acers.org/ basicscience/gordon.htm The organizer is Stephen J. Bennison (Chair of The Ceramics Gordon Conference 2001), E.I. DuPont de Nemours & Co. Inc. and Director of The American Ceramic Society Experimental Station, E356/311, Wilmington, DE 19880-0356 ; telephone 302/695-3368, e-mail stephen.j.bennison@usa.dupont.com

The Tenth Archaeological Chemistry Symposium

Archaeological Chemistry 2001 is scheduled to take place as part of the annual meeting of the American Chemical Society, 26-30 August 2001, in Chicago, IL. The session organizer is Kathryn A. Jakes, Professor of Consumer and Textile Sciences at Ohio State University (1787 Neil Avenue, Columbus, OH 43210-1295; telephone 614/292-5518, email: jakes.1@osu.edu) Papers in all areas of chemistry applied to the study of archaeological materials and chemistry employed to answer archaeological problems will be presented. Past symposia have included discussions of a wide range of instrumental methods of analysis applied to inorganic, organic, and biological materials. Problems in archaeology addressed by chemistry have included provenance, technology, dating, and population migration, among others. Dr. Jakes is developing a book proposal to ACS for a volume that will contain the contributions from the session. She has accepted 16 papers from colleagues including Ron Hancock, Julian Henderson, Charles Kolb, Joseph Lambert, S. Reslewic & J. Burton, C. Rieth, and Christian Wells. Information is available in the June 2001 issue of *Chemical and Engineering News* and on the ACS website at http://www.acs.org/meetings

Archaeological Science 2001

New Directions in Archaeological Science, ArchSci 01, is scheduled at the University of Newcastle upon Tyne, UK, 29 August to 1 September 2001. There are five major sessions and organizers (with affiliations indicated): 1) Food and nutrition (Mike Richards, University of Bradford); 2) chronology (Mike Baillie, Queens University, Belfast); 3) life cycle of the artifact (Mike Tite (University of Oxford); 4) prospection and geoarchaeology (Martin Bell, University of Reading); and 5) new directions in archaeological science (Martin Jones, Cambridge University). It is anticipated that the proceedings of the sessions will be published in *Journal of Archaeological* *Sciences.* The closing address, "Archaeological Science: A Theoretician's View," will be presented by Mike Shanks (Stanford University). The session entitled "The Life Cycle of the Artefact" is scheduled for 30 August, but as of this writing no speakers have been assigned to any of the sessions. Additional information including abstract forms, registration materials, and fee structure are available from Dr. David Passmore, (Department of Geography, University of Newcastle upon Tyne) and on the conference website at http://www.ncl.ac.uk/geography/conference/conference.html

XIVth UISPP

The XIV Congress of the International Union of Prehistoric and Protohistoric Sciences (UISPP) is scheduled for 2-8 September 2001 at the University of Liège, Belgium. Eighteen sessions are anticipated including one on archaeometry. Papers are still being added to the sessions, but three contributions concern ceramics: "Céramiques africaines: contextes d'apparition et d'evolution, techniques et sociétés" (E. Huysecom); "La céramique non tournée comme témoignage culturel" (X. Seru); and "technologie céramique et sociétés archéologiques" (R. Martineau). More complete information regarding the sessions and registration materials and fees are available on an extensive website at http://www.ulg.ac.be/ prehist/uispp/2nd-circular-eng.html

Materials Issues in Art and Archaeology VI

The Fall 2001 Meeting of the Materials Research Society to be held 26-30 November 2001 in Boston, MA will feature a symposium, Materials Issues in Art and Archaeology VI. The symposium organizers are Pam Vandiver, Martha Goodway, Jennifer Mass, and Jim Druzik. (Their street and e-mail addresses, and telephone numbers appear below.)

Papers were solicited that use the methods and techniques of materials science and engineering to understand the degradation, and promote the long-term preservation, of material culture, i.e. works of art, culturally significant artifacts, and archaeological remains and sites. Preserving cultural heritage extends beyond artifact preservation to developing a critical understanding of how ancient people used technology and craft to solve problems of survival and organization and to make symbols or representations of what was important in their world, especially for its maintenance, longevity and beautification.

Paper contributions of empirical studies were solicited that: 1) Reconstruct and interpret ancient technologies, especially through studies of workshop and industrial remains (archeomaterials); 2) study the nature and diversity of the ancient landscape as a background to human cultural evolution through analysis of residual physical traces (biogeochemistry); and 3) recreate an understanding of the environment, resources, and other constraints on the practice of technologies (resource survey, site catchement analysis and site formation analysis). Contributions may also: 4) characterize the cultural context and the knowledge necessary and sufficient to practice, innovate and transmit know-how for individual cultural survival and achievement (science, technology and society); 6) apply new, cutting-edge methods or old techniques of analysis in new ways to material cultural problems (archaeometry); 7) promote an understanding of degradation, weathering and corrosion that leads to stabilization and long-term preservation of material culture (conservation science); or 9) present successful experiment that incorporate studies of ancient technical knowhow into modern K-12 and university curricula (ancient materials outreach). Charles Kolb is assisting with the review of manuscripts submitted for publication.

Contact information: Pamela B. Vandiver and Martha Goodway (Smithsonian Center for Materials Research and Education, 4210 Silver Hill Rd., Suitland, MD 20746; e-mails vandiverp@scmre.si.edu, goodwaym@scmre.si.edu, telephone 301/238-3700 ext.162 or 164, Fax 301/238-3709). Jennifer Mass (SUNY Buffalo, Art Conservation Department., Rockwell Hall 230, 1300 Elmwood Ave., Buffalo, NY 14222; e-mail massjl@bscmail.buffalostate.edu, telephone 716/878-5025, Fax 716/878-5039). James R. Druzik (The Getty Conservation Institute, 1200 Getty Center Dr., Los Angeles, CA 90292; e-mail jdruzik@getty.edu, telephone 310/440-6825, Fax 310/440-7711).

On the last day of the conference, a "Pyrotechnology Workshop and Demonstration" is planned in which experiments will be conducted in the 3500-year-old technologies of Egyptian faience, faience inlay, glass core vessel manufacture, and the technologies of iron smelting and glassblowing. The latter experiments are to be framed in a 2000-year old Roman period context.

Eastern States Archaeological Federation

The annual ESAF meeting is scheduled for 8-11 November in Watertown, NY. Details about the meetings are available on the Internet at www.siftings.com/esaf.html Chris Espenshade and Skelly and Loy, Inc. anticipate organizing a symposium "Chasing Behavior: New Approaches to Native American Pottery Studies in the Northeast." The symposium will highlight case studies of new ways of extracting Native American behavior from the examination of pottery. The past ten years have seen the development and application of many new approaches to ceramics analysis, and the symposium will emphasize how these studies complement more traditional typological and chronological approaches. The symposium is to include a mixture of case studies of new physicochemical approaches, experimental archaeology, and the application of ethnographic data. Ideally, the symposium will include 8-10 papers of 20 minutes each, plus an introduction and a discussant presentation. The number of papers may be increased or decreased depending on the response to the symposium idea. Abstracts were required by 1 May, and copies of the papers would need to be provided to the discussant by 7 October. Additional information is available from Chris Espenshade, via e-mail at cespenshade@skellyloy.com.

Ceramic Ecology XV, 2001

A proposal for the Ceramic Ecology XV symposium has been submitted to the American Anthropological Association for the annual meeting scheduled in Washington, DC, 14-18 November 2001. The 15th annual symposium is organized and chaired by Charles C. Kolb (National Endowment for the Humanities) who will also provide the introduction to the session. The discussant will be Karen O. Bruhns (San Francisco State University). Papers will be given by: Judy C. Voelker (State University of New York at Buffalo) reporting on her village ceramic ethnoarchaeology in Thailand; Thomas P. Myers (University of Nebraska State Museum) on Jivaro ceramic style and ethnic identity; Patricia Fournier Garcia (Instituto Nacional de Antropologia e Historia, Mexico) and Fabiola Monroy-Guzman (Instituto Nacional de Investigaciones Nucleares, Mexico) presenting a multidisciplinary assessment of majolica production in New Spain; and Sandra Lopez Varela (Universidad Autonoma del Estado de Morelos, Mexico) discussing Maya Kaxob pottery tool trace wear. Other presentations will be made by Samuel V. Connell (UCLA) reporting on clay procurement and fabrication in the Naco Valley, Honduras; Marilyn Beaudry-Corbett (UCLA) and Andres Ciudad Ruiz (Universidad Compultense de Madrid, Spain) on pottery kilns in Central America; Eleanora Reber (Harvard University and University of North Carolina at Wilmington) on INAA studies of American Bottom pottery from Illinois and re3lationships to maize cultivation; Shannon Fie, Erika Borjum, and Philip J. Arnold, III (all Loyola University of Chicago) discussing ceramic seriation and Midwest Woodland archaeology; and Charles C. Kolb (NEH) on the fate of ceramic collections from the Kabul Museum, Afghanistan. Louana M. Lackey (Maryland Institute, College of Art) will give her traditional "paper," a synthesis of current ceramic news from the field and laboratory submitted by members of the Ceramic Studies Interest Group (alumni and friends of the Ceramic Ecology symposia).

ASOR 2001

The American Schools of Oriental Research (ASOR) annual meeting in Boulder, Colorado, 14-17 November 2001, will include a session "New Discoveries from Materials Science in the Archaeology of the Near East." The session chairperson, Elizabeth S. Friedman (University of Chicago), plans 4-6 presentations focusing on archaeological problems in the study of organic and inorganic remains, and particularly contributions dealing with ancient technology, trade patterns, demography, and subsistence. Abstracts were due to Dr. Friedman by 1 April 2001. She may be contacted at esf1@midway.uchicago.edu and ASOR forms and meeting information are available at http://www.asor.org

Archaeometry 33, April 2002

The 33rd International Symposium on Archaeometry will be held 22-16 April 2002 in Amsterdam, The Netherlands. The Chairman of the Standing Committee is Mike Tite (Oxford); Gar Harbottle (Brookhaven National Laboratory), G.A. Wagner (Heidelberg), and S.U. Wisseman (University of Illinois) are among the ten committee members. Seven sessions (parallel, not simultaneous) are proposed, one of which is "Technology and Provenance II: Ceramics and Glass." The deadline for submitting abstracts is 1 November 2001 with notification of acceptance or rejection in January 2002. Further information is available on the conference website at http:// www.archaeometry.vu.nl/start.html A second information circular is due in May or June. E.A.K. Kars (Rijksdienst voor het Oudheidkundig, Bodemondezoek, P.O. Box 1600, 3800 PB Amersfoort, The Netherlands) is handling the abstract submissions and Scientific Program; telephone +31 33 422 76 09, e-mail e.kars@archis.nl

Internet Resources

The British Geological Survey (BGS) has several useful reports on its website. The four-volume BGS "Rock Classification Scheme" is available for sale (in photocopy format) or is downloadable in hardcopy or transferable to diskette (registration is required). The four volumes are: Igneous rocks, metamorphic rocks, sediments and sedimentary rocks, and artificial and man-made ground and natural superficial. For details, consult the URL http://www.bgs.ac.uk/bgsrce/ home.html Also available for query is the BGS "Lexicon of Named Rock Units," a relational database. For additional information consult the site at http://www.bgs.ac.uk/lexicon/ lexicon_intro.html

Interested in mineralogy, petrography, spectroscopy, or XRD? If so, the International Union of Crystallography (IUCr), the governing body for the field of crystallography, has developed a useful Internet resource, "Crystallography Online" at http://www.iucr.ac.uk/cww-top/crystal.index.html The home page provides links to the World Directory of Crystallographers, a history of the discipline, news and notices, the IUCr *Newsletter*, and newsgroups and mailing lists. Among the topics covered are the structures of minerals and rocks, the physics of X-rays and magnetic materials, and shapes and sizes of chemically interesting molecules. Of special interest are Crystallographic Organizations Online (lists and links to regional and national societies, a country index, etc.), Crystallographic Resources and Information Online (radiation and diffraction facilities, suppliers of equipment, software, databases, international tables, book reviews, book lists, and conference reports), Crystallographic Activities Online (projects, commissions, discussion lists, information files, and congresses), Crystallographic Education Online (educational resources and teaching pamphlets), and Crystallographic Journals Online. The book reviews and publications include valuable assessments. The journals listed (current, back, and sample issues) include Foundations of Crystallography, Structural Science, Structure Communications, Crystal Biological Crystallography, Structure Reports, Applied Crystallography, and Synchrotron Radiation. There is also a link to Journals and Catalogs (n = 63) including Acta Crystallographica (A, B, C, and D), American Mineralogist, Canadian Mineralogist, Journal of Chemical Crystallography, Journal of Electron Spectroscopy and Related Phenomena, Journal of Petrology, Nature, Physics and Chemistry of Materials, Science, and Zeitschrift fur Kristallographie.

The website of the Ceramic Petrology Group (CPG) has recently been established, thanks to Alan Vince, at http:// www.ceramicpetrology.uklinux.net/index.html The Home Page includes information about meetings, CPG membership, links to ceramic petrology on the web and in print. A statement about "what is ceramic petrology," and discussions about the *Bulletin of the Experimental Firing Group* (run by Anne Woods at Leicester University in the 1980s ff.) and the *Old Potter's Almanack* (the joint newsletter of the Prehistoric Ceramic Research Group and the Ceramic Petrology Group). J.D. Hill (Department of Prehistory and Early Europe, British Museum, is the contact person for PCRG), while Andrew Middleton (Department of Scientific Research, British Museum) functions in that capacity for CPG.

The Early Materials' Forum (EMF) is an informal meeting of persons in the UK who are interested in the analytical study of archaeological and historical material. Among these materials are metals, glass, and ceramics. EMF, co-organized by Kathy Erimen (National Museums of Scotland), Aaron Shugar (Institute of Archaeology, University College London), and David Dungworth (English Heritage, AML), tries to have two or three informal meetings per year. The venue of the meeting shifts, with the next scheduled meeting is in November 2001 at the University of Bradford. The abstracts of past presentations (1998 ff.) are on the EMF website at http:// www.ucl.ac.uk/archaeology/emf Two presentations on ceramic topics (P. Mills "A Closer Look at Famille Rose" and D. Thickett "Reading Between the Lines - Analysis of Cuneiform Tablets) date to January 1998, while "Chemical Fingerprinting of Pottery Meets Geochemical Mapping" by Simon Chenery, Emrys Phillips, and Phillip Green at the November 1998 meeting. Andrew Shortland's "Analysis of Faience from Memphis" is dated to May 2000.

Data from the Ceramic Catalog of Jeremy B. Rutter's book, The Pottery of Lerna IV, Phase 1 (Princeton, NJ: American School of Classical Studies at Athens, 1995, 780 pp., 21 pls., 213 figs., 5 plans, 248 tables) was converted into an electronic testbed database by Susan C. Jones and Harrison Eiteljorg II (Center for the Study of Architecture/ Archaeology in Bryn Mawr, PA) in 1998 and updated in July 2000. This database on 365 Early Helladic vessels includes 14 tables and is accessible at the CAS website at http://csanet.org/archive/ adap/lernpot/lermameta.html The Table of Contents includes information about the excavation (1949-1959); the data; the database, and tables: basic catalog, classes, context, Fitch Lab analysis (NAA and AAS), inventory numbers, vessel morphology, plan elevations, vessel contexts, references to other publications, profile terminology, sherd types, syntax, and thin sections. Not all images or information (such as thin sections) are available. The datafiles are available using FTP and are compressed using PKZIP software and are transmitted in .ZIP format.

Readers will be interested to know about "PotWeb Ceramics Online at the Ashmolean Museum," a new and ambitious project on Medieval and later ceramics being launched by the Ashmolean Museum at the University of Oxford. The site is significant for pedagogy and basic information on the time period ca. 850 - 1800 CE. The URL for this very attractive, useful, and easily navigated site is http:// PotWeb.ashmol.ox.ac.uk The Home Page includes five major topics: 1) People and their collections, 2) 1000 years of vessel forms and shapes, 3) fingerprints of the maker, 4) a vessel for everyman and his family, and 5) why is pottery the ABC of archaeology. Among the collectors discussed are Robert Plot, Arthur Evans, T.W. Jackson, T.E. Lawrence, and Rupert

Bruce-Mitford (with a case study of his contributions to ceramic studies and rescue excavations). The 1000 year coverage of ceramic forms begins with Saxo-Norman (850-1150 CE), followed by Early Medieval (1000-1250), Highly decorated (13th and 14th centuries), Late Medieval (1350-1450), Early Post-Medieval (1450-1600), Post-Medieval (16900-1720), and Modern (1720 ff.). Collectively, there are 70 representative vessels depicted as thumbnails, each of which may be enhanced and has descriptors (common name, class, height, identifier, production centre, distribution, use, date, published information, historic context, etc.). In "fingerprints" the discussion focuses on raw materials used by potters, making the vessel, decoration, firing, vessel repertoire and potters' social status, and a bibliography. The content of "a vessel for everyman" includes discussions on vessel purposes (functions), definitions, changing fashions, dating parallels, acquisition (hawkers, markets, etc.), and a brief bibliography. "ABC" considers why pottery is useful to archaeologists (manufacture, use discard, chronology, etc.).

The University of Southampton's Department of Archaeology is Home to "The Later Prehistory Collections Register and Bibliography for England: A Gazetteer" at http:// www.arch.soton.ac.uk/Research/PotterySurvey The period covered is ca. 1000 BCE to CE 43, and the register contains data on 5,569 pottery collections from 5,406 archaeological sites; an additional 500 to 1,000 collections are yet to be incorporated. Statistics by county, distribution maps, methods of data recovery (excavation, field walking, etc.), and applications of scientific analyses (C14, TL, petrographic studies, XRF, NAA, residue analysis, etc.) are included. Unfortunately, the site has apparently not been updated since June 1997.

The publication series Papers from the Institute of Archaeology, University College London, began in 1990 to provide an outlet for papers prepared by research students and graduates of UCL. Tables of Contents for volumes 1-11 may be found on the Internet at http://www.ucl.ac.uk/ archaeology/pia/pia.html Among the articles are several related to ceramics: "Pots, Pans, And People: Ceramic Ecology in West Mexico" by Eduardo Williams (Colegio de Michoacan, Mexico), PIA 3:44-51, 1993; "New Applications of Archaeological Microscopy in the Field: Ceramic Petrography and Microwear Analysis" by G.M. Chandler, PIA 5:39-48, 1994; "The Spatial Organization of Pottery Production in Huancito, Michoacan, Mexico," also by Eduardo Williams, PIA 6:47-56, 1995; and "Review Paper: Spanish Samian Ware: Fundamentals and References" by Maria J. Fernandez Fonseca, PIA 6:57-71, 1995.

Michael Conner (Center for Archaeological Research, Southwest Missouri State University, Springfield, MO 65804, e-mail michaelconner@smsu.edu) has been preparing a report on excavations at the Hadley Creek Site located in western Illinois, ca. 30 km south of Quincy. The site dates to the Late Woodland period, 650-800 CE

(uncorrected). Among the 87 features are two limestonelined features that may be pottery kilns that contain seven complete vessels that appear to be "manufacturing failures." Connor asks for information about similar features and provides ten JPEG images of the kiln excavations and vessels. The URL for the website is http://www.smsu.edu/car/hcr/index.htm The journal *Clays and Clay Minerals*, the official publication of the Clay Minerals Society contains numerous articles on mineralogy, crystallography, geochemistry, soil science, and ceramics, among other areas. The tables of contents for the issues from 1985 through 1997 are currently online at http://cms.lanl.gov/journal_.html

The Tables of Contents for the *Journal of Roman Pottery Studies* (Vols. 2, 1989 through 8, 1999) may be found at http://www.sgrp.org/Jrps.Index.htm The contents for Vol. 1 (1986) are not yet available. Some early volumes are out-of-print but more recent issues are available from Oxbow Books and David Brown Book Co.

The "Registry of Mediterranean Pottery" (RMP) developed by Sebastian Heath, sfsh@umich.edu, is an initial effort to organize ceramic materials from the ancient Mediterranean into a consistent and flexible database (Linux server running PostgreSQL relational database). The registry is sponsored by the Archaeological Publications Group of the Classics Department of the College of the Holy Cross. The database may be searched by location, ware and form, ware and region, or by serial number at http://river.blg.uc.edu/rmp/

"Potsherd," a collection of web pages on pottery and ceramics in archaeology, principally of the Roman Period (1st century BCE to 5th century CE) in Britain and Western Europe, includes the Atlas of Roman Pottery. Maintained by Paul Tyers, the Internet URL is http://www.potsherd.uklinux.net/ The pages of the Atlas describe individual wares by class (tablewares, cooking wares, transport amphoras, etc.) or source (province of origin). The site also includes a companion to Roman Pottery in Britain, a published survey of pottery made or used in Britain during the Roman period, and this is augmented by an index of non-British sites. The toolbar provides links to "An Introduction to the Atlas" (including future plans) and "Publications" (featuring Paul Tyers's Roman Pottery in Britain, London: Routledge, 1997, reprinted 1999; his "Roman Amphoras in Britain" Internet Archaeology 1, 1996; and selections from Pottery in Archaeology by Clive Orton, Paul Tyers, and Alan Vince, Cambridge: Cambridge University Press, 1993). The latter has been translated into Spanish as La Cerámica en Arqueologia (Barcelona, Critica, 1997, ISBN 84-7423-745-9). In addition there are toolbar links to "Wares" (n = 110), "Classes" (Amphoras, Coarse wares, Fine wares, Mortaria, and Terra Sigillata), "Sources" (Africa, Britain, Gaul, Germany, Iberia, Italy, and Eastern), and "Databases." The latter includes The Pottery Kilns of Roman Britain (London: HMSO, 1984) and the French SFECAG [Société Francaise de Étude de la Céramique Antique en Gaul, 1981 ff.]. This is a very useful compendium and the "Database of Terra sigillata Forms" may be easily searched. "Pottery and Archaeology Links" completes the site.

The Study Group for Roman Pottery (SGRP), located in the UK, has reissued the long out-of print *Romano-British Coarse Pottery: A Student's Guide* (Graham Webster 1964), published originally by the Council for British Archaeology. Glossaries, a list of stratified groups, instructions for drawing pottery, and examples of vessel types and decorations are featured. The group is updating the guide, which is available in PDF format from http://ads.ahads.ac.uk/catalogue.html (enter Romano-British Coarse Pottery: A Students Guide into the keyword search engine). However, the third edition of *Romano-British Coarse Pottery: A Student's Guide* by Graham Webster, *CBA* [Council for British Archaeology] *Research Report* No. 6 (1976), 37 pp. and 3 figures, is posted as a PDF file at http://ads.ahds.ac.uk/catalogue/proj_data/cbaresrep/html/rr6.html

G.C. Dunning, J.G. Hurst, J.N.L. Myres, and F. Tischler are the authors of Anglo-Saxon Pottery: A Symposium, reprinted from Medieval Archaeology 3 (1959) and issued as CBA Research Report No. 4 (1959), which is now available on the WWW in PDF format (78 pp. and 2 plates) at http:// ahds.ac.uk/catalogue/proj_data/cbaresrep/html/rr4.html The Structure of Romano-British Pottery Kilns by Philip Corder, reprinted from The Archaeological Journal (Vol. CXIV:10-27, 1957) and issued as CBA Research Report No. 5 (1964) has been posted on the Internet in PDF format (27 pp. and 6 plates) at http://ads.ahds.ac.uk/catalogue/proj_data/cbaresrep/ html/rr5.html Papers from a three-day conference entitled Current Research in Romano-British Coarse Pottery: Papers Given at a CBA Conference held in New College, Oxford, March 24 to 26, 1972, edited by Alec Detsicas, CBA Research Report No. 10 (1973), includes 165 pages of text and 8 plates and is available at http://ads.ahds.ac.uk/catalogue/ proj_data/cbaresrep/html/rr10.html

Roman Shipping and Trade: Britain and the Rhine Provinces, edited by Joan du Plat Taylor and Henry Cleere, CBA Research Report No. 24 (1978), 86 pp., includes ten papers from a January 1977 symposium which documents ceramic use. The URL is: http://ads.ahds.ac.uk/catalogue/ proj_data/cbaresrep/html/rr24.html

Guidelines for the Archiving of Roman Pottery, edited by Margaret Darling (1994), an 11-page document with a glossary and bibliography, is also available on the SGRP's website at http://www.sgrp.org/Guidelines/Contents.htm The informative *Newsletters* of the SGRP are also on line at http:// www.sgrp.org/Newsletter

Karen Larsdatter (Deputy Kingdom Minister of Arts and Sciences for the Kingdom of Atlantia) maintains a series of linked websites related to Medieval topics with an emphasis on replication of ancient technologies. Among these are links to antler, bone, and ivory carving; beads and beadwork; brewing; cooking and food; costuming; dance; dyes; embroidery; fiber arts; lacemaking; leatherwork; shipbuilding; spinning; and woodworking. "Pottery Links" at http://moas.atlantia.sca.org/ topics/pott.htm provides hotlinks to nearly 50 websites that concern Byzantine, Turkish, Italian, and Medieval ceramics and tiles, as well as experimental and replication studies. Among the sites are "Byzantine Tableware," "Domestic Pottery of Anglican York," "Porcelains in the Topkapi Museum," "Pottery Excavated from a Carmelite Friary at Esslingen an Nektar [Baden-Württemberg]" (three parts), "Ship's Provisions on the Mary Rose," "Museum of Medieval and Encaustic Tile," "Anglo-Saxon and Viking Pottery" (including experimental kilns), and "Pottery in Medieval Flanders." "The Historic Tile Company's Museum of Medieval Tiles" includes illustrations from the 13th century to the present. The "Corpus Middeleeuws Aardewerke" (CMA) includes references to 14 volumes in a series on Medieval ceramics from the Netherlands and Flanders. These are informative sites with excellent illustrations and some report serious scientific work.

The Archaeological Ceramic Building Materials Group (ACBMG), located in York, UK, acts as a forum for researchers who are involved in the processing, analysis, and publication of brick and tile for archaeological excavations and surface survey. The ACBMG has developed a significant seven-page document "Draft Minimum Standards for the Recovery, Analysis, and Publication of Ceramic Building Material" which is accessible at http:// www.tegula.freeserve.co.uk/acbmg/stan.html Also associated are "General Building Material References" (created by Ian located the Betts). on Internet at http:// www.tegula.freeserve.co.uk/betts.html, a "Bibliography" of Medieval brick and tiles (by Alan Vince), http:// www.tegula.freeserve.co.uk/vince.html, and a "Bibliography of Brickmaking" at http://ourworld.compuserve.com/ homepages/david_cufley/BRCKBook.htm with 90+ titles. The group has recently moved its website to http://groups.yahoo.com

This Yahoo! Groups URL also provides access to the "Arch-pot" group, an unmoderated list for those interested in British archaeological ceramics of any period, prehistoric to post-medieval.

"Brick Clamps," the oldest and most rudimentary method of firing bricks, are the subject of a *Wall Building Technical Brief* at http://www.gtz/de.basin/gate/brickclamps.htm This German website (German Appropriate Technology Exchange = GATE) contains information on clamp sizes and shapes, wood fired and coal fired clamps, advantages and disadvantages of brick clamps, the means of increasing the efficiency of brick clamps, and further reading. There are seven illustrations and five items in the bibliography (with references to brickmaking in developing countries, and brick and lime kilns in Ecuador).

The LPA, Laboratorio de Prospeccion Arqueologia, Instituto de Investigaciones Antropologicas at Universidad Nacional Autonoma de Mexico (UNAM) in Mexico City, formed in 1980 maintains a Spanish-language Internet site which has descriptions of laboratory activities and a selected bibliography which includes articles by Luis Barba, Linda Manzanilla, and others — particularly on residue analysis, microchemistry, and magnetometry. The site is located at http:// serpiente.dgsca.unam.mx.iia/Lab.html

"Early Islamic Tiles" is an Internet exhibit that showcases a selection of 102 tiles collected by Lockwood de Forest II (1850-1932), an attorney and art collector, on two trips to the Middle East and North Africa in 1875-1876 and 1881-1882. He was a partner of Louis Comfort Tiffany, founder of the American Arts and Crafts Movement in the late 19th century. The web site has a biography of de Forest and color thumbnail images in a bottom frame, with a larger images and basic descriptions (provenance, references, measurements, and condition) in the central window. The tiles are for sale at the seller's gallery web site at http://www.anthonyslayter-ralph.com

"Ceramic Petrology" is the title of an Internet site maintained by M.S. Smith, University of North Carolina at Wilmington, at http://www.uncwil.edu/people/smithms/ cerprt.html There are annotated bibliographies of books and journal articles on petrology, point counting, "temper," thinsection preparation, sherd color and firing determinations, and geochemical analytical techniques.

Internet Sites: Preservation/Ceramics Care

Research Services at the Henry Ford Museum and Greenfield Village maintains a website with a "Caring for your Artifacts" section which has 15 downloadable fact sheets. Among these are a six-page "Glass and Ceramic" sheet that considers causes of damage, guidelines for care (handling, display, cleaning, repair, and environment), a plus a bibliography and references. These are accessible at http://www.hfmgv.org/ histories/cis/pfs.html

The United Kingdom's Museum and Galleries Commission has a website with "Conservation Resources" fact sheets written for the non-specialist that provide basic information on how to care for a wide range of museum objects. Seventy downloadable fact sheets or guides are posted (Adobe Acrobat is required), including "Ceramic and Glass" prepared by Stephen Ball, Peter Winsor, and Sandra Davidson. The topics covered in this sheet include cleaning and handling, display and storage, and repair and restoration. The URL is http://www.museums.gov.uk/ advice/conservation/factsheets.html

The Office of Technical Information at the Smithsonian Institution's SCMRE (Smithsonian Center for Materials Research and Education) — the formal CAL (Conservation Analytical Laboratory) — provides "Guidelines" for object care as a component of the Preservation Studies link on their web site. Paper-based materials, textiles, and historic objects (armaments, clocks, toys, musical instruments, houses, etc.) are emphasized. The "Material Characterization" link is under construction, but Archaeometallurgy, Wood Anatomy and Identification, and Organic Analysis are already posted. Two other components, Ceramics and Compositional Analysis, are listed in the Table of Contents but are not yet available. See http://www/si.edu/scmre/guidelne.html

Replacements Ltd. is a commercial enterprise located in Greensboro, NC that specializes in replacing old and new china, crystal, and silver (flat and hollowware). The company carries 150,000 patterns in their inventory of seven million items. Of particular use to historical archaeologists is that one can browse a list of the150,000 patterns as well as illustrations of 3,000 major china patterns on their Internet site. In addition the manufacturer histories for 15 prominent makers are also available. Among these are Flow Blue, Franciscan, Haviland, Lennox, Pfaltzgraff, Royal Doulton, Spode, and Wedgwood. The site is at http://www.replacements.com

Books Received

- Broodbank, C. 2001. An Island Archaeology of the Early Cyclades. Cambridge University Press. Cloth (\$80.00; ISBN 0-521-78272-4).
- Connah, G. 2001. *African Civilizations: An Archaeological Perspective*. 2nd edition. Cambridge University Press. Cloth (\$64.95; ISBN 0-521-59309-3); paper (\$22.95; ISBN 0-521-59690-4).
- Gamble, C. 1999. *The Palaeolithic Societies of Europe*. Cambridge University Press. Cloth (\$85.00, ISBN 0-521-65105-0); paper (\$37.95, ISBN 0-521-65872-1).

- Emery, A. 2000. Greater Medieval Houses of England and Wales, 1300-1500: Volume 2: East Anglia, Central England, and Wales. Cambridge University Press. \$195 (cloth). ISBN 0-521-58131-1.
- Gould, R.A. 2000. Archaeology and the Social History of Ships. Cambridge University Press. Cloth (\$74.95; ISBN 0-521-56103-5); paper (\$29.95; ISBN 0-521-56789-0).
- Harding, A.F. 2000. *European Societies in the Bronze Age*. Cambridge University Press. Cloth (\$79.95; ISBN 0-521-36477-9); paper (\$34.95; ISBN 0-521-36729-8).



King Croesus' Gold: Excavations at Sardis and the History of Gold Refining. Andrew Ramage and Paul Craddock, with contributions by M.R. Cowell, A.E. Geçkinili, D.R. Hook, M.S. Humphrey, K. Hyne, N.D. Meeks, A.P. Middleton and A.P. Özbal. 2000. Archaeological Exploration of Sardis, Volume 11. Cambridge, Mass. and London, Harvard University Art Museums and British Museum Press. 272 pages. \$75.00 (US). ISBN 0-674-50370-8.

Reviewed by Mark Hall, Archaeology Department, Niigata Prefectural Museum, Gongendo 2247-2, Sekihara-cho 1, Nagaoka 940-2035, Japan. email: hall@nbz.or.jp

The ruins of Sardis are located in the Hermus river basin of western Turkey. Both the writings of Herodotus and the archaeological record indicate that by the 7th century BC, Sardis was the capital of an expanding empire, whose most notable ruler in both myth and history was King Croesus. The city was sacked by the Achaemenids in 547 BC, and controlled by them until being captured by Alexander the Great in 334 BC. The city continued to thrive through the Byzantine Empire.

Excavations were started at Sardis in 1910, and continued intermittently until the start of the Archaeological Exploration of Sardis project by Professor G.M.A. Hanfmann in 1958. Since then, excavations have been conducted there annually. The field director since 1977, is Prof. Crawford Greenwalt, Jr.

Sardis is not your typical Classical era city though. First, the Lydian city was a "native foundation" and not founded by Greek colonists. The city is also famous since it is credited with inventing gold and silver coinage. Even in the days of Herodotus, the coinage issued by Sardis was noted for its purity.

This book, the 11th volume in the site report series, deals with the discovery and finds from the gold refining area in the city of Sardis. The gold refining area of the site was excavated between 1964 and 1968. At the time, as noted by Ramage (p. 72), it was thought to be part of a destruction layer.

The book is divided into 10 chapters, and accompanied by acknowledgements, prologue, epilogue, glossary and six appendices. The Prologue is written by both Ramage and Craddock, and gives a brief overview of the excavation and gold refining procedures. Given the depth these topics are dealt with in later chapters, one has to wonder why this prologue was even written. The Prologue, outside of a brief paragraph in the opening section, provides little into why this study was done or some of the goals to be achieved by it.

Chapter One, written by Ramage, puts Sardis into its archaeological and historical perspective. The geology and gold resources of the area are reviewed, and some details on the history of Lydian coinage are provided. Given the assumptions made in later chapters, a more detailed explanation of the geology of this area and more information on the geochemistry of the gold from the Pactolus River would have been welcome.

Methods of gold refining are reviewed in Chapters 2 and 3. Chapter 2 looks at surface enrichment and gold refining by parting techniques in pre-Renaissance Europe and the rest of the world, while Chapter 3 exclusively looks at gold refining by parting techniques in post-Medieval Europe. While some archaeometric studies are utilized in the opening of Chapter 2, these two chapters focus primarily on written accounts by contemporary authors. Amalgamation refining methods and assaying are relegated to Appendices 3 and 5.

The geographical and chronological split for these two chapters is bewildering though. While making the break at the Renaissance seems logical given the wealth of written materials, the placement of all non-European technologies into chapter 2 is puzzling. This is particularly intriguing since Craddock notes on page 49, that the Japanese operations on Sado Island borrowed technology from the 16th century Portuguese. Furthermore, in regards to the Japanese section, while Craddock footnotes having had contact with Japanese archaeologists, his account of the Japanese technology is based primarily on the works of Gowland written in the early 20th century. Research by Ito & Saito (1998), Kosugue (1998), and Ueda et al. (1996) is ignored. Confusion is also created by reference to excavations on Sado Island at a place called "Emaki"; unfortunately, there is no such place on Sado or in Niigata Prefecture for that matter. Incidentally, in Japanese, "emaki" means picture scroll.

The excavations at the refining area and the finds from it are detailed in Chapter 4 and Appendices 1 and 2. This is a fairly standard type of excavation report with plans, profiles, photographs and illustrations. While its relationship to the refining area is unresolved (not the fault of the excavators), the presence of a nearby altar to Cybele raises some interesting issues on the role of religion and the metals industry. Unfortunately, unlike the more recent work presented in Knapp, Herbert, and Piggott (1998), these issues are not explored.

Chapters 5 and 6 report on the scientific analyses of the remains found at the site. Chapter 5 by N. D. Meeks provides a report on a portion of the SEM analyses. While the methodology and operating conditions are fairly well explained, there are a few missing pieces of information. For the quantitative analyses it would have been useful to know what standards were used in creating the calibration curve, and the accuracy and precision of the analyses. Chapter 6, written by A. P. Middleton, D. R. Hook, and M. S. Humphrey, provides the results of the ICP, petrographic, and SEM studies of the ceramic materials and litharge. The utilization of the three analytical technologies allows them to elucidate much about the refining technology behind the gold and silver found at Sardis.

The chemical composition of the Lydian coinage is reviewed in Chapter 7. The chapter brings together analyses from previous studies and presents twenty new ones from items in the collection of the British Museum. The fineness of the gold and silver issues is quite high, with impurities accounting for 2% or less of the total weight percentage. The electrum issues from Sardis were intentionally alloyed; the gold from the Pactolus (the closest gold source) contains anywhere from 17% to 30% silver, while the Lydian electrum coinage averages 44% silver (p. 172). The coinage is one more piece of evidence demonstrating the control and understanding the refiners and coiners had over the metallurgical practices.

While the preceding chapters are fairly standard for archaeometry books, Chapters 8 and 9 report on replication experiments and the analyses of their experimental products. This is not common for most archaeometric studies, and the authors need to be commended for it. In Chapter 8, Craddock provides a review of earlier work on salt cementation and parting, and a simple explanation for the chemistry behind the process. In Chapter 9, foils manufactured from synthetic goldsilver alloys and then refined by parting are examined and compared to those manufactured in antiquity. While the microstructures are similar, it is noted that the prehistoric foils are homogenous, while the replicated foils are not. The authors believe the explanation for this is that the prehistoric foils were held at temperatures above 700BC for several hours to days, while their experimental replications were held at temperature for only a few hours.

One interesting observation in the study is that while the Lydian gold and electrum coins contain platinum-group element (PGE) inclusions, the foils do not. While the simplest explanation would be that two or more "sources" of gold were exploited at Sardis, Craddock rejects this explanation. Going to Appendix 4, the reader can find out what he thinks the refiners were doing at Sardis. Drawing on an account in the *Mappae Clavicula*, a 10th century AD alchemical manuscript, he believes that the PGE inclusions were removed by melting the gold alloys with lead, then allowing the PGE inclusions to settle out the molten Pb-Au alloy, and then cupelling the Pb-Au alloy to recover the gold. This, as admitted by Craddock, is highly speculative; it is uncertain whether this process was even known in the 6th century BC, and no chemical or experimental evidence is provided. Clearly, more work needs to be done on this issue.

Chapter 10 by Craddock is a summary of the preceding chapters and explains the refining procedures believed used at Sardis. The analytical and experimental evidence points to a cementation process being used to refine gold at Sardis. Silver is believed to been recovered from the parting vessels by smelting them with lead, followed by cupellation. The Epilogue puts Sardis into its archaeological and historical context.

While one can raise trivial issues on the technical studies, this book does suffer in aspects of its production. While it is copiously illustrated with both black and white, and color figures, the value of some of them is questionable. The out-of-focus color photographs of the gold foils in Figures 9.1 through 9.5 seem a waste, and a scale and a key are sorely needed in Figure 9.25. The six color pages of sherds, without a scale no less, seem excessive. One also has to question the use of a color photograph in Figure 2.6, when the same information is essentially shown in Figures 2.4 and 2.5. The sketch in Figure 4.31 should have been re-drawn. Given the cost they add to a book, color plates should be used in a meaningful fashion and of a high quality. Unfortunately that is not the case here.

In terms of the chapter arrangement and content, one is forced to flip back and forth between the chapters and appendices to follow the discussion. This book at times tries to deal with the artifacts on the basis of the analytical technique, and at other times tries to deal with them on a materials basis (gold, silver, etc.). For example, the information on the gold foils and their refining is dispersed through Chapters 5, 9 and Appendix 4. In another case, the information on the parting sherds is spread between Chapters 5 and 6. The editors should have taken a more active role in preventing these gaffes.

The results presented here, while resolving how gold was refined at Sardis, raises further questions to be answered. It is hoped that the authors continue to pursue them in the future. This is a useful reference for scholars doing analytical studies of ancient gold, but it will have limited appeal for Classicists, archaeologists and numismatists. The archaeological site report and description of the finds takes up only a small portion of this volume. For the numismatist, there are only 20 new analyses presented, and the rest have appeared elsewhere.

References

- Ito, H. and Saito, T. (1998) An experimental study on the chemical surface treatment called "color dressing" of *koban*, the oval-shaped gold coin in the Tokugawa Shogunate rule of Japan," in *Proceedings of the Fourth International Conference on the Beginning of the Use on Metals and Alloys (BUMA IV)*, pp. 225-226, Japan institute of Metals, Sendai, Japan.
- Knapp, B., Herbert, E., and Piggott, V. (1998) Social Approaches to an Industrial Past: The Archaeology and Anthropology of Mining. Routledge: London.
- Kosugue, T. (1998) Study of metallurgy: The picture scroll of Sado gold and silver mine in the Edo Period, in *Proceedings of the Fourth International Conference on the Beginning of the Use on Metals and Alloys (BUMA IV)*, pp. 267-268, Japan institute of Metals, Sendai, Japan. (In Japanese).
- Ueda, M., Taguchi, I., and Saito, T. (1996) *Non-destructive Analysis* of the Fineness of Kobans in the Yedo Period. IMES Discussion Paper 96-E-26. Institute of Monetary and Economic Studies, Bank of Japan, Tokyo.

Elsevier's Dictionary of Archaeological Materials and Archaeometry. In English with translations of terms in German, Spanish, French, Italian, and Portuguese. Zvi Goffer, Elsevier, Amsterdam-Lausanne-New York-Oxford-Shannon-Tokyo 1996. XVIII+445 pages, 1,374 terms, 62 tables, Bibliography, Indices. Price: US\$158.00 (cloth). ISBN 0-444-81949-5.

Reviewed by Ludomir Lozny, Department of Anthropology, Hunter College, 695 Park Avenue, New York, NY 10021. email ludomir.lozny@hunter.cuny.edu

This is a unique book. A dictionary of terms and definitions used in various scientific fields mixed with some archaeological nomenclature. It is divided into three parts. The main portion titled Basic Table consists of 1374 entries organized alphabetically. A bibliography, which lists all references used with most of the entries, forms the second part. And the final, third part is composed of indices of all terms translated into five languages: German, Spanish, French, Italian, and Portuguese. The indices also provide the page number where the term 's explanation in English is to be found.

Many specialists might not be satisfied with the selection of entries and the accuracy of explanations, especially of those pertaining to their narrow fields. I, for instance, would like to see an entry explaining the difference between flint and chert (both terms being used interchangeably), or a mention that antler-made tools could have been used in pressure flaking. But I do not think that without those explanations the dictionary is of lesser quality. Furthermore, I believe that some colleagues, especially in North America, may actually learn that chamotte is another term for a grog-based pottery temper.

There are obvious shortcomings as they usually happen in a work of this kind. But neither those, which are inevitable in a one person project of this sort, nor minor editorial glitches and spelling errors not covered in the errata, seriously diminish the significance of the reviewed book. To those who shall argue that the selection of terms is not representative and the terms are not explained accurately, I like to quote the entry explaining the term Aaccuracy,@ which in the reviewed dictionary is not defined as precision, like we may remember from the Webster Dictionary of the English Language, but as Athe degree to which experimental measurements are free from errors.@ Accuracy, in other words, does not mean error-free, it only indicates a stage in the endeavor to limit errors.

Nonetheless, all entries are clearly defined and explained; they are brief and introductory rather then definitive. The cross referencing system in the Basic Table section, where boldface indicates that a term is further explained in the dictionary, helps to use the dictionary most efficiently. Many entries are followed by one or several references listed in the bibliography. Also, presented on page XVII List of Tables facilities quick reference to tabulated data and information. The provided bibliography is quite outdated but it does include many publications in other than English languages, mostly German, French, Italian, and one in Russian. The majority of books listed have been published in the 1960, 1970, 1980s, and only several in the 1990s.

But why this book? Why can't archaeologists just take a look at any dictionary of science when needed? My guess is that the reviewed book is exactly to eliminate such time consuming penetrations through other dictionaries. This dictionary contains explanations especially of those scientific terms, which archaeologists might come across most often. The idea behind putting the dictionary together was born from realization that archaeology is becoming an interdisciplinary field and therefore those of us who are serious about doing our job should learn of scientific terms, definitions, etc. Does the dictionary fulfills that goal? Yes, in many respects. Today archaeology is more interdisciplinary than ever and the archaeological practice inevitably requires the knowledge of several scientific fields.

The main function of the dictionary is to ease contacts

between archaeologists and representatives of the natural sciences. As Zvi Goffer writes in the Preface: "The inception of this dictionary came from realization that there is a growing need for more interdisciplinary communication between scholars (...): it was written to provide succinct definitions of the materials in the technologies used to produce, modify, and shape materials in the past (...)."

The dictionary provides explanations of terms and definitions of several scientific fields including physics, chemistry, geology, biology, ecology, paleontology, etc. The range of covered terms and definitions extends from descriptions of the basic properties and characteristics of materials and the productions of artificial materials, to methods for dating them, establishing their geological or geographic origin and ascertaining their authenticity. The user will find here definitions of the materials and technologies used to produce, modify and shape materials in the past and concise introductions to the scientific concepts and techniques now used to identify, characterize and date materials and the technologies from the past.

Do we need science in archaeology? Sometime ago I heard an archaeologist crying that the carbon dates obtained for a certain region do not match the chronological sequence established according to the seriation of local pottery. Therefore, the archaeologist concluded, the carbon dates must be wrong and the whole dating method is not reliable. Several entries in the dictionary explain how carbon dating works and why it is considered the most accurate method. No doubt the dictionary has a considerable educational value and both professional archaeologists and students will greatly benefit from it.

This comprehensive and well-organized dictionary is addressed to specialists interested in archaeology, ancient art, and the natural sciences. Its intentions may be identified as multi-directional: to bridge the existing gaps in communication between various scientific fields, to inform about most significant results of research in different fields, and what is especially significant to those of us who like to read literature in other languages - to inform specialists of different fields what words correspond in other languages to terms and definition of the English language. Overall, the dictionary is meant for archaeologists to better understand the natural sciences and for natural scientists to find out how their knowledge contributes to better comprehend the past.

Zvi Goffer did an excellent job by putting together terms and definitions from several scientific fields that do relate to modern archaeological practice. Among these scientific fields are: chemistry, geology, physics, biology, ecology, and paleontology. The merge between archaeology and science is getting wider and it materializes especially strong in the development of new methods and techniques that archaeologists utilize today. These methods are design to make our job easier and more accurate and the dictionary has been fashioned to better understand the methods which make our job so exciting.

Personally, I favor publications which offer multilingual translations of terms or definitions mostly because they help me in reading professional publications in other languages. To other archaeologists, antiquarians, art historians, conservators, museum curators, and natural scientists this dictionary will be a compact and convenient source of valuable information. **Expanding the View of Hohokam Platform Mounds: An Ethnographic Perspective**. Mark E. Elson. Anthropological Papers of the University of Arizona Number 63. The University of Arizona Press, 1998. XI+145 pp., 33 figures, 8 tables, 1 appendix, references, index. Price: \$16.95 (paperback) ISBN: 0-8165-1841-6.

Reviewed by Michael D. Pool, Austin Community College, 7748 Highway 290 West, Austin, TX 78736

This monograph is not only relevant to Southwestern and Hohokam specialists but will also be of interest to those studying the evolution of sociopolitical complexity. The author strives to resolve the controversy of Hohokam platform mound function in the American Southwest, specifically the Tonto Basin. Previous research used the same sets of data to develop conflicting interpretations of function. One interpretation interprets Hohokam platform mounds as residential features used by and benefiting a socially ranked or stratified society. The other view sees the platform mounds as largely vacant, unused ceremonial features used by groups of limited social differentiation, i.e. egalitarian organization. In order to understand the relationship of mound construction and social complexity, Elson examines ethnographic and ethnohistoric data of mound using groups in Micronesia, Polynesia, South America, and the southeastern United States.

Chapter 1 provides a general overview and history of platform mound research in the American Southwest. Various models used to interpret platform mounds are discussed.

Chapter 2 examines ethnographic and ethnohistoric data for mound-using groups in Micronesia and Polynesia (Ifaluk, Yap, Somoa, and Marquesa along with supplementary data from Tonga and Hawaii), South America (Mapuche), and the southeastern United States (the ethnohistoric Choctaw and Natchez). The author examines environmental data, population size, sociopolitical organization, economic systems, and religious practices relative to the types and functions of platform mounds in these societies.

Chapter 3 synthesizes these data to determine any regularities in human behavior, platform mound function, and sociopolitical organization. This chapter is the meat of the monograph, as well as being the most thought provoking.

Elston found that the societies in the study shared the following attributes: 1. They had a designated chief or headman that provided leadership; 2. Each group had a system either of individual and group ranking or of stratification; 3. Rank or class was inherited; 4. They had a structured redistribution of resources and feasting.

The study also showed that there is no relationship between platform mounds and types of descent systems, marriage practices, or postmarital residence rules. There probably was no relationship with tribute collection, full or part time specialization, or clans.

The study indicates that ethnographic platform mounds cannot be grouped into functionally homogenous categories. Most archaeological interpretations are too simplistic. However, Elson found that mound construction and use in these middlerange groups had several common attributes: 1. Platform mounds were multifunctional and can encompass a number of different functions at any given time or sequentially. They are used most commonly as residential, temple, burial, and community mounds.

2. Mound-using groups were ranked or stratified with a designated chief or leader, e.g. socially complex groups with institutionalized hierarchical social organization. Except for small residential mounds, platform mounds were associated with some control of community labor and resource distribution.

3. The greater the diversity of mound types and the larger the size of the mounds, the greater is the social complexity and the authority of the chiefs or religious leaders. The greater the energy investment in mound construction, the greater is social complexity. Also, the control of resources by chiefs or highly ranked individuals is greater. Feasting and redistribution were common features.

4. Platform mounds were associated with a specific descent group or a group considering themselves to have a common ancestry (household, lineage, clan, or tribe). Platform mounds are often used to glorify the corporate group and are probably associated with some form of ancestor worship.

5. If the territory is still occupied by the descent group, platform mounds will take on a different function once they are abandoned. They often serve as a mythical home of descent group ancestors. Except for small residential mounds, all platform mounds were re-used, so sequential use is a common characteristic.

In Chapter 4, Elson turns his attention to the Tonto Basin and examines the debate over prehistoric settlement in this area. In reviewing the research in the Tonto Basin, he focuses on a single local settlement system in the eastern Tonto Basin that contained 5 platform mound sites and 39 other sites. The primary debate concerns the nature of the occupation: is it indigenous or was it the result of settlement by Hohokam, Mogollon, or Anasazi groups or some combination of these. Implicit in the debate are assumptions about the nature of the social complexity of groups in the Tonto Basin that produced the Roosevelt Phase platform mounds.

Those that see a Hohokam affiliation argue that the platform mounds are the result of peer-polity emulation or the migration of elite members of Hohokam groups in the Phoenix Basin. The platform mounds are viewed as marking upper tier sites in a hierarchical settlement system and functioned in the administration of irrigation systems, land tenure, and/or trade networks. The institutionalized elite then lived on top of the platform mounds or they served as redistribution centers the integrated a dispersed community exploiting a number of different resource zones.

Researchers that espouse Mogollon-derived models attribute significantly less social complexity to the platform mound builders. There are no elite leaders or elite residences. These groups were egalitarian. The Tonto Basin platform mounds functioned solely as nonresidential ceremonial structures that integrated kinship/clan segments or small residential units through ritual. Like the Hohokam model, the platform mounds functioned to organize labor, land tenure, and community organization and to redistribute resources but doing so within an egalitarian system. The difference is not so much in the functions of the mound as in the social complexity as it is in the degree of social complexity required for these functions and construction of platform mounds. Did ritual organization or elite control have the primary role?

In Chapter 5, Elson examines the eastern Tonto Basin settlement system in light of his ethnographic model. From this study, it is clear that mound-using groups are either ranked or stratified with some form of inherited leadership. Moreover, the degree of complexity is correlated with the size and diversity of platform mounds. The most highly ranked and stratified societies had the largest (by volume) and the greatest number of functionally different mounds. This information indicates that the Roosevelt phase mound-building groups were ranked and had ascribed leadership with ranking between individuals and groups. However, given the moderate size and limited diversity of types of mounds, they probably were not stratified.

The crux of Elson's model is the correlation between social complexity and energy expended by a group in construction. The more energy that was expended the more complex social organization has to be to mobilize and direct a work force. Mound size and diversity are proxy measures for the amount of energy expended in construction. Elson demonstrates this relationship in his ethnographic and ethnohistoric study of platform mound-using groups. However, I am intrigued by the idea of a general relationship between social complexity and the energy required for construction projects. Elson's research begs for a study beyond platform mounds that would examine this relationship in a more general sense. Could it be that the Great Kivas of the "egalitarian" Mogollon required similar energy expenditures, suggesting a similar level of complexity?

Chapter 6 examines Hohokam platform mounds in general. There are seven major clusters of platform mounds in the Hohokam region. Platform mounds within any cluster are more similar in form and, presumably, function within clusters than between any clusters. This suggests that platform mound function was locally oriented rather than regionally oriented. More importantly, there are more and larger platform mounds in the Phoenix Basin cluster than in any other cluster; the smallest Phoenix Basin platform mound is larger than the largest platform mound of any other cluster. This suggests that models for the Phoenix Basin are not applicable to other clusters.

Lastly, Elson lists the Roosevelt Project reports and papers by producing firm (Desert Archaeology; Statistical Research; and the Arizona State University Office of Cultural Resource Management) in an appendix. This is a laudable attempt to make the gray literature of contract work more visible.

Determining Geologic Sources of Artifact Copper: Source Characterization Using Trace Element Patterns. George (Rip) Rapp, James Allert, Vanda Vitali, Zhichuan Jing, and Eiler Henrickson. University Press of America, Lantham. 2000. xi + 156 pp., 24 figures, 41 tables, 2 appendices, glossary, index, bibliography. ISBN 0-7618-1688-7.

Reviewed by Kathy Ehrhardt, Department of Anthropology, New York University, New York, NY 10003

Compared to work with other archaeological materials, relatively few archaeometric provenance studies focus on, or have even dealt with, sourcing native North American artifact copper. For George Rapp and his team, this small volume represents the results of large-scale, long-term pioneering research into the applicability of trace-element analysis by neutron activation to doing just that. For over a quarter century, he and his colleagues, based at the Archaeometry Lab, University of Minnesota, Duluth, have been engaged in developing standardized methodological procedures and appropriate analytical protocols for using NAA to link, as unambiguously as possible through chemical fingerprinting, individual prehistoric copper artifacts with the particular ore sources from which the artifact raw material came. To date, they have amassed an impressive database of well over 1,000 trace element characterizations representing at least seventyfive potential ore sources from at least five major copper-bearing regions of North America. They have successfully fingerprinted seventeen sources. The team has also sampled over 200 native copper artifacts, and have proposed sources for twenty-one. As their research unfolded, the group published several "works in progress" reporting on various aspects of the problem. They now submit the current monograph as their most thoroughgoing, comprehensive treatment of the data to date. What they present here is a concise, substantive, readable chronicle of their efforts to streamline this specific technique for use on a particular class of raw material and on the prehistoric material culture industry associated with it. It represents a monumental step forward in native copper sourcing studies.

Their research responds directly to longstanding questions archaeologists have asked concerning the sources of artifact copper in prehistory. Inquiry has centered on the native copper deposits of the Lake Superior region. Because of the geological significance of the deposits and the amount of prehistoric extraction and production activity that went on there, it has long been considered the "center" of indigenous copper working technology. However, throughout prehistory, major copper-using cultures have been found hundreds of miles from this source. Also, functional and decorative artifacts made of native copper have been recovered from burial and domestic contexts at sites in many parts of the eastern woodlands. These occurrences have served as important springboards for investigating such processes as the dynamics of long distance trade/exchange, technological and symbolic aspects of mortuary ceremonialism, and continuity in change in ancient metalworking practices. Archaeologists have been quite successful modeling these activities by finding patterns in the form, manufacturing style, and use, as well as the depositional context and distribution of copper artifacts. However, at the same time, many have assumed that the copper itself originated in the Lake Superior region. While some archaeologists have long been aware that understanding where the artifact copper actually came from would have enormous implications for validating, adjusting, or even redrawing these models, scientific attempts to source native copper using trace-element analysis have lagged behind investigations centering on other raw materials.

This volume reflects these authors' attempts to remedy the situation. The thrust of their research here, however, is methodological and analytical, not interpretive in an archaeological sense. In the introduction, they provide only a brief historiographic overview of archaeological investigations into Great Lakes copper and into the question of copper sourcing. For this background, they refer the reader to their previous papers or to the references they cite in the text. They proceed directly to explaining how provenance studies using trace-element analysis can contribute to resolving these questions, and that their research goals center on working out a methodology with which to do so. Their strategy has involved locating, sampling, and characterizing accurately as many geological copper sources (ore bodies, mines, localities) as possible. Once copper sources were "fingerprinted" geochemically, characterizations of individual artifacts could potentially be "matched" to them.

The researchers then introduce the reader to the myriad of complex geological, methodological, and analytical problems they faced as they made their way through their research program. These problems relate to three major aspects of the research: 1) understanding the geochemical nature and heterogeneity of the raw material as it occurs in nature and the potential changes it may have undergone as it was processed, used and abandoned in prehistory; 2) determining the appropriateness and limitations of the technique and the instrumentation as well as establishing optimal sampling and data collection procedures; and 3) applying the appropriate suite of statistical methods to achieve the most accurate characterizations results. They spend much of the rest of the book discussing these problems in greater depth and explaining how they handled them.

In Chapters 2 and 3, they set the "material" stage by providing important geomorphological and geochemical descriptions of several types of copper deposits across North America. Although they tested over 75 separate deposits, they focus on the 17 which were ultimately fingerprinted. Importantly for provenance studies of native copper, the specific geochemical conditions under which copper is formed are reflected in its trace element makeup. As the authors note, however, understanding and accounting for within-source variation in trace element distribution is as important (and can be as problematic) as characterizing between-source variation.

Chapters 4 and 5 cover how the INAA technique works and how specific sampling and data collection procedures were ultimately arrived at to ensure optimal irradiation results and accurate trace-element values. For instance, careful recording and sampling protocols were established to avoid problems and errors due to improper material sampling and specimen preparation. Irradiation parameters (flux, irradiation and decay times) and measurement protocols had to be worked out and kept relatively constant for each of the batches irradiated. When standards were changed at the reactor facility (U. of Wisconsin Nuclear Reactor) from use of an internal gold standard to a soil standard (Canadian Reference Soil Standard CCRMP-SO4), inconsistencies in the growing database needed to be resolved. As a result, after 20 years of refining the technique, the authors reanalyzed 389 key source and artifact samples.

The next three chapters (6-8) review the data analyses and results. First, the authors explain how the ten trace-elements (AG, Cr, Fe, Hg, Sb, Zn, As, Au, La, W) they used in their analysis were selected from the original 46 measured. They then walk readers through the analytical procedures used to classify and separate sources, providing clear and detailed rationale for each step. Easily decipherable tables and figures illustrate their arguments. The authors used a multivariate statistical approach, specifically predictive and descriptive discriminant analyses, to analyze the data. Seventeen deposits were represented in the data set. In all but two cases, the deposits were represented by at least ten samples, collected as carefully as possible from areas within a defined source.

Their results demonstrated clear geographic distinction among source groupings, with the seven Lake Superior Region sources clustering together. Further separations within these seven deposits were also possible. Separations were based largely on relative trace-element contents. Particular elements or elements determined to be discriminating factors in both classification and separation of sources were identified.

Finally, the researchers turn to sourcing native copper artifacts (Chapter 9). They use samples from three northeastern Minnesota prehistoric sites to demonstrate the process, focusing on the Lake Superior region as the potential source of the raw material. Twenty-one native copper artifacts were sourced to seven fingerprinted deposits in the region. Based on the differences in age of the artifacts, the authors posit that this information may well lead to new thoughts about locational change in intraregional exploitation of Great Lakes sources over time.

The authors conclude by emphasizing that the database as presented is far from exhaustive. As they readily admit, many problems, including inter-laboratory comparability of results, could not be solved herein. However, numerous issues were indeed resolved, and the methodological and substantive contributions of this volume far outweigh its shortcomings. The authors have demonstrated (at least in the cases they presented here) that discrete geological sources of native copper can be distinguished reliably through trace-element analysis. In addition, the trace-element data (presented both in the text and in the appendices) and the methodology generated in this study provide researchers with a solid jumping-off place from which to further test and refine the methodology, expand the database, and extend native copper sourcing assignments. More importantly, with this research, Rapp and his colleagues have provided the opportunity for archaeologists to apply a new line of scientifically derived evidence to our old, as yet unresolved questions concerning prehistoric copper exploitation. While the authors make only limited attempts to do so, interested readers may go to Mary Ann Levine's work on sourcing native copper in the northeast by NAA for one good example.

Reference

Levine, Mary Ann. 1996. *Native Copper, Hunter-Gatherers, and Northeastern Prehistory*. Unpublished dissertation, Department of Anthropology, University of Massachusetts, Amherst. **Spanish Colonial Silver Coins in the Florida Collection.** Alan K. Craig, University Press of Florida: Gainesville, 2000. xxv + 217 pp., 28 tables, 3 appendices. Price: \$49.95 (paper). ISBN: 0-8130-1748-3.

Reviewed by Danielle A. Parks, Cyprus American Archaeological Research Institute, 11 Andreas Demetriou Street, Nicosia 1066, Cyprus

In this volume, Alan Craig discusses the Spanish colonial silver coins in the Florida Collection, approaching 23,000 in number. The book is divided into two parts, with the first, including Chapters 1 through 5, summarizing the background of Spanish colonial minting, and the second, Chapters 6 through 10, devoted specifically to those issues appearing in the Florida Collection.

The Florida Collection is comprised almost entirely of coins acquired through salvage operations recovering material from shipwrecks within the territorial waters of Florida. For the most part, there was no active selection involved, as the finds were divided into four lots by weight and number, with the state receiving one lot. The composition of the collection is further shaped by the dates of the shipwrecks, with the 1715 Fleet contributing 97% of the holdings. The author has been studying the collection for fifteen years, publishing the gold coins before moving on to the more numerous silver issues. The proposed aim of this book is to cater to both the academic and the layman, presenting representative examples of the various issues included in the Florida Collection.

Chapter 1 briefly introduces the shipwrecks before moving on to an outline of the Spanish involvement in the New World. Spanish interest is explained in terms of the material benefit that the government reaped from the exploitation of mineral resources, enabling the monarchs to pursue their political agendas in the Old World. He concludes with a description of the route taken in the transport of the precious metals.

Chapter 2 outlines the organization of the mints, including weight standards, administration, and officials in charge. Switching back and forth between the highly technical and the popular, this section is often hard to follow and the sporadic organization does not help. It never becomes clear to the reader how each mint functions as an individual entity, and more importantly, as part of the entire Spanish colonial mint organization.

The next chapter is perhaps the most interesting in the whole book, and relates several of the more notorious scandals involving the Potosí mint. The author is at his best when he relays snippets of gossip, and indeed, seems to revel in them. He uses the term counterfeit to refer to the illegally debased issues produced by the Potosí mint, which implies that the agency itself was not official. Since the coins are in fact products of the official mint, it might be better to refer to them as illegally debased issues, as the term "counterfeit" can be confusing. The concept of countermarking is slipped in at the end of the chapter, and as a technical concept, would be better addressed elsewhere, perhaps in combination with Chapter 5.

Chapter 4 returns to the discussion of mint operating, but from the perspective of coin manufacture, and includes the retrieval and treatment of the ores, the manufacture of the coins, and their transport to Spain. Again, coverage here is uneven, at times quite informative and at others, topics are dealt with abruptly, fitted in as asides. If this chapter were to be combined with Chapter 2, the functioning of the individual mints would become much clearer.

The following chapter describes the types employed on the coins. It defines terms like cob and planchet, which have been referred to frequently in previous pages. Once again, the chapter suffers from the author's unfocused approach. It would be better placed before the discussion of mint organization, and the contents reshuffled. A clear description of the coin types – which are well illustrated but not coherently described in the text – should form the beginning of the chapter, with such aspects of manufacturing that are germane to the products of the individual mints, followed by forays into the "galanos" and other topics that catch the author's fancy.

Part II is devoted to the coins in the Florida Collection. Chapter 6 presents the background of the collection, noting the importance of the 1715 Fleet, and the dominance of the Mexican issues. Craig considers the frequency of the Mexican coins curious in view of the relative importance of the Potosí mint, but only later is it clear that the author believes that the Potosí issues simply "missed the boat."

The Mexican coins are the subject of Chapter 7. Thorough charts allow the reader to ascertain the relative frequency of the denominations, and the author confirms that the larger denominations were preferred for ease of transport, and were in fact minted for the express purpose of the Spanish tithe. Smaller denominations did not travel far, as they were intended to satisfy the needs of local commerce. Most of the chapter is devoted to a description of the coins' appearance, well illustrated by photographs, but with observations sometimes oddly lumped together. The discussion of certain technical aspects is useful, as it allows one to differentiate between the products of different mints. The weakness of this chapter is its failure to draw any conclusions about the mint itself.

Chapter 8 is devoted to the author's favorite mint, Potosí. His liking for his subject inspires him to go beyond the description of the types and into a discussion of the mint history and operation, but it is still difficult to reconstruct the chronology of the mint, and its place in the Spanish economy. Chapters 9 and 10 follow almost as afterthoughts. Chapter 9 covers four mints, Lima, Cartagena, Santa Fé de Bogotá, and Guatemala, most of which are mentioned for the first time in this chapter. Once again the focus is on the appearance of the coins, rather than their significance. The author asserts that the relative frequency of denominations is the same for all the mints, but Lima's surge in the four-real coins, would argue that it is not. Chapter 10 briefly concludes the text, with a statement of the significance of the Florida Collection - it is the largest collection of salvaged Spanish colonial collection – and that the direction of future study lies in metallurgical analyses to ascertain the metal standards.

Three appendices follow. The first lists conversion rates for various units, and the third, useful for the scholar, conveys such information as weights, assayers, and registration numbers for those coins illustrated. The second appendix presents the translated text of an archival document describing a visit to the Potosí mine in 1700, which is more coherent than the corresponding section in the text.

This book suffers from two problems. The first is the scattershot approach adopted by the author, lacking a strong connective organization, and waivering between the highly technical and the popular. Partially, this is a consequence of trying to cater to both professional and amateur audiences simultaneously, but revision emphasizing organization and even coverage would have been beneficial. What is more frustrating to the reader is the lack of a coherent analysis as the mines as a unit, resulting in useful conclusions concerning the workings of the Spanish colonial economy. How the mints cooperated and their relative chronologies are not discussed. Internal operation of the individual mints is not clearly described, and no die studies, for example, which might enlighten us about the mint organization, are cited. In conclusion, this book has the opportunity to enlighten its audience on the workings of the Spanish colonial economy, but this will require the publication of another volume.

British Museum Occasional Paper Number 136: The Ferrous Metallurgy of Early Clocks and Watches: Studies in Post Medieval Steel. Michael L. Wayman, editor. London: British Museum Press, 2000. xi + 215 pp., figures, tables, appendix, glossary, indices.

Reviewed by Edward F. Heite, Heite Consulting, Box 53, Camden, DE 19934 USA

In every era, technologies have interacted, driving one another to innovate. In our own time, for example, demands of the space race have spawned innovative revolutions in several fields. During the nineteenth century, railroad demands for steel rails led to explosive growth in metals industries. The resulting flowering of Bessemer steelmaking is, in turn, credited with making possible the skyscraper.

Still earlier, demands of clock-spring makers inspired steelmaking innovation. This book examines tangible evidence of the interaction between horology and metallurgy during a period of technological change. It combines written evidence of technological history with studies of actual products to accurately measure the rate of innovation.

The book is the product of five collaborators, who worked together in different collaborations on the six chapters. Specimen timepieces were taken from collections of the British Museum, where the authors are associated with the departments of scientific research (Paul Craddock and Janet Lang) and of medieval and later antiquities (Paul Craddock and Janet Lang). Michael Wayman, the principal investigator and general editor, was on study leave at the Museum from the University of Alberta, Edmonton.

The work is aimed at horologists and metallurgists and historians of both specialist fields. Because it traces the development of timepieces and the metal parts that ran them, few readers can be expected to follow discussions in both fields

þage 29

without assistance. A well-conceived glossary of horological and metallurgical terms provides a bridge for both audiences, and provides access for the larger body of potential readers who are specialists in neither field.

The introductory chapter begins with an historical overview of timekeeping technology, including a particularly lucid description of the various mechanical elements and how they developed. Then there is a description of the ferrous metals and differences among the evolving steelmaking methods.

Chapter 2 examines the development of ferrous metallurgical technology and the central role of timepieces in its development during the post-medieval period. Indeed, the authors make a good case for spring-making providing the necessary technological incentive for steelmaking improvements. Indeed, the authors demonstrate that European crucible steel was originally developed to meet exacting demands for the manufacture of clock springs.

Chapter 3 is an examination of seven sixteenth-century iron clocks in the British Museum collection. All the testing had to be non-destructive, since the clocks are complete and working museum specimens. Some standard laboratory procedures, such as mounting in epoxy for metallographic sample preparation, were impossible under these constraints. Nonetheless, the experimenters were able to conduct sophisticated analysis, including SEM-EDX and XRF.

Mainsprings from the sixteenth to nineteenth centuries were the focus of chapter 4. The thirty specimens were arranged and considered in chronological order, "to elucidate the technologies used and their changes over time." When the mainspring was introduced, early in the post-medieval period, clocks were freed from the physical constraints imposed by heavy weights that had driven earlier mechanisms. Eventual developments of watches and chronometers were made possible by this innovation.

Chapter 5 concerns five English watches dated between 1684 and 1803 from the museum's collection. As expected, the introduction of crucible steel in the 1740s was immediately reflected in watch springs.

Chapter 6 summarizes the role of clockmakers in the development of European ferrous metallurgy between the sixteenth and nineteenth centuries.

The editor is to be praised for including a translation from the French of a 1780 Dutch treatise on spring-making, accompanied by twelve period engravings in the style familiar from Diderot's Encyclopedia. The engravings amply illustrate the spring making process during the late eighteenth century, with all the tools. As with the workmen shown in Diderot's plates, we are expected to accept the proposition that springmakers at work were clad in knee-breeches, tricorn hats, and lace cuffs.

This book's usefulness is seriously impaired by conservative and obsolete design features. Halftone illustrations are clustered in the back, but line drawings are in the text. This arrangement requires the reader to constantly flip between text and pictures. To compound this difficulty, the line-art "figures" and halftone "plates" are numbered sequentially within each chapter. Thus, Figure 1.3, a line drawing, is on page 7, but figures 1.4 and 1.5 are on page 147. Many years ago it was necessary to segregate halftone plates from text and line art because they were printed on different paper, using different processes. For at least two generations, this distinction has been technologically unnecessary, and its retention is nothing but annoying affectation.

Similarly, there are three separate indices: subjects, places, and proper names. Again, this archaic system serves no purpose except to make the volume less useful. On the other hand, the editor has fused all the different authors' references into a single bibliography, which is welcome.

In spite of the regrettably archaic layout, this useful and attractive volume is a significant contribution to our understanding of an important period of technological change in the metals industries.

Looking Into the Earth: An Introduction to Geological Geophysics. Alan E. Mussett and M. Aftab Khan. Cambridge University Press, New York, 2000. xix + 470 pages. Paperback: \$42.95, ISBN 0-521-78574-X, Hardback: \$110.00, ISBN 0-521-78085-3

Reviewed by John W. Weymouth, Department of Physics and Astronomy, University of Nebraska, Lincoln, Nebraska, 68588-0111, USA

This is a very readable and enjoyable book. I had fun with it. This is not a detailed, advanced text but rather, as the authors state, is "an introduction to geophysics suitable for those who do not necessarily intend to become professional geophysicists. These include geologists, and other earth scientists such as civil engineers, environmental scientists, and field archaeologists." So you can see it covers a lot of territory, but not in great depth. The authors are experienced geophysicists, teachers and writers, Mussett at the University of Liverpool and Khan at the University of Leicester. The book is first launched with a section on data acquisition and reduction as well as "Carrying out a geophysical Survey". This is followed by global, refraction and reflection seismology that includes an interesting section on earthquakes. Next are sections on small scale and large-scale gravity. The section on magnetism opens with a section on palaeomagnetism that includes material on polar wandering and the magnetic polarity time scale. Surveying, including anomaly shapes, source depths and computer modeling, follows. The section on electrical includes chapters on resistivity, induced polarization, self-potential and electromagnetic methods.

The chapter on radiometric dating includes several dating methods that cover a larger range than carbon-14, some of which are significant in early hominid dating. The discussion of the age spectrum method in Ar-Ar dating is a great contribution to an elementary text. These topics are not usually covered in standard geophysics texts. Other sections cover radioactive surveying, geothermics, well logging and subsurface methods. Throughout the book there are informative sidebars to expand on definitions, basic equations or other special mathematical.

About 29% of the book is devoted to examples of applications, all of which are most interesting. For just

informative reading you can pick a topic from tectonics or volcanoes or the East African Rift or the K/T mass extinction asteroid or whatever might pique your interest.

Then finally the chapter that might be of most interest to the readers of the SAA Bulletin, the chapter on Archaeological Surveying. This is actually rather brief, laying out the essentials of the most commonly used methods - resistivity, magnetics, conductivity and radar - as applied to archaeological problems. These sections are followed with a brief one on the display of data. Two case histories are presented. One is a Roman villa on the Salisbury Plain, the other a fur-trading fort in Canada. This section could serve as an introduction to the topic, but if the reader is really interested in learning about geophysics applied to archaeological sites, time would be better spent reading Clark (Seeing Beneath the Soil: Prospecting Methods in Archaeology, 1990, Batsford, London) or for a more thorough approach, Scollar et al. (Archaeological Prospecting and Remote Sensing, 1990, Cambridge University Press, Cambridge, UK).

Throughout this book, as is befitting an elementary text, each chapter ends with a useful summary, then a list of problems. The causal reader might enjoy trying some of these problems. The answers to the problems are listed in an appendix.

This is a most enjoyable book. It is not small, 470 pages and a large, 8.5 by 11 inch format, and contains many topics not usual in elementary geophysics texts. It is not the answer for some one seriously interested in geophysics applied to archaeology but could provide useful background information for many related archaeological topics.

Meetings Calendar

Susan Mulholland, Associate Editor

* = new listings; + = new information for previous listings

2001

- Aug. 26-30. 10th Archaeological Chemistry Symposium. American Chemical Society Meeting, Chicago, Illinois, USA. Kathryn Jakes, 1787 Neil Ave., Columbus, OH 43210-1395, USA; tel: 614-292-5518; email: Jakes.1@osu.edu.
- *Aug. 27-31. Past Climate Variability Through Europe and Africa. Centre des Congrhs, Aix-en-Provence, France. Catherine Stickley, Environmental Change Research Centre, University College London, 26 Bedford Way, London WC1H 0AP, Great Britain; tel: 44-0-20-7679-5562; fax: 44-0-20-7679-7565; email: c.stickley@ucl.ac.uk; web: www.geog.ucl.ac.uk/ecrc/pep3/ aix2001/
- Aug. 29-Sept. 1. Archaeological Science 2001. University of Newcastle upon Tyne, UK. Web: http://www.ncl.ac.uk/ geography/conference/conference.html. Email: m.collins@ ncl.ac.uk.
- *Sept. 50th Anniversary Symposium on Scientific Research in the Field of Asian Art. Forbes Symposium 2001, DCSR,

Freer Gallery of Art/Arthur M. Sackler Gallery, Smithsonian Institution, Washington DC, 20560, USA; email: dcsr@asia.si.edu.

- *Sept. 2-8. XIVth UISPP Congress, Liege, Belgium. Includes colloquium: The Significance of Experimentation for the Interpretation of the Archaeological Processes: Methods, Problems, and Projects (Miarosa@tin.it or sperimentale@technologist.com). Conference website: www.ulg.ac.be/prehist/uispp-home.html.
- *Sept. 9-13. Ninth International Conference on Accelerator Mass Spectrometry, Nagoya, Japan. Contact: Prof. Toshio Nakamura, The Conference Chairperson, Center for Chronological Research, Nagoya University, Furo-cho, Chikusa-ward, Nagoya 464-8602 Japan. Tel +81-52-789-3082; fax: +81-52-789-3092; email: ams9@ nendai.nagoyau.ac.jp; web: http://www.nendai.nagoya-u.ac.jp/AMS-9/
- *Sept. 12-14. 2nd Conference on Preserving Archaeological Remains in Situ (PARIS2). Museum of London Archaeology Service. Three sessions: New Research, Decisions, and Strategic Direction. PARIS2, Museum of London Archaeology Service, 87 Queen Victoria Street, London EC4V 4AB, Great Britain; fax: 020-7410-2201; email fionam@molas.org.uk
- *Sept. 14-16. Historical Mtallurgy Society Conference 2001, University College, Northampton, UK. Eddie Birch, 1 Fields End, Oxspring, Sheffield, S36 8WH,UK.
- Sept. 18-22. PAGES PEPIII Conference. Aix-en-Provence, France. Catherine Stickley, Environmental Change Research Centre, Univesity College London, 26 Bedford Way, London, WC1H 0AP, UK; tel: 44-0-20-7679-5562; fax: 44-0-20-7387-7565; email: c.stickley@ucl.ac.uk; web: www.geog. ucl.ac.uk/ecrc/pep3.
- +Sept. 19-23. 7th Annual Meeting of the European Association of Archaeologists, Esslingen am Neckar, Germany. Session on Biomolecular Archaeology organized by J. Burger (email: jburger@mail.uni-mainz.de) and M. Collins. Conference website: www.esslingen.de/eaa2001/e-q-q-d.html For further information: EAA-Tagungsbüro 2001, Marktplatz 16, 73728 Esslingen am neckar, Germany. fax 711-3512.2912; email eaa2001@Esslingen.de
- *Sept. 19-23. The 4th International Conference on Archaeological Prospection (Archaeological Prospection 2001), a joint conference with AARG, Vienna, Austria. Info: Michael Doneus, Institut fuer Ur- und Fruehgeschichte, Franz-Kleingasse 1, A-1190 Wien; fax: +43-1-4277–9404; email: archeo2001@zamg.ac.at; web: http:// www.univie.ac.at/archeo2001/
- *Sept. 22-24. 11th Canadian Paleontology Conference (CPC-XI). London, Ontario, Canada. Jisuo Jin; email: jjin@julian.uwo.ca.
- *Sept. 22-26. Tree Rings and People: International Dendrochronology Conference. Davos, Switzerland. Connie Woodhouse, NOAA Paleoclimatology Program, National Geophysical Data Center E/GC, 325 Broadway, Boulder CO 80305, USA; tel: 303-497-6297; fax: 303-497-6513; email: woodhous@ngdc.noaa.gov; web: www.wsl.ch/forest/ dendro2001/

- October 3-6, 2001. 6th European Meeting on Ancient Ceramics (EMAC '01). Ceramic in the Society. Organized by M. Maggetti and V. Serneels, Institute of Mineralogy and Petrography, University of Fribourg, Switzerland. tel 41 26 3008920 / 31; fax 41 26 3009765; email: vincent.serneels@unifr.ch; web: www.unifr.ch/mineral/ emac01. Special sessions cover topics including: social interactions and constraints in the fields of production and consumption; history of development of ceramic technology and driving forces for inovation; ceramic materials used in pyrotechnologies (metallurgy, glassmaking, etc.); and scientific methods for the determination of the function of ceramics (residue analysis, etc.).
- *Oct. 14-15. Symposium on the Hiscock site. Buffalo Museum of Science, Buffalo, New York, USA. Michelle Rudnicki; tel: 716-896-5200, ext. 312; email: rudnicki@science-buff.org.
- *Nov. 1-2. Early Materials Forum, University of Bradford, UK. Contact: Lyn Wilson, email: l.wilson2@bradford.ac.uk. Website: www.ucl.ac.uk/emf/
- Nov. 14-17. New Discoveries from Materials Science in the Archaeology of the Near East. Symposium at the Annual Meeting of the American Schools of Oriental Research (ASOR), Boulder, Colorado. Session Chair: Elizabeth S. Friedman, University of Chicago. Email: esf1@midway.uchicago.edu. ASOR registration website: http://www.asor.org
- *Nov. 14-18. Chacmool 2001-An Odyssey of Space. University of Calgary, Alberta, Canada. Program Committee, Dept. of Archaeology, University of Calgary, Calgary, AB Canada T2N 1N4; fax: 403-282-9567; email: cjcluney@hotmailcom.
- Nov. 26-30. Materials Issues in Art and Archaeology VI. Fall 2001 Meeting of the Materials Research Society, Nov. 26-30th, Boston, MA, USA. Organizers: Pamela B. Vandiver, Martha Goodway, Jennifer Mass & James Druzik. For more info, visit the MRS website: www.mrs.org/meeting/fall2001/ or contact P.B. Vandiver, Smithsonian Center for Materials Research and Education, 4210 Silver Hill Rd., Suitland, MD 20746, USA;email: vandiverp@scmre.si.edu; tel (301) 238-3700 x-162; fax (301) 238-3709.
- *Nov. 28-Dec. 2American Anthropological Association meeting. Washington, DC, USA. Session: Ceramic Ecology XV-Current Research on Ceramics 2001. 15th Annual Ceramic Ecology Symposium. Charles Kolb, National Endowment for the Humanities, Room 411, 1100 Pennsylvania Avenue, NW, Washington DC, USA; tel: 202-606-8250; fax: 202-606-8639; email: ckolb@neh.gov.

2002

- *Jan 9-12. 35th Conference on Historical and Underwater Archaeology. Adam's Mark Hotel, Mobile, Alabama, USA. Amy Young, Dept. of Anthropology and Sociology, PO Box 5074, University of Southern Mississippi, Hattiesburg, MS 39406, USA; fax: 601-266-6373; email: amy.young@usm.edu.
- *Jan. 29-Feb. 1. Congresso dell'Associazione Italiano

d'Archeometria. Web: www.geomin.unibo.it/ORGV/aiar/ congr2/index.htm. AIAr President: Claudio D'Amico, Dip. Scienze della Terra e Geologico Ambientali, Piazza San Donato, 1, I 40126 Bologna, Italy. Tel. 39 0512094923; fax: 39 0512094903/04; email: damico@geomin.unibo.it

- *April 9-13. Fourth Symposium14c and Archaeology, Oxford, UK. Contact: Oxford Radiocarbon Accelerator Unit, Research Laboratory for Archaeology and the History of Art, 6 Keble Road, Oxford OX1 3QJ, England; fax: + 44 0 1865 273932; email: orau@archaeology_research. oxford.ac.uk
- +April 22-26. 33rd International Symposium on Archaeometry. Amsterdam, The Netherlands. Theme Session: Conservation Studies-Science and the in situ Preservation of Archaeological Heritage. E.A.K. Kars, Rijksdienst voor het Oudheidkundig Bodemonderzoek, P.O. Box 1600, 3800 BP Amersfoort, the Netherlands; tel: 31 33 422 76 06; fax: 31 33 422 77 99; email: e.kars@archis.nl; web: www.archaeometry.vu.nl.
- *July 21-25. The 6th International Conference of Ancient DNA and Associated Bio-molecules, Jerusalem, Israel. Contact: Mark Spigelman. Email: dna6@md.huji.ac.il
- Aug. 14-21. 17th World Congress of Soil Science, Bangkok Thailand.Arid and Semi-Arid Soils: Records of Past Climates, Carbon Sequestration, Genesis and Management. Convenor: Brenda J. Buck; University of Nevada Las Vegas, Department of Geoscience, 4505 Maryland Parkway, Las Vegas NV 89154; tel 702-895-1694; email buckb@nevada.edu; web: http://www.17wcss. ku.ac.th/
- *August 28-31. 4th International Meeting on Phytolith Research, McDonald Institute for Archaeological Research, University of Cambridge, UK. For further information: Marco Madella,
- The McDonald Institute for Archaeological Research, Downing Street, Cambridge CB2 3ER. Tel: 44-(0)1223-333537; fax: 44-(0)1223-339285. Website available soon.

2003

- *March 29-April 2. 3rd International Congress of Limnogeology. Tucson, Arizona, USA. Andy Cohen; email: acohen@geo.arizona.edu.
- *June 21-26. The Fifth World Archaeological Congress, Washington, DC. To be held at the Catholic University of America, in partnership with the Smithsonian National Museum of Natural History & National Museum of the American Indian. Web: www.american.edu/wac5; email: wac5@american.edu; fax: 202-885-1837.
- *Sept. 1-5. 18th International Radiocarbon Conference, Wellington, New Zealand. Hosted by the Rafter Radiocarbon Laboratory and held in the Museum of New Zealand, Te Papa Tongarewa. For further information: Rafter Research Centre, PO Box 31 312, Lower Hutt, new Zealand; tel 64-4-570-4650; fax 64-4-570-4657; email 14Confinfo@gns.cri.nz
- *Sept. 24-26. Archaeometallurgy in Europe, Milan, Italy. International Conference organized by the Associazione Italiana di Metallurgia. First announcement available on the conference website: http://www.fast.mi.it/aim/archaeo.htm

Department of Anthropology University of South Florida 4202 E Fowler Ave SOC 107 Tampa FL 33620-8100

ADDRESS SERVICE REQUESTED

Please send subscription address changes to Secretary/Treasurer.

SAS Bulletin Society for Archaeological Sciences

SAS Bulletin Staff

Editor: **Robert H. Tykot**, Department of Anthropology, University of South Florida, 4202 East Fowler Avenue, Tampa, Florida 33620-8100, USA; tel 813-974-7279; fax 813-974-2668; e-mail rtykot@chuma1.cas.usf.edu

Associate Editor, Archaeological Ceramics: Charles C. Kolb, National Endowment for the Humanities, Division of Preservation and Access, Room 411, 1100 Pennsylvania Avenue, NW, Washington, DC 20506, USA; tel 202-606-8250; fax 202-606-8639; e-mail ckolb@neh.gov

Associate Editor, Archaeological Chemistry: Michael Richards, Department of Archaeological Sciences, University of Bradford, UK. email: M.P. Richards@Bradford.ac.uk; tel (01274) 235532; fax (01274) 235190

Associate Editor, Archaeometallurgy: Martha Goodway, Smithsonian Center for Materials Research and Education (SCMRE), 4210 Silver Hill Road, Suitland, MD 20746-2863 USA; tel 301-238-3700 x164; fax 301-238-3709; email GoodwayM@scmre.si.edu

Associate Editor, Bioarchaeology: David B. Landon, Center for Cultural and Environmental History, Anthropology Department, University of Massachusetts-Boston, Boston, MA 02125 USA; email david.landon@umb.edu

Associate Editor, Book Reviews: Michael D. Glascock, Missouri University Research Reactor, 223 Research Reactor Center, University of Missouri, Columbia, MO 65211, USA; tel 573-882-5270; fax 573-882-6360; e-mail glascock@reactor.murr.missouri.edu

Associate Editors, Dating: Jack Rink, Department of Geology, McMaster University, 1280 Main Street West, Hamilton, ON, Canada L8S 4M1; tel 905-525-9140 x24178; fax 905-522-3141; e-mail rinkwj@ mcmail.cis.mcmaster.ca; Donna L. Kirner, UCR Radiocarbon Laboratory, Department of Anthropology, University of California-Riverside, Riverside, CA, 92521-0418 USA; tel 909-787-6346; fax 909-787-5409; e-mail dkirner@ucrac1.ucr.edu;

Associate Editor, Geoarchaeology: Mike Waters, Anthropology Department, Texas A&M University, College Station, TX 77843-4352, USA; tel 409-845-5246; fax 409-845-4070; e-mail waters@tamu.edu

Associate Editor, Meetings Calendar: Susan Mulholland, Archaeometry Laboratory, U. of Minnesota-Duluth, 10 University Drive, Duluth, MN 55812, USA; tel 218-726-7957; fax 218-726-6979; e-mail smulholl@d.umn.edu

Associate Editor, Remote Sensing and GIS: Apostolos Sarris, Laboratory of Geophysical - Satellite Remote Sensing & Archaeoenvironment, Institute of Mediterranean Studies, Foundation of Research & Technology Hellas, Melissinou & Nikiforou Foka 130, P.O. Box 119, Rethymnon 74100, Crete, Greece; tel (30)-831-25146, (30)-831-56627; fax (30)-831-25810; e-mail: asaris@ret.forthnet.gr

SAS Administration

General Secretary: **R. E. Taylor**, Radiocarbon Laboratory, Department of Anthropology, University of California-Riverside, Riverside, CA 92521, USA; tel 909-787-5521; dept. tel 909-787-5524; fax 909-787-5409; e-mail retaylor@ucracl.ucr.edu

SAS Executive Officers 2001-2003

President: Arleyn W. Simon, Archaeological Research Institute, Department of Anthropology, Arizona State University, Tempe, AZ 85287-2402, USA; tel 602-965-9231, 6957(direct); fax 602-965-7671; e-mail Arleyn.Simon@asu.edu

Vice President/President-elect: **Gregory Hodgins**, Center for Applied Isotope Studies, University of Georgia, 120 Riverbend Road, Athens, GA 30602, USA; tel 706-542-1395; 706-542-6111; fax 706-542-6106; email ghodgins@arches.uga.edu

Past President: **Christine Prior**, Rafter Radiocarbon Laboratory, Institute of Geological & Nuclear Sciences, 30 Gracefield Road, PO Box 31-312, Lower Hutt, New Zealand; tel 64-4-570-4644; fax 64-4-570-4657; email C.Prior@gns.cri.nz

Secretary/Treasurer: Felicia R. Beardsley, Department of Anthropology, Univ. of California-Riverside, Riverside, CA 92521-0418, tel 909-787-5524; fax 909-787-5409; e-mail beardsley@qnet.com

Internet and the World Wide Web: James Burton, Department of Anthropology, University of Wisconsin, Madison, Wisconsin 53706-1393, USA; tel 608-262-4505; fax 608-265-4216; e-mail jhburton@facstaff.wisc.edu

Vice President for Intersociety Relations: **Michael Richards**, Department of Archaeological Sciences, University of Bradford, UK; tel (01274) 235532; fax (01274) 235190; email: M.P. Richards@Bradford.ac.uk

Vice President for Membership Development: Christian Wells, Department of Anthropology, Arizona State University, Tempe, AZ 85287-2402, USA; tel 602-965-9231; fax 602-965-7671; e-mail christian.wells@asu.edu

SAS Editor for Archaeometry: **Steven Shackley**, Phoebe Hearst Museum of Anthropology, 103 Kroeber Hall, University of California-Berkeley, Berkeley, CA 94720-3712, USA; tel 510-643-1193, x-3; fax 510-642-6271; e-mail shackley@qal.berkeley.edu

Editor, Archaeometry: Michael Tite, Research Laboratory for Archaeology and the History of Art, Oxford University, 6 Keble Road, Oxford OX1 3QJ, UK; tel 44-(0)1865-515211; fax 44-(0)1865-273932; email Michael.Tite @rlaha.ox.ac.uk

Editor, Journal of Archaeological Science: **Richard Klein**, Department of Anthropology, Stanford University, Stanford, CA 94305-2145, USA; e-mail RKlein@Leland.Stanford.edu

SAS web page: http://www.wisc.edu/larch/sas/sas.htm

Published quarterly by the Society for Archaeological Sciences

Distributed to subscribers: \$20/year regular membership; \$15.00 student and retired; \$30.00 institutional; \$300 lifetime. Individuals add \$95.00/ year for *Journal of Archaeological Science*; \$30/year for *Archaeometry*. Payable with major credit cards (+7%). ISSN 0899-8922.