



SAS Bulletin

Society for Archaeological Sciences

Volume 26 number 3/4

Winter 2003



From the Editor

We apologize for the delay in the publication of the last 2003 issue of the *SAS Bulletin*, but there were some personal and other factors leading to the delay. We announce that starting in 2004, there will

be a co-editor (E. Christian Wells, U. of South Florida), which will enhance the newsletter's production. In this issue we present many of the regular sections found in previous issues, along with reports about the SAS in 2002-2003. Immediately below are details on some SAS membership benefits.

Robert H. Tykot

SAS Membership Benefits - Journals & Books

Blackwell

Archaeometry \$30 / £22 (reg. \$47). ISSN 0003-813X. 4 issues per year. Pay to SAS with your annual membership.

Academic Press

Journal of Archaeological Science \$90 (reg. £570). ISSN 0305-4403. 12 issues per year. Pay to SAS with your annual membership.

Kluwer Academic Publishers

Discount on the SAS series *Advances in Archaeological and Museum Science*. For listing of all five volumes with tables of contents, visit: <http://www.wkap.nl/prod/s/AAMS>

Wiley

Archaeological Prospection \$100 / £65 (reg. \$435). ISSN 1075-2196. 4 issues per year;

Geoarchaeology \$110 (reg. \$195). ISSN: 0883-6353. 8 issues per year;

International Journal of Osteoarchaeology. ISSN 1047-482X. Discount in negotiation. (reg. \$520). 6 issues per year;

Books - 25% discount on archaeology books. Wiley customer services: tel (UK): 44 (0) 1243 779777; tel (USA): 1-212-850-6645; email: cs-journals@wiley.co.uk; web: www.wiley.com/

2004 Fryxell Award to R.E. Taylor

R.E. Taylor will be awarded the 2004 Fryxell Award for Interdisciplinary Research at the 69th Annual Meeting of the Society for American Archaeology, Montreal, Québec Canada, March 31 - April 4, 2004. A symposium in his honor, entitled *A Time for Science: Papers in Honor of R. E. Taylor*, will be sponsored by the SAA Fryxell Committee and the Society for Archaeological Sciences. The symposium co-organizers and chairs are Arleyn Simon and Christine Prior. The symposium description follows:

The SAA presents the 2004 Fryxell Award for Interdisciplinary Research to R.E. Taylor for his outstanding contributions to the field of radiocarbon dating and archaeological sciences. Erv Taylor has greatly influenced the archaeological discipline through his exacting rigor in the development and application of chronometric techniques. This symposium honors his lifetime work by presenting recent advances in a broad range of radiocarbon and other archaeological techniques applied to research issues in North America and throughout the world. These papers underscore the broad range of scientific methodologies that can provide significant contributions to our understanding human prehistory and cultural processes.

In This Issue

SAS Reports

| | |
|---|----|
| President's Report, Membership Development | 2 |
| Web Management, Intersociety Relations, Bulletin | 3 |
| Dating Methods | 4 |
| 18th International Radiocarbon Conference (G. Hodgins) | 4 |
| Artifacts, Archaeometry, and ASOR, 2000-03 and Beyond (E.S. Friedman and R. Sternberg) | 6 |
| Archaeological Chemistry (N. Reber) | 7 |
| Geoarchaeology (F. Pearl) | 9 |
| News of Archaeometallurgy (M. Goodway) | 10 |
| Archaeological Ceramics (C.C. Kolb) | 12 |
| Pomerance Award to Ian Freestone | 29 |
| SAS Annual Budgets (2002-2003) | 30 |
| Upcoming Conferences | 31 |

President's Report for 2002

Arleyn W. Simon

The 2002 year has been a successful one for the society, with many activities, and transitions.

A set of informal board and membership meetings were held in conjunction with the SAA annual meeting in Denver. These discussion sessions centered on the role of archaeometry in academia and the private sector and the need for continuity of personnel and laboratory support, the need to incorporate at least one course on archaeological science into most curriculums, the need to have faculty positions for archaeological scientists/archaeometrists as well as professional laboratory positions, and the need to improve funding for this type of research. Most research funding goes into traditional field survey and excavation with little in reserve for highly technical studies. Increasing awareness of these issues in departments, institutions, and government agencies is important.

The formal board and business meetings were held in conjunction with the ISA meeting in Amsterdam. Two student works were chosen for the newly named R.E. Taylor Student Poster Awards, which were presented at the conference.

R.E. (Erv) Taylor, the founder of SAS and general secretary of the society for 25 years, became the General Secretary, Emeritus, and continues as an advisor to SAS. The operations of the SAS business office moved to Franklin and Marshall College and to the capable hands of the new General Secretary, Rob Sternberg. Rob is a past president of SAS, and past Editor of the Bulletin, so his knowledge of the SAS legacy is invaluable.

I would like to note that several members of the SAS Board nominated R.E. Taylor for the 2003 SAA Fryxell Award in Interdisciplinary Research.

I also formally thank Felicia Beardsley for her many years of service as SAS Secretary-Treasurer. Felicia has performed great service to SAS despite the hardships of extended field work in Micronesia, and working and residing at a distance from the original SAS Office of the General Secretary. Felicia has always come through with the membership roles, negotiations with publishers, the annual budget, and the SAS archives including the by-laws. We thank her sincerely for all these efforts. Many of these duties are now shifted to the new Office of the General Secretary and under the guidance Rob Sternberg.

Thanks to all the other SAS board members for their positive efforts in many different areas; membership (Christian), intersociety relations (Mike), journals (Steve), the SAS web and SASnet (Jim), the ISA (Sarah), and not least, the *Bulletin* (Rob).

As I am unable to attend this year's SAS business meeting in Milwaukee, I hereby formally welcome our new SAS President, Gregory Hodgins, and turn over the "virtual gavel" for the 2003 SAS meeting to him. Greg has already been studying the recent history of the society and exhibits a clear vision of the future of the society. The SAS is in good hands at the start of its next 25 years.

I look forward to continuing to be involved with SAS activities.

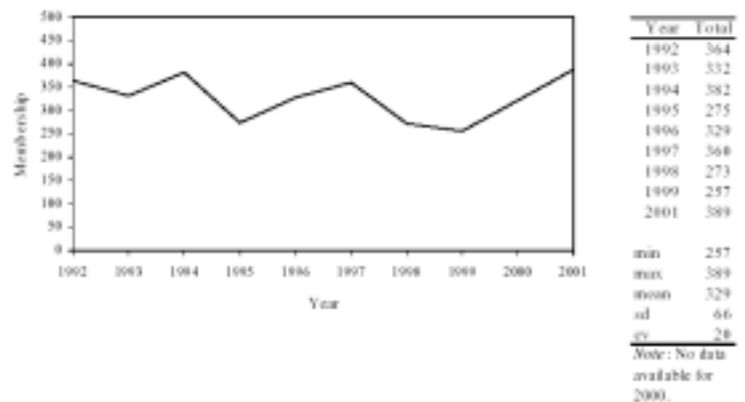
Report on Membership, 2002

Christian Wells

SAS Vice President for Membership Development

The Society for Archaeological Sciences (SAS) was founded in 1977 to enhance communication between archaeologists and physical scientists. Now with close to 400 members worldwide, the SAS meets this objective and continues to play an important role in the development of interdisciplinary research endeavors, with members from anthropology, chemistry, biology, geology, and ecology to name a few of the many disciplinary specialties representing scholars that have united with the SAS over the past 25 years.

While the size of SAS membership has been cycling over the past decade (see figure below), the year 2001 witnessed our largest membership increase in over ten years, with a total of 389 members compared to a ten-year average of 329 ± 66 . Since 1999, membership has increased by roughly 35%, which is the highest two-year increase in the past ten years.



Above: line graph showing the fluctuations in SAS membership over the past decade.

At Right: table of SAS membership totals from 1992 to 2001.

Membership in 2001 (see table below) consisted mainly of regular members residing in the U.S., although one-fourth (26%) of the membership is represented by individuals and institutions located outside the U.S. Compared to all other categories except Institution, students and retired individuals represent the smallest sector of SAS membership, composing only 7%.

In 2001, the SAS launched a new **Millennium Membership Campaign** to build the society's membership

| Category | USA | | Foreign | | Total |
|-----------------|------------|-----------|------------|-----------|------------|
| | n | % | n | % | |
| Lifetime | 46 | 65 | 25 | 35 | 71 |
| Student/Retired | 24 | 83 | 5 | 17 | 29 |
| Associate | 46 | 75 | 15 | 25 | 61 |
| Regular | 155 | 75 | 53 | 25 | 208 |
| Institution | 17 | 85 | 3 | 15 | 20 |
| Total | 288 | 74 | 101 | 26 | 389 |

Note: All totals and percentages are calculated by row.

for the 21st century. While we continued to pursue aggressively increased membership in all demographic and geographic domains, we focused our efforts on increasing student membership, in particular. To this end, SAS promotional literature was mailed electronically to nearly 100 students last year, thanks to the communication networks afforded by the Society for American Archaeology's Student Affairs Committee. In addition, SAS literature was distributed to students and other potential members at five major conferences, including the annual meetings of the American Chemical Society (Chicago, IL), the Materials Research Society (Boston, MA), the American Anthropological Association (Washington, DC), and the Society for American Archaeology (New Orleans, LA, and Denver, CO).

As our members are well aware, the funds provided by membership allow the SAS to publish a top-notch, information-packed newsletter - the *SAS Bulletin*, organize and operate an important communication network - SASnet, negotiate discounts for two world-class journals - *Journal of Archaeological Science* and *Archaeometry*, and distribute the highly successful monograph series - *Advances in Archaeological and Museum Science*. In addition, the SAS coordinates action on a wide range of fronts essential to archaeology's well-being, including its sponsorship of conferences and sessions that promote data-sharing and high-quality interdisciplinary research among an international audience of archaeological scientists. But if these activities are to continue, we must keep our members and add new names to the roster. It is not just enough to renew our own membership: we must continually find and recruit new SAS members and encourage them to stay with us.

For this reason, we ask that all of our members make an effort to get at least one student, friend, or colleague to join the SAS this year.

Tell him or her about the SAS website, <http://www.socarchsci.org/>, and loan him or her copies of the SAS Bulletin. You might even consider giving SAS membership as a gift to a friend or colleague in another country who may not be able to afford it.

For more information on membership, visit <http://www.socarchsci.org/memb.htm> or send your check or money order to: Office of the General Secretary, Department of Geosciences, Franklin & Marshall College, Lancaster, PA 17604-3003, USA.

Keep our society alive and well for the 21st century!

Report from the Webmanager

James Burton

This year things ran smoothly for both SASnet and SASweb, so I adopted the "If it ain't broke, don't fix it approach".

SASnet

SASnet (SASnet@relay.doit.wisc.edu) is now in its 13th year. The individuals in the subscriber base change occasionally, but the number of subscribers has been remarkably steady for several years at approximately 320. The subscriber base has, however, become much more international, now representing

more than two dozen countries. It remains a quiet list, averaging only a few posts per week. I am grateful to the subscribers that there has never been, in the history of the list, any problem with offensive posts or 'flame wars'. The only messages that I (continually!) have to discard are requests to launder billions of dollars from Nigerian bank accounts. To subscribe, send the following command: "subscribe SASnet <your name>" to the list server address: listserver@relay.doit.wisc.edu., NOT to the SASnet addresss.

SASweb

SASWeb is in its second year with its own domain name www.socarchsci.org, hosted through CorrComm. SASWeb documents include society information, Bulletin contents, links to proceedings of the International Symposia on Archaeometry, and extensive links to archaeometric facilities, publications, meetings, and other resources. The SAS Bulletin remains the most commonly accessed document. Because the Bulletin is now in pdf format, which requires a relatively large file size, SASweb moved at the beginning of 2003 to a new server with a significantly expanded capacity, but this move did not require a change in the host company, the domain name, or the cost, and should be invisible to visitors. SASweb currently averages approximately 400 "hits" daily from an average of somewhat more than 3000 unique visitors per month from nearly seventy countries.

Report on Intersociety Relations, 2002

Michael P. Richards

SAS Vice President for Intersociety Relations

Intersociety relations this year focused mainly on linking the society with publishers and editors of journals that might be of interest to SAS members. Specifically, this past year we were approached by the editors of the journal *Archaeological Prospection* to discuss offering discounts to the journal for SAS members. After negotiating with Wiley we arranged a reduced price (\$100 U.S.) for SAS members, and Wiley is open to offering discounts to other journals they produce as well. Subscribers who are members of SAS should indicate this when they renew their subscription to get the discount to this journal, and to enquire about possibilities for other journals. This is a positive step, as it demonstrates the advantage of negotiating collectively as a society, and will hopefully lead to new membership in the society as we increase the list of journals to which members are entitled to discounts.

Annual Report on the SAS Bulletin, 2002-2003

Robert H. Tykot, Editor

In the past year, since the last SAS annual board meeting, the following issues of the *SAS Bulletin* have been published: Volume 25(1), May 2002; Volume 25(2), August 2002; Volume 25(3-4), December 2002; Volume 26(1), April 2003.

Each issue was 32 pages in length, and over the year included columns by the editor, the president, and the general

secretary. Regular features included columns by Associate Editor Charlie Kolb on archaeological ceramics, book reviews edited by Michael Glascock and Mark Hall, the calendar, and various announcements, advertisements, and other contributions. With the most recent issue we welcome three new associate editors: Colleen Stapleton (calendar), Nora Reber (archaeological chemistry), and Fred Pearl (geoarchaeology). And we graciously thank outgoing associate editors Mike Glascock (book reviews), Susan Mulholland (calendar), and Mike Waters (geoarchaeology) for their significant service over the past several years.

As board members had suggested in the past, we have continued with the glossy cover for the *Bulletin*, but have not published anything in color (in print).

The *Bulletin* was sent by bulk mail to SAS members in the United States, typically taking about two weeks delivery time, and to members in other countries using a mail consolidation service, also taking on average about two weeks delivery time. Each issue of the *Bulletin* is also converted to PDF and made available on the SAS website with the assistance of Jim Burton. The PDF version of the *Bulletin* is in color.

Currently, each issue of the *Bulletin* costs about \$2.00 for printing, about \$.50 for mailing within the US, and \$2.00 for mailing outside the US. There are additional costs including envelopes, mailing and return address labels, return postage for issues returned (because of change of mailing address, forwarding order expired, etc.), and shipping back issues at first-class postage rates to members who join (or renew) later in the year. In the past we have typically averaged 3 issues per year but more recently have gotten back to a regular quarterly publication; at 4 issues per year the *Bulletin* is costing SAS about \$12 per US member and about \$17 per non-US member.

In order to keep up a quarterly publication schedule, it is necessary that SAS board members, *Bulletin* associate editors, and regular SAS members continue to contribute on a regular basis. A pre-programmed email reminder will be sent out to SAS board members and associate editors on a quarterly basis, and should be posted on SAS-NET as well.

Dating Methods

Paula Reimer (Center for Accelerator Mass Spectrometry, Lawrence Livermore National Laboratory) announces the release of CALIB 4.4, the updated radiocarbon age calibration program. The program and datasets can be downloaded from <http://depts.washington.edu/qil/dloadcalib/>. The new version incorporates the option to use the Southern Hemisphere calibration dataset, adds a decadal extension of IntCal98 to the single year dataset, and corrects a rare problem in CALIB 4.3 with missed probability ranges due to flat regions of the probability distribution. The program has a graphical user interface with a help system. The Macintosh version of CALIB 4.4 is not yet available, but an online version with most of the same features can be executed at <http://www.calib.org>. Users will note that the intercept method (Method A) is no longer

available. For details see the CALIB 4.4 manual at <http://radiocarbon.pa.qub.ac.uk/calib/manual>

Christopher Bronk Ramsey announced that v3.9 of OxCal is now available at: <http://www.rlaha.ox.ac.uk/orau/> Check the program development page: <http://www.rlaha.ox.ac.uk/oxcal/develop.htm> to see if the updates will be relevant to you. He also expects to update OxCal further next year with the IntCal04 dataset.

Uwe Danzeglocke, Bernhard Weninger and Olaf Jöris report that the CalPal program (download version) as well as the CalPal homepage (<http://www.calpal.de>) has also been updated. There are two new climate data sets included in CalPal, first, the Ammersee stable oxygen isotope record (5000-15500 cal BP measured on ostracods by von Grafenstein et al. (1999), as available from the NOAA/IGBP PAGES, and second, the Tree-Ring Homegeneity Growth Indices denAD 1985-6067 denBC (annual resolution) based on regional tree-ring chronologies from Germany, with numeric data by courtesy of Burkhard Schmidt and Wolfgang Gruhle (Köln). The download version of CalPal now contains the Near East Early Neolithic 14C-Data-Base (Levante, Anatolia, Iraq, Iran; including geographic coordinates) with 14C ages ranging from the Natufian to the end of the Late Pre-Pottery Neolithic (PPNA-PPNC). This database (n=2300 entries) is incorporated in CalPal by courtesy of Utz Böhner. It builds up on archaeological radiocarbon data first collected by Gary Rollefson (n=800, Levante) and Laurens Thissen (n=450, Anatolia). We would also like to draw your attention to the homepage of this new 14C database: <http://www.context?database.de/> This database may be of use for attendants of the "4th International Congress on the Archaeology of the Ancient Near East", recently held in Berlin: http://www.ngdc.noaa.gov/paleo/meetings/icaane2004_workshop.html We have also updated the graphic and bibliographic libraries (HELP). To support research in Glacial 14C calibration, we have added a HELP entitled "13 Reasons to calibrate Glacial 14C-Ages using the GISP2 Age-model" (<http://www.calpal.de/calpal/manual/index.htm>).

The International EPR (ESR) Society now has a new website. The address for the site is: <http://www.ieprs.org>, or you can also use www.eprsociety.org, and www.esrsociety.org if that is easier for you to remember. Also, please check out the new EPR Society Newsletter website which is located at: www.epr?newsletter.ethz.ch.

The 18th International Radiocarbon Conference, Wellington, New Zealand

Reviewed by Greg Hodgins

The 18th International Radiocarbon Conference was held 1-5 September, 2003 in Wellington, New Zealand. The Conference Venue was Te Papa, the recently completed National Museum of New Zealand. Its waterfront location in downtown Wellington, striking architecture, and superb exhibits gave the meeting a very special atmosphere. The approximately

235 attendees from around the globe testified to both the worldwide expansion of radiocarbon dating facilities and regional developments in radiocarbon-based research. In addition to New Zealand, Australia, Europe, and North America, it was a pleasure to see strong participation from China, Japan, Korea, Malaysia, as well as many attendees from Eastern Europe, Russia, and Africa.



Roger Sparks of the Rafter Radiocarbon Laboratory speaking at the Conference Dinner in Te Papa. The Rafter Radiocarbon Laboratory, GNS, New Zealand, hosted the Conference

Within the five day Conference, two half-day oral sessions and a multitude of poster presentations were devoted to archaeology. Other sessions focused on atmospheric, terrestrial and marine aspects of the carbon cycle, Pleistocene/Holocene climate change, radiocarbon calibration, as well as developments in dating methods, instrumentation and sample preparation. A few archaeological highlights are presented below.

The Pacific Rat in New Zealand

Debate has raged in New Zealand regarding the date of early human settlement since Richard Holdaway's 1996 publication of a suite of rat bone dates 1200 years older than the 1250-1350 AD consensus settlement date. The rats are not native to New Zealand and are considered a proxy human arrival. Proponents of early settlement believe Holdaway's dates indicate the early presence of humans. Although direct evidence of an early human presence is lacking, it might be explained if the initial settlements failed after a brief time. Critics of early settlement have questioned the dates from a variety of angles. Several papers were presented at the meeting on both sides. Tom Higham of Oxford University summarized the technical arguments, highlighting studies where rat bones within securely dated contexts generated anomalous radiocarbon dates, thus suggesting rat bones are prone to contamination, and this may have been the cause of the initial early measurements. Holdaway, of Palecol, New Zealand responded by presenting four new early rat bone dates from non-archaeological deposits. Three of the deposits were constrained by well-dated volcanic tephra, and the fourth corroborated by radiocarbon dates of associated fossils and OSL dating of sediments above and below the burial context. Janet Wilmshurst, of Landcare Research, New Zealand entered the debate with a new data set: rat gnawed seed shells, the proxy's proxy. She dated large numbers of both gnawed and pristine seeds preserved in three North Island peat sites. While the dates on the seeds spanned 3.3 to 0.4 ka, none of the gnawed seeds were older than 700 BP. Further research investigating the rat populations on both the north and south islands are underway.

Radiocarbon dating and the marine reservoir affect

In archaeological sites where both terrestrial and marine resources are available, C14 dating needs corrections to account for the marine reservoir effect. It is becoming increasingly clear that local rather than global reservoir values are required for high precision dating. Juntaro Ohmichi, from Nihon University, and colleagues from University of Tokyo, measured paired marine and terrestrial samples found in archaeological middens in an attempt to establish localized reservoir values and clarify the Middle to Late Jomon Period pottery transition. Their results demonstrated the difficulties of this undertaking for settlements along the Japanese coast. Complex local ocean circulation patterns, freshwater inflow, differences in marine organism behavior, and complex midden stratigraphy conspired to obscure measurement of localized reservoir values.

Few involved in measurement of reservoir values have access to paired materials as uncontested as that presented by Cook et al. That group has been examining dietary change in the lower Danube over the period from the Late Mesolithic to the Middle Ages. In a previous study, they established the freshwater reservoir value for the Iron Gates Gorge region of the Lower Danube using a human bone pierced with an ungulate spear point. Comparison of the stable isotope values and radiocarbon contents of the ungulate and human bone established a 540 year reservoir value. The initial study suggested a gradual transition in human diet from one exploiting aquatic resources to one based upon terrestrial resources in the transition from the Late Mesolithic to the Neolithic. A new suite of stable isotope and radiocarbon measurements on human remains from Lepenski Vir modified the conclusions of the earlier study and makes the transition appear more abrupt.

Phillipa Ascough et al. examined temporal changes in marine reservoir values, and how such changes can affect established archaeological chronologies. Their study used paired marine/terrestrial samples from Scottish coastal archaeological sites. These indicated that observable variations in the marine reservoir values occurred throughout the Scottish Holocene. The archaeological implications of their observations were demonstrated by examining evidence for the timing of the transition between Broch and Wheel House cultures during the Scottish Iron Age, approximately 100 BC. Conventional theory postulates a one hundred year gap between the end of Broch habitation and the construction of Wheel house settlements. A re-examination of the dating evidence, that includes accounting for an Iron Age alteration of the marine reservoir value eliminates this gap and necessitates a revised picture of the cultural transition.

Cultural Chronologies

Yaroslav Kuzmin, from the Russian Academy of Sciences, in collaboration with Russian Colleagues and the NSF-Arizona AMS Facility, USA summarized a large suite of dates providing a chronological framework for the cultural complexes of the Sakhalin Island in the Russian Far East. This island is the stepping stone between mainland Asia and the Japanese archipelago. Many cultural and technological developments evident in Sakhalin Island archaeology are mirrored by developments in Hokkaido and undoubtedly future studies

fleshing out this chronology will highlight further links.

Mineo Imamura from the National Museum of Japanese History, presented evidence that the start of the Yayoi period of prehistoric Japan should be pushed back to 800 BC, or perhaps earlier. The Yayoi period, which is subsequent to the Jomon period was thought to have begun around the 4th or 5th Century BC. This origin was extrapolated from evidence that mid-Yayoi pottery is often found in association with Chinese objects of around the 1st Century BC. However, Imamura reported radiocarbon dating charred materials adhering to early Yayoi pottery sherds generated 7th Century BC dates.

Megafaunal Extinction in Siberia

A large suite of dates presented by Orlova et al, from the Russian Academy of Sciences, generates a new picture of the pattern of Megafaunal extinction. In addition to the previously recognized late populations of woolly mammoth on the arctic coasts of Siberia, (approx 12000 BP on the Taymyr, Yamal and Gydan Penninsulas), new evidence demonstrates that later populations in several sub-arctic regions of Western Siberia surviving until as late as ca 9800 BP. A similar picture of sub-arctic refugia appears from new dates of woolly rhinoceros, bison, horse and muskox remains.

Radiocarbon Calibration: a preview of IntCal04

Michael Freidrich, Hohenheim University, presented a paper on the extension and refinement of the radiocarbon calibration curve. New data links the Central European Holocene oak chronology to several Preboreal pine tree ring chronologies. This pushes tree-ring based radiocarbon calibration back to 12480 BP, covering the entire Holocene, plus 840 years of the Younger Dryas. Paula Reimer, from Lawrence Livermore National Laboratory reported that subtle changes will take place in the dendrochronology-calibrated portion of the curve between the 1998 and the 2004 versions. These changes are due to changes in data set selection and the statistical methods. The marine modeled data set for this period has also been revised.

Moving beyond the continuous tree ring record, the calibration curve for 12.4 to 26 ka has undergone considerable change. The marine data from the Cariaco Basin sediment cores have been measured at nearly decadal resolution for 10.7 to 14.5 ka. Several new coral data sets have been published, and divergence between sets has generated considerable debate. Improvements between calibration data sets spanning 14.5 to 16.5 ka have dramatically reduced the uncertainty in this region of the curve, removing the so-called pig in the python visible in Intcal98. New U/Th data points have been added to extend calibration 2000 years to 26 ka.

For the time span if 26 to 50 ka several high resolution records have become available. Although these are individually coherent, large discrepancies between sets, in some regions up to several thousand years, means that calibration beyond 26 ka is not recommended. The official release of IntCal04 is scheduled for the summer of 2004.

Before the close of the conference, proposals for the next venue were tabled by University Cheikh Anta Diop de Dakar, Dakar, Senegal, and the University of Oxford, Oxford, UK.

Artifacts, Archaeometry, and ASOR, 2000-2003 and Beyond

Elizabeth S. Friedman and Rob Sternberg

In 1999, Michael Sugerma served as chair of the first American Schools of Oriental Resreach (ASOR) annual meeting session devoted to archaeometry. The session, "New Discoveries from Materials Science in the Archaeology of the Near East," was created to provide a platform for informing the ASOR community about current research by archaeologists conducting physical and chemical analysis on artifacts primarily from Cyprus, Israel, Jordan, Turkey, Syria, and Egypt. The session was organized to demonstrate how materials science is being incorporated into current research methodology.

Elizabeth Friedman took over the session in 2000, and to suggest the abundance of information that could be extracted from individual artifacts, the following year changed the title to "Artifacts: The Inside Story." Near Eastern archaeologists using chemical and physical techniques to explore artifact compositions and methods of manufacture were thus given a forum in which to present work to colleagues in their field. Research on inorganic remains, specifically manufactured objects, became the primary agenda. This report includes sessions presented at the following meetings: Nashville (2000), Broomfield, CO (2001), Toronto (2002) and Atlanta (2003).

Originally some of the papers concentrated on the analytical techniques and how they could be adapted to the archaeological material. However, this soon became problematic in that many of the archaeologists present at the conference did not have a sufficient background in the natural sciences to understand the nuances of the techniques, nor did they find these details all that relevant. Rather, the audience was much more interested in what types of information could be obtained by using these techniques and how they could integrate this information into their reconstruction of the past. As a result, subsequent papers have focused less on the intricacies of the techniques and more on the applications.

The session's goal is not only to report "new discoveries" but also to teach the archaeologists what types of information can be obtained from the multitude of analytical techniques, thus enabling selection of the most appropriate methods from those available. Many of the papers represent the efforts of collaborative research from different disciplines, including archaeology chemistry, geology, history, physics, and radiology.

The annual sessions

The ASOR meetings provide many forums for ceramic studies that employ neutron activation, x-ray diffraction, x-ray fluorescence, scanning electron microscopy, and petrographic analysis. Some of these papers best fit the archaeometric session. Nahum Applbaum (2000) used of medical computed tomography to determine how complete ceramic vessels and figurines from the southern Levant were manufactured. Elizabeth Friedman (2000) relied primarily on SEM/EDS to determine that metallic ware from 3rd millennium BC central Anatolia was manufactured from a magnesium-silicate clay,

not the traditional aluminum-silicate clay. Yuval Goren (2000) used petrographic and chemical analysis to determine that some of the 14th century BC Amarna letters written by leaders of the Canaanite city-states were actually written not from their own "hometown" as archaeologists and historians had assumed but from Egyptian-ruled administrative centers. Otto Kopp (2003) demonstrated quite clearly how three-component plots of chemical data indicated a shift in mineral composition of pottery from Jordan.

Although ceramic studies provide a wealth of information for the Near Eastern archaeologist, there is also a tremendous interest in metallurgical studies. The techniques include lead-isotope analysis, optical microscopy, electron microscopy, ICP-AES, PIXE, AAS, LA-ICP-MS, and energy dispersive spectroscopy. Sophia Stos-Gale (2000) used lead-isotope analysis to determine the provenance of the ore used for hacksilver found in the eastern Mediterranean region from the 1st millennium BC. PIXE was used by Meg Abraham (2001) to distinguish gold granulation techniques on Minoan artifacts. By using a multitude of methods, Jonathan Schnereger (2001, 2002) found possible traces of iron-working in eastern Turkey dating to the early 2nd millennium BC, hundreds of years earlier than previously believed. Jennifer Humayun (2001) used LA-ICP-MS to identify trace element signatures and SEM to study the method of manufacture in a piece of silver from 3rd millennium BC Turkey. Chris Thornton (2002) used ICP-MS and metallographic analysis of a collection of early copper-based artifacts from 3rd millennium BC Iran to discuss the evolution of copper-based metallurgy in that part of the world.

Aaron Shugar's (2002) metallurgy paper, presented in an open session, included a variety of analytical techniques used to reveal a two-stage smelting/re-melting process model of Chalcolithic copper production from the site of Abu Matar in the Negev. Naama Yahalom (2003), whose paper was read by Nava Panitz-Cohen, combined a technological analysis of a 12th century BC tin-bronze artifact from Beth She'an with an iconographic study of the ancient Near East and eastern Mediterranean to determine that the object was a result of technological and iconographic sharing of Canaanite, Egyptian, and Cypriot elements.

Besides ceramics and metals, presented papers have also discussed developments in faience, glass, and bead manufacture. These processes also require great knowledge and control of pyrotechnology to produce a successful product. Daniella Bar-Yosef (2002) investigated Chalcolithic beads from the southern Levant by using XRD and SEM, and found that the beads were manufactured from a talc paste and fired at very high temperatures. Neither the talc nor the pyrotechnology were native to the Levant in the 5th millennium BC, but they do fit well with Indus Valley traditions. This technological study is thus turning into one of provenance as well. This is a clear example of how archaeometric data can lead to further avenues of investigation.

Many of the same techniques to study ceramics and metals are used to study glass. Kyoko Yamahana (2001) used non-destructive synchrotron radiation-based x-ray fluorescence to obtain the elemental composition of Egyptian glass vessels from the New Kingdom. Colleen Stapleton (2002) used the electron

microscope and LA-ICP-MS on 9th century BC glass from northwest Iran to suggest that technological knowledge was shared among glassmakers, metallurgists and potters. This discovery is representative of the general trend in archaeometric studies, that it is sometimes difficult to completely isolate one manufacturing technique from another when so many of them are interrelated.

The combination of a variety of analytical techniques was highlighted in a number of papers such as the one by Margaret Sax (2001) on Near Eastern cylinder seals. She used x-ray diffraction to identify the type of stone used for each seal, rated the stone's hardness, and then used SEM to investigate the different engraving methods. This work and many of the others mentioned above reflect on technological processes and craft specialization throughout the ancient Near East.

Archaeometrically oriented papers can also be found in other sessions. Abstracts from meetings back to 1990 can be found at the ASOR web site (<http://www.asor.org//AM/pastmtgs.htm>). For example, the 2002 meeting included five papers using geophysics, eight GIS papers including a GIS session, and sessions on foodways and water, featuring archaeobotany and geoarchaeology.

Future of Archaeometry at ASOR annual meetings

In the past five years we've seen a greater acceptance of archaeometry in Near Eastern archaeology and a good deal more enthusiasm by devoted field archaeologists. The audience for this session has grown as more traditional archaeologists have become familiar with the types of data being presented. Most of the works in this session are works in progress allowing researchers to get informed feedback from colleagues who sit just outside their specific field. In other cases, the work has been published in scholarly journals and books.

Until archaeometric-based research is fully incorporated into general archaeology, there will be always be a need for "Artifacts: The Inside Story." Research is leaning heavily toward an understanding of ancient technological processes with questions about technological choice lying at the fore. Understanding the interrelationship between these ancient technological processes contributes to the overall picture of how these technologies were part and parcel of everyday life. The data acquired, and the interpretation of them, offer considerable support for the reconstruction of the social, political, and economic systems operating in antiquity.

Archaeological Chemistry

Nora Reber, Associate Editor

News

The SAA 69th Annual Meeting in Montreal, Québec Canada, will take place March 31 - April 4, 2004 at the Delta Centre Ville Hotel. This conference normally contains many sessions of interest to archaeological chemists, particularly the mammoth multiple session on "Stories of Maize I, II, III, and IV" organized by John Staller, John Hart, Robert Thompson, and Michael Blake. These sessions will discuss almost all

imaginable aspects of maize, including genetics, stable isotope analysis, paleoethnobotanical analysis, phytoliths, pollen, absorbed organic residues, iconography, and case studies from throughout the New World. Participants are far too many to name here, but discussants include Terry Brown, Gary Crawford, Christine Hastorf, Richard Ford, Gayle Fritz, Lee Newsome, Bruce Smith, and Patty Jo Watson.

The 2004 Carbondale Visiting Scholar conference, *We Are What We Eat: Archaeology, Food, and Identity*, held at Southern Illinois University, Carbondale, took place March 12-13, 2004. Those interested in this conference should check the website, <http://www.siu.edu/~cai/VS.2004.htm>, or contact the organizer, Dr. Kathryn Twiss, ktwiss@siu.edu.

Henry Schwarcz reports that his group has a paper in press at *Journal of Archaeological Science* discussing ancient Roman diet, and the routing model in stable isotope analysis.

Have Projects, Will Analyze

Robert Lusteck of the University of Minnesota is in need of samples of ancient maize and potsherds from vessels believed to have contained maize from the southeastern U.S. His Ph.D. dissertation concentrates on the identification of maize subspecies through phytolith analysis. Analysis does not destroy potsherds, and is free! Please contact Rob at luste002@umn.edu.

Nora Reber of UNC Wilmington (yes, that's me) is beginning a new project on the Black Drink in absorbed pottery residues. Before reaching the pottery residue stage of the project, she needs samples of yaupon holly (*Ilex vomitoria*) and button snakeroot (*Eryngium yuccifolium*). For more information, please contact her at reber@uncwil.edu.

Symposia

A symposium on ESR dosimetry, held in Brazil in October 2003, focused primarily on ESR detection of recent, relatively high dose, radiation damage, such as that from nuclear plant accidents, but included oral and poster sessions on dating. Keynote speaker was Christophe Falguères, who reviewed the dating of the European Pleistocene, including data from the Early Pleistocene sites of Atapuerca and Visogliano, and quartz from the Creuse valley that suggests human presence in Europe more than 500 ka in the past. Anne Skinner, program chairman for the symposium, extended this to more recent sites with presentations on the dating of Neanderthal sites in Central Europe to the period 40-60 ka. Other archaeological materials studied included calcite overlays on cave paintings in Brazil, suggesting occupation at least at 30 ka, and quartz in Aeolian dust from Asia. The proceedings of the conference will appear in *Radiation Measurements* in 2004.

Special Issues

The *Journal of Anthropological Archaeology* 22(3) published a special issue in September, 2003 on bone chemistry and bioarchaeology taken from a 2001 SAA symposium in honor of Harold W. Krueger and his role in studies of paleodiet and bone apatite. It discusses hot topics in bone chemistry, and contains data from around the world: East Turkana, by Schoeninger, Reaser, and Hallin; Mound 72 at Cahokia, by

Ambrose, Buikstra, and Krueger; Ontario and southern California, by Harrison and Katzenberg; the Moatfield ossuary of Ontario, by van der Merwe, Williamson, Pfeiffer, Thomas, and Allegretto; the Osmore Valley of southern Peru, by Tomczak; Tierra del Fuego, by Yesner, Figuerero Torres, Guichon, and Borrero; and northern Borneo, by Krigbaum.

The *International Journal of Osteoarchaeology* 13(1-2) also published a special issue on Bone Chemistry in its January-April 2003 issue, taken from the 6th seminar on Paleodiet and edited by Paul Koch and Jim Burton. This issue contains articles on many different types of isotope analysis: strontium isotopes, by Hoppe, Koch, and Furutani; and by Schweissing and Grupe; calcium isotopes, by Clementz, Holden, and Koch; sulphur isotopes, by Richards, Fuller, Sponheimer, Robinson, and Ayliffe; trophic level enrichment of carbon and nitrogen isotopes, by Bocherens and Drucker; amino acid specific stable carbon isotope analysis, by Howland, Corr, Young, Jones, Jim, van der Merwe, Mitchell, and Evershed; apatite collagen carbonate isotopic relationships, by Hedges; nitrogen isotopes in hair, by Sponheimer, Robinson, Ayliffe, Roeder, Hammer, Passey, West, Cerling, Dearing, and Ehleringer; barium and strontium isotopes, by Burton, Price, Cahue, and Wright; and a concluding discussion of stable isotopes and diet by Lee Thorp, Sponheimer, and van der Merwe.

Another important symposium volume is *Archaeological Chemistry: Materials, Methods, and Meaning*, edited by Kathryn A. Jakes, 2002, ACS Symposium Series No. 831. It is the result of an American Chemical Society symposium in 2001, and contains 15 chapters that range in topic from nondestructive techniques to examination of resins, glass, pottery, coins and textiles.

Books of Interest

On the conservation front, C. Wayne Smith and Jerome M. Klosowski, of the well known Texas A&M conservation lab, have published *Archaeological Conservation Using Polymers: Practical Applications for Organic Artifact Stabilization*, Texas A&M University Anthropology Series vol. 6, 2003. For those interested in up to date glass conservation, the 2nd edition of *Conservation and Restoration of Glass*, by Sandra Davison and Roy Newton has been released by Butterworth-Heinemann press, 2003.

Kluwer Academic Press has recently (October 2003), released *Molecular and Structural Archaeology*, NATO Science Series II: Mathematics, Physics, and Chemistry, vol. 117, edited by Georges Tsoucaris and Janusz Lipkowski.

Almost more in the bioarchaeology category, but with some interesting applications of biomarker chemistry, is *Emerging Pathogens: The Archaeology, Ecology and Evolution of Infectious Disease*, edited by Charles Greenblatt and Mark Spigelman, and published by Oxford University, 2003.

For archaeometrists interested in plant residues and the uses of plant resins in archaeology, Jean H. Langenheim has written a useful reference: *Plant Resins: Chemistry, Evolution, Ecology, and Ethnobotany*, Timber Press, 2003.

Of interest to all archaeological scientists will be *Beer: Tap Into the Art and Science of Brewing*, by Charles Bamforth

and Doug Muhleman, 2003, which includes a section on ancient brewing and the invention of beer. It could be of use in classes on ancient Babylonian diet, pottery residues, and is reputed to be a good read, as well.

Scientists interested in ICP may find *ICP Emission Spectrometry: A Practical Guide*, by Joachim Nölte, Wiley VCH, 2003, a useful beginners reference.

Need Publicity? If you have any information you'd like included in the next issue of the *SAS Bulletin*, in the Archaeological Chemistry section, please contact me at rebere@uncwil.edu



Geoarchaeology

*Frederic Pearl, Associate
Editor for Geoarchaeology*

In this issue, I cover three topics: a software review, a publication opportunity, and a geoarchaeology meeting notice.

Three Dimensional Landscape Modeling Software and the Geoarchaeologist

I wanted to share with you a piece of software that I find extremely useful, easy to use, and affordable: a combination I think we all can appreciate. These days, computer aided design is a part of the fabric of archaeology more than ever before. Yet most geoarchaeologists that I know are not also defacto graphic designers as well. It's one thing to adjust the levels on a digital photo, but a completely different matter to create an accurate 3-D animated terrain model for your study site, right? Think again. I recently discovered a piece of software that allowed me to do just that, and with only a few hours of practice I was creating realistic virtual images of my study area.

Introducing Natural Scene Designer 4 (NSD4). NSD4 is a powerful yet easy to use 3-D terrain modeling program which lets you design, render, and even animate natural outdoor scenes. I first happened upon NSD three years ago when I was planning a field project in Samoa, a place that I had never been. I downloaded free digital elevation data from the USGS and within several hours I was rendering beautiful three dimensional models of my future study area. I was even able to animate a "virtual flyover" of the island that very accurately depicted the terrain, greatly enhancing my ability to teach, plan, and convey information to others.

Capabilities

The main function of NSD4 is to render a realistic virtual image of an outdoor scene. This is accomplished by importing a 3-D terrain model, also known as a digital elevation model or DEM, and using the simple interface to position the viewing angle. Depending on the speed of your computer processor

and the resolution of the final image, rendering can take from just a few seconds to several minutes. The image produced is a terrain simulation, and not an exact reproduction of the location. Even so, I found NSD indispensable in visualizing the geomorphic features of a landscape I had never before witnessed. It literally brought to life the 7.5' USGS quads that I had of the area, and I quickly adopted it as a powerful planning tool.

Terrain models are available for free from websites authorized by the USGS (such as <http://data.geocomm.com>). However, Natural Graphics, makers of Natural Scene Designer, sell terrain models for the entire United States (including Hawaii), which are excruciatingly simple to use. I can't emphasize how easy it was to get started. You can also make your own terrain models from scratch using Advanced using programs like Surfer, or from printed maps with Didger (both from Golden Software).

Natural Scene Designer can stitch together hundreds, or even thousands of images to create 3-D panoramas and Quicktime movies of your study area. Maybe a "virtual flyover" is just what your next presentation needs to convey the geomorphology of your study area? I've used Quicktime movies of the Samoan landscape in classroom and conference settings to great effect.

The addition of the terrain editor in Version 4 is a major improvement. I found that some of the digital elevation models provided by the USGS were not as detailed as I would like. Sometimes they are only accurate to within 10 m, which is simply not good enough to show subtle details. The terrain editing tools can compensate for some of those inadequacies, but if you are hoping to show subtle terrain changes, on the order of a few meters then you will be disappointed by the USGS data. They are essentially no more accurate than the 7.5' quads.

In addition to making minor corrections in the terrain models, the terrain allows a geoarchaeologists to sculpt the topography to simulate the paleo-landscape. For example, I see no reason why this could be used to create a series of individual images that show an alluvial valley as it changes through time. Unfortunately, at this time I don't think the software could easily stitch together a time-lapse of that process.

Another great feature is the ability to adjust sea level, and to fill in valleys with lakes. This is an excellent way to simulate pluvial lake settings, or higher sea-levels. It should be noted with dismay, however, that the freely available terrain models do not contain bathymetric data, so it is impossible to lower sea-levels without importing your own terrain models (an advanced procedure). That is, unless you have a digital elevation model with bathymetric data you are out of luck.

Problems Encountered

The main limitation of NSD4 is that there are not enough simulated vegetation types included with the software. There are only five: oak, palm, redwood, sweet gum, and a generic "bush." For each type you can adjust its size and color, so one workaround, for example, to create shrubs, is to tell the computer to make miniature trees of a slightly different shade (miniature oak trees make great shrubs). Natural Graphics could

solve this problem by either including more ready-made objects and trees in the software, or providing them at a reasonable cost for download on their website. I also found NSDs object-making abilities to be difficult to use. The program allows you to create simple 3-D objects (like blocks and spheres) to put into your scenes. Theoretically you could place these to represent buildings or excavation units. However, I found it difficult to place the objects at the correct scale at the exact position. It was relatively easy to “eyeball” placement of such objects, however, which could turn out useful.

System Requirements

NSD4 doesn't require a powerhouse computer, though I can tell you from experience that rendering a long animated sequence could take hours on a slow machine. The average off-the-shelf computer will render a single hi-resolution image in minutes, if not seconds. The minimum system requirements are as follows: For Mac users, any PowerPC based Mac running MacOS 9.0-9.2 or MacOS X, with 32 MB of RAM, and a CD-ROM drive will do the trick. Similarly, for Windows users the requirements are equally paltry: a PC with a 200 MHz or faster processor, Windows 95, 98, NT, 2000, or XP, and 64MB of RAM, and a CD-ROM drive are all that is required. However, Windows users will have to wait until the summer for the release of version 4 for their platform. You might get started with version 3. Mac users can get started with version 4 right away. NSD4 retails at \$139 (upgrades are less) and individual CDs with terrain models are \$20 each. The entire US is contained on 14 CDs. For additional info go to <http://www.naturalgfx.com>.

Publication Opportunity

Current Research in the Pleistocene is currently accepting papers for the 2004 volume (21). CRP has become one of the foremost publication outlets for Quaternary scientists of the Americas and the Eastern Asian Pacific Rim. CRP focuses on short, but significant contributions on almost any aspect of Pleistocene research. The short contributions for CRP are not intended to take the place of extended monographs, but rather, serve as a means of getting the information and ideas out to the research community with a minimum of fuss and bother. Plus, the short turnaround time means that the research will be accessible to other scientists worldwide on a timely basis. The deadline for submissions is March 15th, 2004. For more information see the website for the Center for the Study of the First Americans at <http://csfa.tamu.edu>, or contact me and I'll send you a call for papers.

Upcoming Conference

The Geoarchaeology Interest Group is having its annual gathering at the 69th Society for American Archaeology Meeting in Montreal. The preliminary program for the Annual Meeting is available at <http://www.saa.org>. The Geoarchaeology Interest Group will meet on Thursday, April 1st (no kidding) at 6:00 pm. (location TBA; check the final program). The conference runs through to Sunday. This year's conference should be exciting. In addition to many great archaeological sessions, and a great host city, Rolfe Mandel

and Paul Goldberg (Editor in Chief and Co-Editor of *Geoarchaeology*) are chairing a session on Thursday morning: *Geoarchaeology and Complex Societies*.

Simple 3-D Modeling for Geoarchaeologists - A meeting not to be missed

This year the American Quaternary Association (AMQUA) is having their biennial meeting in Lawrence Kansas, from June 26th to 28th, at the University of Kansas. I'd like to call your attention to POST-Meeting field trip #4: Late Quaternary Alluvial Stratigraphy and Geoarchaeology in the Central Great Plains (Monday afternoon, June 28 through Wednesday, June 30, 2004). Focusing of the late Pleistocene and Holocene alluvial stratigraphy in the Central Great Plains of Kansas, this trip will visit some very prominent Paleoindian sites. These sites will be put into their proper geologic context, and field trippers will make stops at the impressive, radiocarbon_dated sections of alluvium in the drainage networks of the Smokey Hill and Cimarron valleys. This trip will be lead by Rolfe Mandel (Kansas Geological Survey), Jack Hofman (University of Kansas Department of Anthropology), and Leland Bement (Oklahoma Archaeological Survey). Field trips are a wonderful environment to relax, get to know fellow geoarchaeologists, and learn or refresh your skills and knowledge alongside a large body of experts. You'll get your hands dirt and have a great time. If you like it, get more info for trips sponsored by the Friends of the Pleistocene (FOP) [More information on AMQUA and the FOP are both available at <http://www4.nau.edu/amqua/>]. See you there.

News of Archaeometallurgy

Martha Goodway, Associate Editor

A conference in honor of Paul Craddock on his forthcoming retirement from the British Museum's Department of Conservation, Documentation and Science has been announced. Under the title of *Metallurgy: A touchstone for cross cultural interaction*, it is to be held at the British Museum from April 28-30, 2005, and will address the exploitation of metals and tech transfer among other technologies as well as cultures. There will be a poster session so as to avoid parallel sessions, and selected papers will be published in a refereed volume. Abstracts of 200-400 words should be sent to slaniece@thebritishmuseum.ac.uk (or, Susan La Niece, Scientific Research, The British Museum, London WC1B 3DG, UK; tel +44 20 7323 8226, fax +44 20 7323 8276) by 31 August 2004.

The Annual Conference of the Historical Metallurgy Society is to be held September 10-12 in Portsmouth, England. Visits to Fort Cumberland and the science labs of the Centre for Archaeology of English Heritage, and to the Historic Dockyard with Henry VIII's *Mary Rose*, Nelson's *HMS Victory*, and the first iron warship the *HMS Warrior* are planned. There may even be a Tudor banquet in the *Mary Rose* Museum. The

program will emphasize the maritime uses of metal. For further information contact Dr Justine Bayley, English Heritage Centre for Archaeology, Fort Cumberland, Fort Cumberland Road, Eastney, Portsmouth PO4 9LD, UK; email: justine.bayley@englishheritage.org.uk.

The international conference on Archaeometallurgy in Europe held at the science museum 'Leonardo da Vinci' in Milan last September was a great success, with many attendees from eastern Europe and North America. Two thick proceedings volumes [ISBN88 85298 59 8] containing 152 papers were published by the Associazione Italiana di Metallurgia (Piazzale Rodolfo Morandi 2, I-20121 Milano; tel +39-02-7639-7770, +39-92-7602-1132, fax +39-02-7602-0551, aim@aimnet.it, www.aimnet.it) in time to be distributed to the participants. The only flaw was that the presentations, which were in parallel sessions, were not held to schedule. Nevertheless, surrounded by evidence of Leonardo's genius for invention and only two blocks away from 'The Last Supper', the environment was inspiring.

The latest volume in the series published by the Materials Research Society, *Materials Issues in Art and Archaeology VI*, was issued as MRS Proceedings Volume 712 [ISBN 1-5899-648-6]. The symposium was held in Boston from November 26-30, 2001, and the volume was edited by Pamela B. Vandiver, Martha Goodway and Jennifer L. Mass. The 593 pages include 59 papers on a wide variety of methods, materials, and issues. Papers on metals can be found in the sections on conservation and preservation science; characterization: new methods and improved techniques; archaeological science and archaeometry; site formation, site analysis, resource survey, and organization of technology; weathering, dating, technology and authentication; archaeomaterials, technology and society; replicative experiments, synthesis of materials and model systems; historic technologies; and ancient technology and modern craft. The volume can be ordered (code 712 J) from the Materials Research Society, 506 Keystone Drive, Warrendale PA 15086 7573 USA, (tel 1-724-779-3003, fax 1-724-779-8313, info@mrs.org, www.mrs.org/books/) for US\$86 (\$75 to MRS members) and \$99 overseas. This does not include shipping. They accept MasterCard, Visa, American Express and Diners Club. This volume is also available electronically on the MRS website with free access for all current MRS members.

Patterns and Process: a Festschrift in Honor of Dr. Edward V. Sayre, edited by Lambertus van Zelst, has been published by the Smithsonian Center for Materials Research and Education (Suitland, Maryland 2003). It contains papers by Heather Lechtman on "Middle Horizon bronze: centers and outliers" (248 268); by Pieter Meyers on the "Production of silver in antiquity: ore types identified based upon elemental compositions of ancient silver artifacts" (271 288); and by Emile C. Joel, Joan J. Taylor, and Robert D. Vocke on "Geological implications of the lead isotope data on ores from the Great Orme mine, north Wales, U.K." (291 311). Copies can be obtained without cost or mailing fees by emailing ngadia@scmre.si.edu or writing Anne N'Gadi, Smithsonian Center for Materials Research and Education, 4210 Silver Hill Road, Suitland MD 20746 2863 USA with your request. Please

include your mailing address.

David Blick's book on *The Old Copper Mines of Snowdonia* is available in paperback in a revised third edition [ISBN 1-84306-075-2]. Among the more than forty mines covered are Sygun and the Great Orme, both now open to the public. It can be ordered from Landmark Publishing Ltd (www.landmarkpublishing.co.uk, tel 44-335-347349), Ashbourne Hall, Cokayne Avenue, Ashbourne, Derbyshire DE6 1EJ England, for £9.95. It is posted free in the UK. They take Visa, MasterCard, and Switch.

Professor George Varoufakis has written *Ancient Greek Standards: the history and control of the materials which left their mark on Greek civilization*, an illustrated monograph of 89 pages [ISBN 960 521 071 1] translated by Aikaterini Apostolaki into English. It was published in 1999 by Aeolos Books, 35 Arachovis St, Athens 106 81; tel 3301553, fax 3802859, www.aiolos.com (this web site seems to be entirely in Greek). Besides his position at the University of Athens Professor Varoufakis has served as Chairman of the Hellenic Organization for Standardization (ELOT).

Jeffrey Wadsworth contributed an article on damascus and other steel, "Ancient and modern steels and laminated composites containing steels," to the December MRS Bulletin, pages 980-987.

The Archaeotechnology column in the *JOM*, the *Journal of the Mining, Metals, and Materials Society*, now being conducted by Michael Notis, director of the Archaeometallurgy Laboratory at Lehigh University (www.lehigh.edu/~inarcmet), presented a paper on "The lost wax casting of icons, utensils, bells and other items in South India" by R.M. Pillai, S.G.K. Pillai, and A.D. Damodaran in the October 2003 issue, pages 12 16. The same issue has a feature by Maureen Byko, "The modern blacksmith: metalworker, craftsperson, historical re-enactor" on pages 17-20, with a cover photograph of smithing at Colonial Williamsburg. Another paper in this series, "The history and evolution of wiredrawing techniques" by Brian D. Newbury and Michael R. Notis appeared in the February 2004 issue, pages 33-37. In this there are some serious inaccuracies, e.g. concerning the production of iron used for wire earlier than the 19th century, 'Westphalian fining' was done on cast iron ingots, not on ore.

Dr. Aaron Shugar, who is also on the staff of the Archaeometallurgy Laboratory at Lehigh, has a fellowship this year at the Smithsonian Center for Materials Research and Education (SCMRE) to study bells from Honduras, where he is excavating, also early copper alloys from the Levant and, if time permits, the transition from wrought iron to tonnage steel.

Dr. Pamela Vandiver served as Acting Director of the Smithsonian Center for Materials Research and Education upon the resignation of Lambertus van Zelst until her departure in December to take up an appointment as Professor in the Materials Science and Engineering Department of the University of Arizona in Tucson.

If you have any archaeometallurgical news to share or comments to make, you can write or call me at the Smithsonian Center for Materials Research and Education (SCMRE), 4210 Silver Hill Road, Suitland MD 20746 2863 USA; tel 1-301-238-3700 x164; fax 1-301-238-3709; email GoodwayM@

scmre.si.edu. (Please do not post mail to the central Smithsonian zip code (20560) because mail sent there may be irradiated to kill any possible anthrax contamination. Mail treated this way is delayed, and may even be destroyed.)



Archaeological Ceramics

Charles C. Kolb, Associate Editor

The column in this issue includes eight topics: 1) News from SCMRE; 2) Reviews of Books on Archaeological Ceramics; 3) Other Books; 4) Important Articles; 5) Previous Meetings; 6) Forthcoming Meetings; 7) Exhibits; and 8) Internet Resources. Papers on ceramics and pottery given at the WAC5 and 9th EAA meetings receive special attention.

News from the Smithsonian Center for Materials Research and Education: Major Changes – Departure and Relocations

Pamela B. Vandiver, Senior Ceramic Scientist at the Smithsonian Center for Materials Research and Education (SCMRE), was recently appointed Acting Director of the 25-person center. She earned a B.A. (1967) from Scripps College; an M.A. in Art and Anthropology (1971) from Pacific Lutheran University (Tacoma, WA); and an M.S. in Ceramics Science (1983) and Ph.D. in Materials Science and Near Eastern Studies (1985), both from the Massachusetts Institute of Technology, Cambridge, MA. Her M.A., concerned an exhibition of ceramics and blown glass, “Spheres, Trails and Shadows,” the M.S. (1983) thesis at MIT was “Paleolithic Pigment Processing,” and the dissertation was “Sequential Slab Construction: A Near Eastern Pottery Production Technology, 8000-3000 B.C.”

Among her publications are *Ceramic Masterpieces: Art, Structure and Technology*, W. D. Kingery and P. B. Vandiver (New York: Free Press, 1986) and six volumes in the Materials Issues in Art and Archaeology series symposia (1988-2002) published by the Materials Research Society, Pittsburgh (Warrendale, PA since 2001): *Materials Issues in Art and Archaeology I*, E. V. Sayre, P. B. Vandiver, J. Druzik and C. Stevenson, eds., Symposium Proceedings Vol. 123 (321 pp.) 1988; *Materials Issues in Art and Archaeology II*, P. B. Vandiver, J. Druzik and G. Wheeler, eds., Symposium Proceedings Vol. 185 (844 pp.) 1990; *Materials Issues in Art and Archaeology III*, P. B. Vandiver, J. Druzik, G. S. Wheeler and I. C. Freestone, eds., Symposium Proceedings Vol. 267 (1101 pp.) 1993; *Materials Issues in Art and Archaeology IV*, P. B. Vandiver, J. Druzik, J. L. Galvan, G. S. Wheeler, I. C. Freestone, eds., Symposium Proceedings Vol. 352 (960 pp.) 1995; *Materials Issues in Art and Archaeology V*, P. B. Vandiver, J. Druzik, J. Merkel and J. Stewart, eds., Symposium Proceedings Vol. 462 (427 pp.) 1997; and *Materials Issues in Art and Archaeology VI*, P. B. Vandiver, M. Goodway and J. L. Mass, eds., Symposium Proceedings Vol. 712 (593 pp.), 2002.

Pam’s areas of interest include the analysis, reconstruction, and explanation of conservatism and innovation in craft technologies and material culture, especially Paleolithic ceramic, soft stone, and pigment use; Neolithic plaster and pottery techniques; early glass; slag and glaze technology in Eurasia using the methodologies and techniques of archaeology and materials science; and site resource survey. Her CV is on line at <http://www.si.edu/scmre/about/cv-pbv.htm>. Congratulations to Pam for her behind the scenes efforts to save the SCMRE and to the Smithsonian’s leadership for having the wisdom to select her as the Acting Director. However, as of 1 January 2004, she will become a Professor in the Materials Science Department at the University of Arizona. With Nancy Odegaard (Professor of Anthropology and Conservator at Arizona State Museum) and others, they will develop a program in Conservation Science at the Master’s degree level. Smithsonian’s loss is Arizona’s gain; best wishes to Pam.

On 23 October 2003, Ronald L. Bishop and M. James Blackman announced that, in compliance with the recommendation of the Smithsonian’s Science Commission Report, they would be moving from the SCMRE to the Department of Anthropology in the National Museum of Natural History (NMNH). This move effectively ends archaeometric research in SCMRE. Ron and Jim will rebuild the archaeometric investigations facility in NMNH. Their new mailing address is: Department of Anthropology, Smithsonian Institution, P.O. Box 37012, 10th Street and Constitution Avenue, (NMNH, MRC 112), Washington, DC 20003-7012; telephone 202/357-2363. We wish them well.

Books on Archaeological Ceramics

Anna-Marie Keblow Bernsted, **Early Islamic Pottery: Materials and Techniques**. London: Archetype Publications, 2003. ix + 101 pp., ISBN 1-873132-98-0. \$32.50, £19.50 (paper). Keblow Bernsted, a conservator at Davids Samling (The David Collection) in Copenhagen since 1985, and who is responsible for the Islamic pottery collection, states that the purpose of her book is “to make the pottery of the early Islamic period accessible to those who might be interested in the ceramic techniques, including those applying to pigments, glazes and body” (p. v). The volume has a brief preface, acknowledgment, and Introduction (pp. vii-ix), and is subsequently arranged in four sections. It contains one two-page map and 124 figures (some half tone and line illustrations, but most are in color). Nearly all of the photographs and sketches are by the author. The illustrations of the ceramic specimens are accompanied by metric measurements but not all of the sherds and thin sections have graphic scales or measurements reported verbally in the narrative or captions. The illustrations include graphs of the results of Energy-dispersive X-ray Analysis (EXD) and Scanning Electron Microscopy (SEM) undertaken at Nationalmuseets Bevarungssektion by U. Schnell. Keblow Bernsted has also assembled a useful bibliography of 71 citations that include materials in English, German, Danish, and Spanish. Basic sources are not mentioned; e.g. Anna Shepard’s *Ceramics for the Archaeologist* [rev. ed.] (1965); Prudence M. Rice’s *Pottery Analysis: A Sourcebook* (1987); and Orton, Tyers, and Vince’s *Pottery in Archaeology* (1993). A two-page,

three-column Subject Index (pp. 99-100) has 179 major entries, and a Place-name Index contains 156 entries (p. 100).

The brief introductory essay characterizes early Islamic ceramic production beginning in CE 622 that built upon older traditions but incorporated new technological innovations, particularly in glazes, slips, and inorganic pigments (including luster pigments that incorporated colloidal particles of gold, copper, and silver), and the creation of quartz-frit pottery (fritware). She refers to the CE 1301 Persian manuscript on ceramic traditions by Abu'l Qasim, a member of a family of potters from Abu Tahir (Kashan). The manuscript was translated from Persian to German in 1935 by H. Ritter, J. Ruska, and R. Winderlich; the German edition was translated into English by J. W. Allan as "Abu'l Qasim's Treatise on Ceramics" (Iran 11:111-121, 1973). Keblow Bernsted refers frequently to this document in subsequent discussions. A two-page color map of "The Islamic World" with ancient and modern place names includes, from west to east, the eastern Mediterranean (Greece and Egypt) to India (the Iberian Peninsula depicted in an inset) and from Kazakhstan to Yemen, north to south. This splendid map lacks any measurement scale.

The initial section of the book considers ceramic raw materials and techniques (pp. 1-52 with 84 figures) including discussions about glaze recipes and methods of producing pigments, and incorporates comments from Abu'l Qasim's manuscript as well as data derived from scientific investigations. This narrative includes descriptions of 14 ceramic decorations or wares, ranging from "Unglazed, pre-Islamic pottery" to Lajvardina ware. In three paragraphs, the author covers pre-Islamic pottery beginning in the sixth millennium BCE, prior to a discussion of early glazes, and excavations at Abbasid Samarra, Iraq where Chinese Tang wares (CE 618-907) were recovered. There are sections on white-ground decoration (which began in the Abbasid period), inglaze colours, lustre ware, slip-painted ware (Nishapur and Garrus types), fritware, silhouette ware, Raqqa ware, Laqabi ware, relief-moulded ware, Minai ware, and Lajvardina ware and its relationship to cobalt blue and lapis lazuli. Useful distinctions are made between cobalt ores and Egyptian blue pigment, the importation of cobalt and copper ores to Iraq from Persia. The discussion of Lustre ceramics (pp. 7-11) is especially informative and includes a lengthy citation from Abu'l Qasim's manuscript (the author also includes translations of Abbasid measures), EDX and SEM data, and thin-section and glaze illustrations. Her discussion of Fritware (pp. 23-28) also includes manuscript citations and EDX data while Silhouette ware, a 12th century underglaze ceramic (pp. 28-29), has important references about chromite black, cobalt blue, and alkaline glaze; the narrative also has citations from Abu'l Qasim and reports SEM-EDX data.

"Kilns" (pp. 53-59) is a rather brief and disappointing summary of "a characteristic kiln of the period." There are two color illustrations of a traditional wood-fired kiln, one from Natanz, Iran and a second from Kütahya, Turkey; a sketch of the latter; a finished drawing of a kiln from Andalusia, Granada; and a sketch of a kiln similar to the one described in Abu'l Qasim's treatise. Kiln furniture included saggars, ceramic pegs and ceramic tripods. Keblow Bernsted did not provide any of the illustrations for this chapter; her narrative does not mention

that these are updraft kilns. This discussion might have been augmented by kiln and firing references in Henry Glassie's *Turkish Traditional Art Today* (1993), *Art and Life in Bangladesh* (1997), *Material Culture* (1999a), *The Potter's Art* (1999b), and *Contemporary Traditional Art of Bangladesh* (2000). Three articles by Beal M. Mossman and Marcia Selsor could elaborate the Iberian tradition: "A utilitarian pottery tradition and the modern Spanish kitchen" (1988a) in C. C. Kolb and L. M. Lackey (eds.), *A Pot for All Reasons: Ceramic Ecology Revisited*, Temple University, Philadelphia, pp. 213-237; "The three-story kiln of Agost, Spain" (1988b) in C. C. Kolb (ed.), *Ceramic Ecology Revisited, 1987: The Technology and Socioeconomics of Pottery*, British Archaeological Reports S436, Oxford, pp. 57-87; and "The clay preparation tradition of Agost, Spain" (1989) in C. C. Kolb (ed.), *Ceramic Ecology, 1988: Current Research on Ceramic Materials*, British Archaeological Reports S513, Oxford, pp.155-174.

The third section, "Chemical and Petrographic Investigation of the Pottery" (pp. 61-86) begins with a brief description of "Techniques and Methods" in which Optical Emission Spectrophotometry (OES), Petrography, and Scanning Electron Microscopy (SEM) are mentioned briefly, and there is a paragraph on "Clay Properties" with a sketch of mineral grains and a grain size classification (derived from Tucker 1982). However, the reference should be to M. E. Tucker's *The Field Description of Sedimentary Rocks* (1994). There are four subdivisions in this chapter, each having two components (wares and clays), and the highly informative narratives are accompanied by 25 illustrations (mostly thin sections with reference scales). The subdivisions are Iraqi ware and clay (pp. 63-67), Egyptian ware and clay (pp. 68-73), Syrian ware and clay (pp. 73-79), and Persian ware and clay (pp. 79-86). No sample sizes are reported in any of these studies.

The Iraqi investigation focuses on 9th century Abbasid pottery (tin glaze with inglaze decoration and tin glaze with lustre on pale ochre yellow to pale beige earthenware); some Munsell color equivalents are noted. Data on chemical and petrographic analyses are presented. Iraqi clays are alluvial and calcareous, and potters did not add temper. The author also suggests ranges of firing temperatures. The Egyptian study focuses on 10th century Fatimid wares (tin glaze lustre on pale yellow body) and 13th century Mamluk pottery (lead glaze with sgraffito decoration). Data from chemical and petrographic analyses are presented, and the author concludes that the clays correspond with Nile clay/marl. She proposes that the clay used is naturally tempered (large grains of quartz and feldspar, rock fragments, mica, and iron oxide) and suggests firing temperatures. The Syrian Seljuk 12th-13th century Raqqa types were also studied and chemical and petrographic data reported. There is a bimodal grain distribution (30-50 and 125-250 μ m); quartz grains predominate in the paste along with moderate quantities of feldspar, and the ware is coarse grained and porous, hence, these ceramics are distinct from the Iraqi specimens and she postulates that Iraqi clays might have been levigated and were fired at about the same temperatures.

The Persian Samanid pottery comprised of 10th century Nishapur types (slipped red earthenware) and Seljuk 12th-13th

century Kashan Types – relief cast, silhouette, lajvardina, minai, and laqabi decorated white fritware) fell into two distinct groups. The former clay was naturally rich in lime and iron, with grains of quartz, feldspar, and sericitized feldspar, with lesser amounts of amphibole, muscovite and pyroxene. Fritware is low in lime and iron but high in quartz and feldspar and had alkali frit added by the potters to form an “artificial paste.” Nishapur ceramics had high mean values of V, Cr, Co, and Ni, suggesting that the clays came from ferruginous ultrabasic volcanites; the Kashan clays were low in these elements and had an iron-poor granitic origin. The author also briefly considers older Persian pottery traditions in the north (Guran, Sialk, Hisar, and Giyan) as well as more recent southern polychrome traditions (Persepolis and Susa). She concludes that “the greatest immediate difference in the Muslim potters’ repertoire of quartz-frit pottery was, after form and decoration, in the colour of the paste, which was mainly determined by the local clay. A variation is thus seen in paste colour from the Abbasid ochre yellow alluvial clay over the Fatimid pale yellow calcareous clay to the Seljuk quartz paste and the white quartz-frit paste used in 13th-century Persia” (p. 86). She comments that “the potter’s workshop was located at a suitable distance from his raw materials, but it was not unusual, if these raw materials were not available in the vicinity, to transport them from afar” (p. 86), which appears to be contrary to Dean Arnold’s ceramic ethnoarchaeological data in *Ceramic Theory and Cultural Process* (1985). The reader wishes for a further elaboration of this discussion.

The final section, “Topography and Occurrence of Ceramic Raw Materials” (pp. 87-93), is divided into four sections (Iraq, Egypt, Syria, and Iran), each accompanied by a general map that illustrates basic topographic features related to clay resources. Five geographic-geological regions are considered for Iraq: alluvial plain (mud flats or sabkhas), sand-dune belt, Al-Dibdibba (an area of sand and gravel), Al-Hajara (a limestone rock area), and Al-Widyān (a flatland west of the Euphrates). For Egypt, the Nile Valley and its clay deposits are summarized briefly. Syria is divided into a coastal zone (characterized by limestone and dolomite), central mountains (desert sand), the southwestern Hauran area (basaltic), and Al-Jazira (stony soils with clays, marl and conglomerates). Iran’s varied topography is distinguished by a series of mountain chains (northern, eastern, central, and southern) with rocky and gravel deserts (granite and syenite predominate). The discussion of Iraq’s topography and resources is more complete and informative than the others.

Written and illustrated by a museum conservator with a scientific background and expertise in Islamic pottery, this volume provides a basic introduction to early Islamic ceramic in terms of clays and aplastics, major wares, and raw material distribution. The discussion of ceramic kilns is perfunctory and parts of the section on raw materials are superficial. Nonetheless, the illustrations of the ceramics and the thin sections are superb and the volume provides a very commendable introduction to the subject for those interested in Islamic material culture and ceramic analyses.

The book is available from Archetype Publications Ltd. (7 Fitzroy Square, London W1T 5HJ, telephone: 44(207)-380-0800), a publisher and seller of books on the conservation of

works of art and antiquities. There is a web site at <http://www.archtype.co.uk>. The US distribution agent is JG Publishing Services, P.O. Box 11106, Marina Del Rey, CA 90292; telephone: 888/502-8600; fax: 310/206-2343; Internet www.jgpubs.com; and e-mail info@jgpubs.com.

Erzsébet Jerem and Katalin T. Biró (editors), **Archaeometry 98: Proceedings of the 31st Symposium: Budapest, April 26-May 3, 1998**, 2 vols., Archaeolingua Central European Series 1, British Archaeological Reports International Series S1043, Archaeopress, Oxford, UK, 2002. ISBN 1-84171-421-6, 841 pp., £90.00. Jerem and Biro are the editors of the inaugural title in the Archaeolingua Central European Series. Archaeometry 98 includes 129 papers presented at the 31st International Archaeometry Conference held in Budapest. In general, Archaeometry symposia are organized according to four main topics: 1) investigation of biological materials, 2) dating methods, 3) field archaeology, and 4) technology and provenance of archaeological materials. The Budapest meeting selected experimental archaeology as its special field of interest since this field has seen some major new achievements in the past several years. Because of the great number of papers, the editors decided to publish the proceedings in two volumes, following the structure of the meeting. Twenty-five papers concern ceramic materials. The author, titles, and page numbers are given below.

Vargas-Sanders, R., Díaz, E. O., and Martínez, R. D., “Identification of ancient proteins from a ceramic sculpture of Mictlantecuhltli at the Templo Mayor, Mexico – News and progress,” pp. 63-66. Fabbri, B., Gualtieri, S., and Santoro, S., “The importance of the firing atmosphere in the production of coarse ceramics with calcite and chamotte inclusions,” pp. 191-195. von der Crone, M. J., and Maggetti, M., “Experimental firing of clays using salt water,” pp. 249-255. Wolf, S., “Questions, answers, and limitations: Chemical, mineralogical and petrographic distinction between three Medieval brick productions in Switzerland,” pp. 257-261. de la Fuente, G. A., “Application of a diatomological analysis (provenance) in archaeological ceramics: An Experimental approach,” pp. 501-512. Demirci, S., Caner-Saltik, E. N., Türkmenoglu, A., and Böke, H., “Technological properties of some Medieval glazed pottery in Anatolia,” pp. 513-518. Duruz, M., and Maggetti, M., “An Early Medieval pottery workshop from the 9th century at Reinach, Switzerland,” pp. 519-524. Eiland, M. L., and Williams, Q., “Infra red examination of archaeological ceramics,” pp. 531-539. García-Heras, M., Fernández-Ruiz, R., and Tornero, J. D., “New developments in the analysis of archaeological ceramics by total reflection X-ray fluorescence (TXRF),” pp. 541-545. Gassner, V., and Sauer, R., “Archaeometrical characterization and provenance studies on pottery found at Velia (Southern Italy),” pp. 547-554. Gebhard, R., Guggenbichler, E., and Häusler, W., Riederer, J., Schmotz, K., Wagner, F. E., and Wagner, U., “Mössbauer study of a Celtic pottery-making kiln in Lower Bavaria,” pp. 555-563. Hayashida, F., Glascock, M., Häusler, W., Neff, H., Reiderer, J., and Wagner, U., “Technology and organization of Inka pottery production: Archaeometric perspectives,” pp. 573-580. Jacobson, L., van der Westhuizen, W. A., and Morris, D., “XRF analysis of type R pottery from the Riet River Area, Northern

Cape, South Africa," pp. 581-583. Jacobson, L., van der Westhuizen, W. A., and Oosyhuysen, J., "Sarm 69 ceramic-1: A new pottery certified reference material for inter- and intra-laboratory calibration," pp. 585-586. Koch, C. P., Pavlish, L. A., Farquhar, R. M., Hancock, R. G. V., and Beukens, R. P., "INAA of pottery from Il Lokeridede and Jarigole, Koobi Fora Region, Kenya," pp. 578-592. Misonne, B., Laduron, D., and Brulet, R., "Provenance study and technological approach of Late Samian ware from Argonne, NW Gaul and Burgundy," pp. 599-605.

Mommsen, H., Andrikou, E., Aravantinos, V., and Maran, J., "Neutron activation analysis results of Bronze Age pottery from Boeotia including ten Linear B inscribed stirrup jars of Thebes," pp. 607-612. Okyar, F., "Characterization of İznik ceramics," pp. 621-626. Palaguta, I., "Some results on Cucuteni-Tripolye decoration techniques," pp. 626-629. Pavlish, L. A., Farquhar, R. M., Redford, D. B., Hancock, R. G. V., and B'Naity, J., "Archaeological, historical, and geochemical analysis of basket handle jars from Mendes, Egypt," pp. 631-634. Pérez-Arantegui, J., and Castillo, J. R., "Chemical characterization of clear lead glazes on Islamic ceramics, produced in Northern Al-Andalus (Muslim Spain)," pp. 635-639. Therrin-Michael, G., Masserey, C., and Galetti, G., "Macroscopical, mineralogical and chemical characterization of pottery from an Early La Tène settlement at Alle (Noir Bois), Jura, Switzerland: An example for the combination of 'low-' and 'high-tech' methods," pp. 641-647. Tuna, N., "Spatial analysis of different ware types from Knidian pottery workshop A4 at Tekir, Turkey," pp. 649-654. Tulun, T., Uzgil, E., Güleç, A., Tekin, A., Batur, A., Erdem, A., Kahya, Y., Köksalm, G., Sağlamer, G., Tanyell, G., Tütengil, A., Altun, A., Arli, B., Arli, H., Çobanoğlu, V., and Erel, C., "A multidisciplinary study of ancient İznik ceramics," pp. 655-665. Yellin, J., and Cahill, J. M., "Origin of the rosette-stamped storage jars from ancient Judah: Preliminary results of the neutron activation analysis," pp. 667-671.

This volume is available from Archaeopress, Gordon House 276, Banbury Road, Oxford OX2 7ED England; telephone and FAX: +44 (0) 1865 311914, e-mail: bar@archaeopress.com; Internet <http://www.archaeopress.com>. It may also be obtained from The David Brown Book Co., P.O. Box 511 (28 Main Street), Oakville, CT 06779; telephone Toll-free: 800/791-9354, 860/945-9329; fax: 860/945-9468; e-mail: david.brown.bk.co@snet.net.

Ceramics in America 2003 published for The Chipstone Foundation by the University Press of New England became available in September 2003. It is available directly from the University Press of New England (37 Lafayette Street, Lebanon, NH 03766; Orders 800/421-1561, Fax 603/643-1540, Internet <http://www.upne.com>). The regular retail price is \$55.00 not including shipping and handling. For subscribers to the HistArch listserv, there is a special price of \$42.00, postpaid. Cite order code: CIA1. This special price also is available for the two previously published volumes: Ceramics in America 2001 and Ceramics in America 2002.

The major articles in the 2003 edition include: Miranda Goodby, "'Our Home in the West': Staffordshire Potters and Their Emigration to America in the 1840s," pp. 1-25; Arthur F.

Goldberg, "Highlights in the Development of the Rockingham and Yellow Ware Industry in the United States – A Brief Review with Representative Examples," pp. 26-46; Barbara H. Magid and Bernard K. Means, "In the Philadelphia Style: The Pottery of Henry Piercy," pp. 47-86; Michelle Erickson and Robert Hunter, "Swirls and Whirls: English Agateware Technology," pp. 87-110; Peter Williams, "The Talbot Hotel Pit Group," pp. 111-137; Ivor Noël Hume, "Through the Looking Glass: or, the Chamber Pot as a Mirror of Its Time," pp. 138-171; Richard Viet and Mark Nonestied, "Taken for Granite: Terracotta Gravemarkers from New Jersey and New York," pp. 172-195; Graham Hood, "Meditations on a Chinese Musician," pp. 196-213; and Anthony W. Butera, Jr., "'Informed Conjecture': Collecting Long Island Redware," pp. 214-237. Shorter contributions include: Merry Abbitt Outlaw, "New Discoveries: Introduction," pp. 239-241; William B. Liebeknecht, Rebecca White, and Richard W. Hunter, "A Coxon Waster Deposit of the Mid-1860s, Samples in Trenton, New Jersey," pp. 241-244; Leigh J. Dodd, "Excavation on the Site of the Lewis Pottery Complex, Buckley, North Wales, United Kingdom," pp. 245-248; Stephen E. Patrick, "A Maryland Grouping of Bow and Derby Figures of the 1760s," pp. 249-251; David G. Orr, "Samuel Malkin in Philadelphia: A Remarkable Slipware Assemblage," pp. 252-256; Christopher T. Espenshade, "The Two Faces of Anthony Baecher," pp. 256-258; William B. Liebeknecht and Richard W. Hunter, "The Richards Face — Shades of an Eighteenth Century American Ballarmine," pp. 259-261; Beverly A. Straube, "The Prodigal Son Returns to Jamestown," pp. 262-265; Alain C. Outlaw, "Backcountry Sophistication: Anthropomorphic Elements from a Piedmont North Carolina Kiln," pp. 265-268; L. Madison Washburn, "Toy Story," pp. 268-270; Christopher C. Fennell, "Molded Malevolence: Instrumental Symbolism Rendered in Clay," pp. 270-273; and Mark M. Newell, "Making his MARK," pp. 273-275.

Book reviews include: Geoffrey H. Priestman, *An Illustrated Guide to Minton Printed Pottery, 1796-1836*, Sheffield, England: Endcliffe Press, 2001, reviewed by Robert Copeland, pp. 277-280; Henry Glassie, *The Potter's Art*, Bloomington and Indianapolis, IN: Indiana University Press, 1999, reviewed by Ellen Paul Denker, pp. 280-282; Charles L. Venable, Ellen P. Denker, Katherine C. Grier, and Stephen G. Harrison, *China and Glass in America, 1880-1980: From Tabletop to TV Tray*, Dallas: Dallas Museum of Art, 2000, reviewed by Amy C. Earls, pp. 282-285; Amanda E. Lange, *Delftware at Historic Deerfield, 1600-1800*, Deerfield, MA: Historic Deerfield, 2001, reviewed by Louise P. Richardson, pp. 286-288; Nancy E. Owen, *Rookwood and the Industry of Art: Women, Culture, and Commerce, 1880-1913*, Athens, OH: Ohio University Press, 2001, reviewed by Cynthia Brandimarte, pp. 288-290; and Christiaan J. A. Jörg and Michael Fleckner, *Porcelain from the "Vung Tan" Wreck: The Hallstrom Excavation*, Singapore: Oriental Art, 2001, reviewed by Linda R. Shulsky, pp. 290-293. Amy C. Earls provides "Checklist of Articles and Books on Ceramics in America Published 1998-2002," pp. 295-306, and the volume has a comprehensive Index, pp. 307-321.

Ceramics In America 2004 is being compiled now and

available by subscription. It will feature several important articles of interest to archaeologists including: "Archaeology of a Colonial Pottery Factory: the Kilns and Ceramics of the 'Poor Potter' of Yorktown" by Norman F. Barka, "The Swan Cove Kiln: Chesapeake Tobacco Pipe Production (ca. 1650-1669)" by Al Luckenbach, and "The Little Engine That Could ... Adaptation and Use of the Engine Turning Lathe for the Decoration of Pottery in Eighteenth and Nineteenth Century Britain" by Jonathan Rickard and Donald Carpentier.

Archaeological Chemistry: Materials, Methods, and Meaning, edited by Kathryn A. Jakes, ACS Symposium Series 831, Washington, DC: American Chemical Society (distributed by Oxford University Press), 2002, ix + 261 pp., 77 halftones, line drawings, and maps, ISBN 0-8412-3810-3, \$98.00 (reduced from \$140.00). Ordering information is available online at <https://www.oup-usa.org/cgi-bin/update.pl>. Kathryn A. Jakes (Department of Consumer and Textile Sciences, Ohio State University) has edited a volume of 15 diverse contributions, many of which involve archaeological ceramics and other material culture including glass beads and glass, silk fibers, obsidian, coinage, and osteological materials. The volume provides current, relevant examples of the application of chemical and physical sciences to the examination of archaeological materials and, thereby, to the discernment of past human behavior. The chapters were originally oral presentations given at the 10th Archaeological Chemistry Symposium, organized by the American Chemical Society's Subdivision on Archaeological Chemistry, held in Chicago in August 2001.

Innovative approaches to nondestructive materials analysis and dating are described including a plasma extraction method for radiocarbon dating, EDTA extraction of lead for subsequent isotopic ratio determination and provenience studies, and laser ablation inductively coupled plasma mass spectrometry for elemental analysis of obsidian, chert, pottery, and glazed surfaces. To determine the provenience of finds, the characteristics of plant resins are categorized based on data obtained from carbon-13 nuclear magnetic resonance, gas chromatography, and mass spectrometry. Neutron activation analysis is used to differentiate glass beads to determine the sources of archaeological glass. Microscopy, scanning electron microscopy, x-ray microanalysis, and infrared microanalysis provide information on the degradation patterns of silk textiles obtained from marine sites. Electron spin resonance is used to understand the thermal history of maize and bone while electron microprobe analysis provides data used to trace obsidian trade routes. Sources of clay for pottery manufacture are distinguished by elemental composition gleaned from electron microprobe analysis and from x-ray fluorescence and methods of manufacture are inferred. Stable isotopic analysis of bone and of tooth enamel provides insights into the use of maize in the diet. Energy dispersive x-ray fluorescence yields the elemental composition of coins, and reflects the continuity of manufacturing methods. Each chapter has its own references and there is a one-page author index and 14-page subject index (pp. 248-261).

The seven initial contributions are: "Archaeological Chemistry: Materials, Methods, and Meaning," by Kathryn A.

Jakes (Ohio State University), pp. 1-7; "Potential for Virtually Nondestructive Radiocarbon and Stable Carbon Isotopic Analyses on Perishable Archaeological Artifacts," by Karen L. Steelman and Marvin W. Rowe (Texas A&M University), pp. 8-21 [AMS ¹⁴C]; "Accelerator Mass Spectrometry Radiocarbon Ages of an Oxalate Accretion and Rock Paintings at Toca do Serrote da Bastiana, Brazil," by Karen L. Steelman, Richard Rickman, Marvin W. Rowe, Thomas W. Boutton (all four Texas A&M University) Jon Russ (Arkansas State University), and Niéde Guidon (Fundação Museu do Homem Americano, Saõ Raimundo, Brazil), pp. 22-35; "Measuring Lead Isotope Ratios in Majolica from New Spain Using a Nondestructive Technique," by Susan Reslewic and James H. Burton (University of Wisconsin), pp. 36-47 [EDTA and ICP-MS]; "Characterization of Archaeological Materials by Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry," by Robert J. Speakman, Hector Neff, Michael D. Glascock, and Barry J. Higgins (all University of Missouri, MURR), pp. 48-63; "Modern and Ancient Resins from Africa and the Americas," by Joseph B. Lambert and Yuyang Wu (both Northwestern University), and Jorge A. Santiago-Blay (National Museum of Natural History, Smithsonian Institution), pp. 64-83 [¹³C NMRS] "Characterizations and Radiocarbon Dating of Archaeological Resins from Southeast Asia," by C. D. Lampert, I. C. Glover, C. P. Heron, B. Stern, R. Shoocongdej, and G. B. Thompson (Lampert, Stern, and Thompson are at the University of Bradford Glover is with University College London; Shoocongdej is at Silpakorn University, Bangkok), pp. 84-109 [GC and GC-MS].

The eight other chapters are: "Analysis of Glass Beads and Glass Recovered from an Early 17th-Century Glassmaking House in Amsterdam," by K. Karklins (Parks Canada), R. G. V. Hancock (SLOWPOKE-2, Royal Military College), J. Baart (Stedelijk Beheer, Amsterdam), M. L. Sempowski (Rochester Museum and Science Center [NY], J.-F. Moreau (Université du Québec), D. Barham and S. Aufreiter (both University of Toronto), and I. Kenyon (Ontario Heritage Foundation), pp. 110-127 [INAA]; "Morphology and Microstructure of Marine Silk Fibers," by Rekha Srinivasan (Chennai, India) and Kathryn A. Jakes (Ohio State University), pp. 128-150 [SEM, EDS and IMS]; "Electron Spin Resonance Studies to Explore the Thermal History of Archaeological Objects," by Robert G. Hayes and Mark R. Schurr (both University of Notre Dame), pp. 151-168; "Geochemical Analysis of Obsidian and the Reconstruction of Trade Mechanisms in the Early Neolithic Period of the Western Mediterranean," by Robert H. Tykot (University of South Florida), pp. 169-184 [EMA and SEM-EDS]; "Chemical, Technological and Social Aspects of Pottery Manufacture in the La Quemada Region of Northwest Mexico," by E. Christian Wells (now at University of South Florida) and Ben A. Nelson (Arizona State University), pp. 185-198 [SEM-EDS and refiring experiments]; "Trace Element Analysis and Its Role in Analyzing Ceramics in the Eastern Woodlands," by Christina B. Rieth (New York State Museum), pp. 199-213 [XRF]; "Contribution of Stable Isotope Analysis to Understanding Dietary Variation among the Maya," by Robert H. Tykot (University of South Florida), pp. 214-230; and "Chemical Compositions of Chinese Coins of Emperor Ch'ien

Lung (Qian Long) and Annamese Coins of Emperor Thanh Thai via Energy-Dispersive X-ray Fluorescence,” by Tiffany Gaines, Eric McGrath, Vincent Iduma, Renee Kuzava, Sarah Frederick, and Mark Benvenuto (all University of Detroit Mercy), pp. 231-244 [XRF].

Other Books and Publications

Korean Ceramics from the Museum of Oriental Ceramics, Osaka by Itoh Ikutaro (Judith G. Smith, ed.), New Haven: Yale University Press, 2000, ISBN 300087799, 151 pp., 104 illustrations (67 in color), \$35.00. Established in 1982, the Museum of Oriental Ceramics in Osaka specializes in collecting, exhibiting, and fostering research on ceramics from China, Korea, Japan, and Vietnam. The museum owns one of the most distinguished and comprehensive assemblages of Korean ceramics in the world. This volume is a catalog of an inaugural exhibition of forty-eight masterworks of Korean ceramics from the museum, ranging from the refined celadons of the Koryo Dynasty (1392–1910), celebrates a long-term loan agreement with the Metropolitan Museum of Art. The works were selected for their rarity and beauty, and for what they reveal of the evolution of ceramic manufacture on the Korean peninsula over a period of eight centuries and the development of uniquely Korean styles and decorative techniques. Itoh Ikutaro addresses specific characteristics (production methods, forms, design, and decorative techniques) that distinguish Korean ceramics from those of neighboring China and the historical circumstances that influenced their production.

Archaeopress and David Brown are also the sources for the following BAR volumes: Dolinka, Benjamin J., **Nabataean Aila (Aqaba, Jordan) from a Ceramic Perspective: Local and Intra-regional Trade in Aqaba Ware during the First and Second Centuries AD, Evidence from the Roman Aqaba Project**, British Archaeological Reports International Series S1116, Archaeopress, Oxford, England, 2003, ISBN 84171 494 1, £32.00, xiii + 140 pages; 3 tables; 47 figures including maps, drawings, photographs, plans. The importance of antiquities for the history of Nabataean Aila cannot be underestimated. The pottery recovered from the excavations of the Roman Aqaba Project (RAP) has provided much more information about the society and economy of the site than the writings of the ancient authors. The port of Aila is located at the northern head of the Gulf of Aqaba, on the Jordanian side of the modern Israeli/Jordanian border. From the mid-1st century BCE through the early-2nd century CE, Aila was an important Nabataean entrepôt serving a variety of commercial and economic functions. The author focuses on the ceramic assemblage from the RAP excavations in an attempt to better understand the socio-economic conditions at the site during this period, as seen through its pottery. Subsequent investigation of this material, combined with a thorough examination of excavation reports and a detailed comparative analysis of ceramic assemblages scattered throughout Jordan and Israel, was carried out by the author and the results of this research have brought to light a great deal of new information regarding the society and economy of Nabataean Aila. This study examines the historical sources and archaeological evidence

regarding Aila during the Nabataean period. Analysis of these sources provides important clues as to the rôle of Aila during the height of the Nabataean kingdom and shortly thereafter: this information both confirms and supplements the ancient authors and offers new insights into Aila’s socio-economic history of Aila. There is a detailed analysis of the Nabataean and Early Roman pottery recovered during the excavations. A discussion of the various wares and vessel types offers insights into the local pottery industry attests to the thriving trading activities of the ancient polis, amply demonstrated by the numerous imports recovered. The final chapter offers some preliminary conclusions regarding the society and economy of Nabataean Aila, including its strategic location as a nexus of trade, the goods and other possible commodities that the site may have produced and exported, and its role as a regional oasis that supplied its rural hinterland with a variety of products. Taken together, information provided by the present study sheds light on the socio-economic history of Nabataean Aila. An appendix contains a catalog of 44 selected examples of early Roman and Nabataean ware.

Flecker, Michael, **The Archaeological Excavation of the 10th Century Intan Shipwreck, Java Sea, Indonesia**, British Archaeological Reports International Series S1047, Archaeopress, Oxford, England, 2002, ISBN 1 84171 428 3, £30.00, iv + 163 pages; tables, photographs, appendices. In 1997 the author excavated a shipwreck in the northwestern reaches of the Java Sea, Indonesia. It became known as the Intan Wreck due to its close proximity to the Intan Oil Field and is dated from early to mid-10th century through Chinese coin dates, stylistic analysis of ceramics, and radiocarbon dating. While the structure of the shipwreck has all but disappeared, sufficient fragments remained for timber identification and a glimpse at construction techniques. These clues, together with cargo types and wreck location, strongly indicate an Indonesian ship of lashed-lug construction. From cargo distribution the Intan ship may have been as long as 30 m. The abundance of surviving cargo stands in stark contrast to the fragmentary hull remains. A total of 6,154 non-ceramic artifacts and 7,309 ceramic artifacts were logged over the course of the excavation. The materials are as diverse as bronze, lead, silver, iron, tin, gold, glass, ceramic, stone, and organics. The provenance of the material culture includes China, Malaysia, Thailand, Indonesia, and the Middle East. This diversity is a clear indication of entrepot trade, the most likely port of lading being the Srivijayan capital, Palembang. Considering the location of the wreck and the large base metal component, the Intan ship could only have been bound for “metal-deficient” Java.

Gheorghiu, Dragos (editor), **Fire in Archaeology: Papers from a Session Held at the European Association of Archaeologists Sixth Annual Meeting in Lisbon 2000**, British Archaeological Reports International Series S1089, Archaeopress, Oxford, England, 2003, ISBN 1 8417 1467 4, £28.00, iv + 154 pages; figures, tables, maps, drawings, plans and photographs. This volume contains 15 papers inspired by the sessions on “The Archaeology of Fire” held at the 6th and 7th European Association of Archaeologists Conferences in Lisbon and Essington in 2000 and 2001. There are few studies on fire and pyrotechnology in the archaeological literature. In

archaeological research fire seems to have been the forgotten phenomenon, with attention being focused on material culture. The papers (covering the Palaeolithic to the Iron Age and regions from Scandinavia to Italy, Spain to the Black Sea) reflect on the approaches to the study of fire, as an essential phenomenon in human evolution. Included are studies of anthracology, ethnoarchaeology, field archaeology, symbolism, technology and experimental archaeology, whose ideas converge to some universals, such as the relationship of fire with environment, materials, human body, its quality of transformability, and its anthropological centrality.

Hendrickson, Mitch J., **Design Analysis of Chihuahuan Polychrome Jars from North American Museum Collections**, British Archaeological Reports International Series S1025, Archaeopress, Oxford, England, 2003, ISBN 1 84171 501 8, £27.00, vii + 107 pages; 23 tables, 67 illustrations including, maps, plans, drawings, photographs. The region of Chihuahua in Northwestern Mexico is a relatively isolated area with a barren desert landscape. There is little in the way of the settlement archaeology typically found in the Southern regions of Mexico, for instance cities, roads, temples and other large stone structures. However, there is archaeological evidence present in this region that points to a significant culture, important due to the fact that it has a material and cultural merging of both Mesoamerican and Puebloan influences. Because of these combined influences there are different theories as to the origins of this culture, with either the Toltecs or the Anasazi being put forward. The Chihuahuan region may not possess any significant settlement sites, but it does have an excellent material culture, particularly its colourfully painted ceramic jars. The study begins with an assessment of Chihuahuan prehistory and ceramic research in this area, as well as the environment, geography, the archaeological record, and ceramic chronologies. Also discussed are the cultural boundaries, definitions and characteristics of the Medio period (1200-1450 CE). The role of decoration in ceramic reconstruction is also covered. The cultural implications of the decorative patterns on the Chihuahuan polychrome jars have previously been largely ignored. These polychromes are part of a distinct pottery series, and the author uses the large number of vessels now located in many North American museums to carry out a whole range of contrastive analyses on these jars, both individually, as well as looking at general design patterns for cultural interpretation. The analysis of the design of the polychrome jars is carried out by contrasting levels of design, styles, and other tests, in order to fit individual samples into the typology. He places these assemblages within geographical, cultural and temporal contexts.

Kilikoglou, V., A. Hein and Y. Maniatis (editors), **Modern Trends in Scientific Studies on Ancient Ceramics: Papers Presented at the 5th European Meeting on Ancient Ceramics, Athens 1999**, British Archaeological Reports International Series S1011, Archaeopress, Oxford, England, 2002, ISBN 1 84171 289 2, £45.00, iv + 402 pages; photographs, maps, plans, and drawings. This volume contains a selection of 43 papers presented at the 5th European Meeting on Ancient Ceramics, at Athens in 1999. This regular meeting provides a forum for the presentation of existing trends in the field of

ancient ceramic studies, based on combined scientific/archaeological approaches. These papers offer an overview of the current status of the highly multidisciplinary research in Europe, both in terms of the many scientific techniques (with a balance between mineralogical and chemical methods) developed and applied, as well as on novel methodological approaches on materials, covering a broad range of periods and geographical regions (from Spain to the Middle East, from Uzbekistan to the Aegean). All the papers of this volume were peer-reviewed for their originality, significance, and technical validity.

Luke, Joanna, **Ports of Trade, Al Mina and Geometric Greek Pottery in the Levant**, British Archaeological Reports International Series S1100, Archaeopress, Oxford, England, 2003, ISBN 1 84171 478 X, £25.00, iv + 81; 16 figures, 4 b/w plates, 3 maps, and 16 tables. Al Mina, at the mouth of the Orontes, 75 km southwest of Catal Hüyük, Turkey, has long dominated Greek-Levantine discussions in the Geometric Period (c. 1000-700 BCE); the site was the first to reveal an abundance of Greek pottery, and still is the findspot of the greatest quantity of Greek Geometric pottery in the Levant (ca. 1500 sherds). The author analyzes and reviews this "Greek emporion," taking as her main topics for discussion Al Mina as a port of trade, the evidence for Greek residence on the site, Greek geometric pottery in the Levant, and Geometric pottery in Greek-Levantine trade.

Monroe, J. Cameron (Peter Davey, editor), **The Archaeology of the Clay Tobacco Pipe XV: Negotiating African-American Ethnicity in the 17th-Century Chesapeake**, British Archaeological Reports International Series S1042, Archaeopress, Oxford, England, 2002, ISBN 1 84171 420 8, £22.00, ii + 96 pages; 22 figures, drawings, maps, and 2 appendices. This is the 16th volume in The Archaeology of the Clay Tobacco Pipe series. The subject matter returns to the east coast of the USA, last considered in the Chesapeake Bay volume (Number XII). A new, extended, typology for Colono pipes is presented, along with a detailed analysis of their chronology. The study of the archaeological evidence at these sites, together with a comparison of the stylistic elements present on the Colono pipes with examples from Mali in West Africa and from elsewhere in the African Diaspora outside North America, supports previous arguments for an African ethnicity for the Chesapeake finds. The author links the increasing social hostility towards Africans in the area, as the century progresses, with changes in the styles observed on the pipes "investing them with... a symbolic content... as a method of communicating cultural survival and ethnic solidarity." The work is of particular significance to prehistorians who lack the means of studying past societies using historical sources.

Negru, Mircea, **The Native Pottery of Roman Dacia**, British Archaeological Reports International Series S1097, Archaeopress, Oxford, England, 2003, ISBN 1 84171 475 5. £27.00, iv + 112 pages; 26 figures, tables, maps; 25 plates, drawings, photographs. This book, based on the author's thesis, analyses the local pottery tradition of Roman Dacia. In the summer of 106 AD a part of Dacia (now Romania) became a Roman province. Taking wheel- and hand-made products, the author investigates only that pottery which clearly derives from

the classic Dacian Late Iron Age, and under local pottery includes the terms local tradition, native, and indigenous pottery. The work contains a repertory of wholly native pottery found in Roman Dacia, as well as a tabulation of sites.

Peterson, Rick, **Neolithic Pottery from Wales: Traditions of Construction and Use**. British Archaeological Reports British Series 344, Archaeopress, Oxford, England, 2003, ISBN 1 84171 489 5, £27.00, 125 pages; drawings, maps, plans, tables, photographs. The author reviews what is known about the Neolithic (4000-2400 BCE) pottery of Wales to create a history of the meaning and use of that material. The volume is divided into two parts. In a thought-provoking and original first section, he deals with some aspects of the history of archaeology, philosophy and science, and attempts to draw these ideas together into a methodology suited to explaining the pottery of Neolithic Wales. The second section employs this methodology to tell the story of the pottery, assessing examples from Llugwy in Anglesey to Tinkinswood on the Glamorgan coast. The work concludes with two detailed appendices, elucidating radiocarbon evidence and providing a summary of pottery traditions.

Robson Brown, Kate A., **Archaeological Sciences 1999**, British Archaeological Reports International Series S1111, Archaeopress, Oxford, England, 2003, ISBN 1 84171 489 5. £27.00, 125 pages; drawings, maps, plans, tables, photographs. This volume contains 13 papers from the Archaeological Sciences 1999 conference hosted by BASRG at the University of Bristol which brought together scientists from throughout the UK and international participants from France, Germany, Poland and Egypt. The papers provide a valuable insight into new avenues for research opening up to archaeological science within the UK. This volume is representative of the very broad range of research themes addressed during the conference, and the 13 papers include: 1) Electron microscopical (SEM) studies on biodeteriorated archaeological Egyptian textiles; 2) Prehistoric crop husbandry and plant use in Southern England: development and regionality; 3) The recognition, interpretation and management of archaeological sites and landscapes using GPS survey and three-dimensional computer modeling; 4) Chaos and patterns: reconstructing past environments using modern data. The molluscan experience; 5) A new method for estimating gestational age from skeletal long bone length; 6) Phosphate redistribution within the fabric of five pottery sherds from north Wales; 7) Assessing and modeling faunal turbation; 8) The Dnieper Rapids region of Ukraine: A consideration of chronology, diet and dental pathology at the Mesolithic-Neolithic transition; 9) Sampling for phosphorus over a grave site: Theory and practice; 10) Early Saxon cultivation of Emmer wheat in the Thames Valley and its cultural implications; 11) Antique to early Medieval copper-alloy metallurgy in Palestine; 12) Very-Realistic visualization of the sculpted bas-reliefs from Cap Blanc; and 13) Identification of a malaria epidemic in antiquity using ancient DNA.

Salem El-Khouri, **Lamia, The Nabataean Terracotta Figurines**, British Archaeological Reports International Series S1034, Archaeopress, Oxford, England, 2002; ISBN 1 84171 414 3, £30.00, 207 pages; 101 drawings, 340 photographs. The Nabataean period represents the flowering of a unique culture

before it was conquered by Rome, and is conventionally dated from the fourth century BCE to the Roman conquest in 106 CE. The Nabataean Kingdom was located in an area between the great cultures of Egypt, Mesopotamia, and Phoenician lands. This volume focuses on describing terracotta figurines in shapes of humans and animals found on the Nabataean sites in South Jordan and Palestine and provide a detailed catalogue with respect to their shape, ware, and possible date, technique of production, meaning and function, to provide important information about the Nabataean culture.

Vallo, Michael, **Die Keramik von Xkipché**, British Archaeological Reports International Series S1056, Archaeopress, Oxford, England, 2003, ISBN 1 84171 436 4, £70.00, xviii, 603 pages; 62 figures, 122 plates, tables; statistical appendices. This volume, in German with an extensive summary in Spanish, provides a detailed analysis of the Mayan pottery from Xkipché in the Puuc area of the Yucatan peninsula, Mexico. During the 7th century, in Puuc area a regional type of Mayan culture emerged, recognizable by characteristic architectural style. Previously, it was impossible to date the beginnings and ends of the settlements in this area. The site of Xkipché offers clues to the dating, with almost half a million of studied pottery fragments. This is by far the largest Prehispanic pottery assemblage from the whole of the northern Yucatan.

Important Articles

The *SAA Archaeological Record* for September 2003 is partly devoted to Latin American Historical Archaeology. Two contributions specifically concern ceramic materials. Patricia Fournier "Historical Archaeology in Mexico: A Reappraisal," *SAA Archaeological Record* 3(4):18-19, 39 also provides a fine bibliography. From her own research, Paty has published: Fournier García, P. (1990) *Evidencias Arqueológicas de la Importación de Cerámica en México, con Base en los Materiales del Ex-Convento de San Jerónimo* [Mexico City], Colección Científica 213, Serie Arqueología, Instituto Nacional de Antropología e Historia, México, DF, México; (1995) *Etnoarqueología cerámica Otomí: Maguey, pulque, y alfarería entre los Hñähñü del Valle de Mezquital*, Unpublished Ph.D. dissertation, Universidad Autónoma de México, México, DF, México; (1996) *La alfarería tradicional: resistencia a la ruptura en cuerpos cerámicos*. Colección Científica, Serie Arqueología, Instituto de Investigaciones Antropológicas, Instituto Nacional de Antropología e Historia, México, DF, México; (1997) "Símbolos de la conquista hispana: hacia una interpretación de significados de artefactos cerámicos del periodo colonial temprano en la cuenca de México," in Marion, M. O. (ed.), *Simbólicas*, Plaza y Valdés-CONA-CYT-Instituto Nacional de Antropología e Historia, México, DF, México, pp. 125-138; and (1998) "La Cerámica colonial del Templo Mayor," *Arqueología Mexicana* 6(31): 52-59. Other works include: Fournier and T. H. Charlton (1999) "La tradición mayólica en México (siglo XVI al XIX)," in Davila, E. F., and Serafin, S. G. (coords.), *Memoria del Primer Congreso Nacional de Arqueología e Historia*, Instituto Nacional de Antropología e Historia, México, DF, pp. 419-426; and Fournier and F. Monroy

(2003) "Arqueología histórica y arqueométrica: aportes al conocimiento de la tecnología productiva de la Mayólica Novohispana," in *III Coloquio de la Maestría en Arqueología: Memoria Electrónica*, Escuela Nacional de Antropología e Historia, México, DF, México.

Monkia Therrien's article entitled "Subtle Differences, Refined Discrimination: Lifestyles in Confrontation in Colombian Historical Archaeology," *SAA Archaeological Record* 3(4):33-36, draws upon Therrien, M., E. Uprimny, F. Salamanca, J. Lobo Guerrero, F. Gaitán, and M. Fandiño (2002) *Catálogo de cerámica colonial y republicana de la Nueva Granada: producción local y materiales foráneos* (Costa Caribe-Altiplano Cundiboyacense, Colombia), Fundación de Investigaciones Arqueológicas Nacionales, Bogotá, Colombia.

Two other notable articles relating to ceramic analyses appeared in chemistry journals during the past few months. The first is "Direct Dating of Archaeological Pottery by Compound-Specific ¹⁴C Analysis of Preserved Lipids" by Andrew W. Stott, Robert Berstan, Richard P. Evershed, Christopher Bronk-Ramsey, Robert, E.M. Hedges, and Martin J. Humm in *Analytical Chemistry*, 2003; ASAP web release date: 03-Sep-2003; DOI: 10.1021/ac020743y. This article was summarized in the "Editor's Choice" column in *Science* 301(5640):1631 (19 September 2003) and another summary also appears in *The Alchemist Weekly Bulletin* on ChemWeb for Oct. 3, 2003. The latter has an article by John K. Borchardt entitled "New Dating Technique Could Resolve Archaeology Disputes," <http://www.chemweb.com/alchem/articles/1063812049388.html>, portions excerpted below. "Bristol and Oxford University researchers report the first direct method for dating ancient pottery using animal fats preserved inside the vessels. The new technique could help archaeologists resolve longstanding disputes.... "Later pottery, such as Roman, is relatively easy to date from its appearance, but earlier pottery can be much harder because of its rough and ready appearance. That's where the appeal of having a technique like this comes in," says team leader chemist Richard Evershed. Until now, there has been no chemical method for directly dating pottery. Organic surface residues have been in direct contact with the soil and are likely to be contaminated, according to Evershed. "Pottery is unusual in that you get these lipids absorbed into the fabric, because most interesting pottery of any respectable age is unglazed," Evershed says. "We're taking a piece of pot and grinding it to a powder, and then extracting lipid that's penetrated right down into the fabric." The method uses automated preparative capillary gas chromatography to isolate individual compounds from the lipid extracts followed by radiocarbon dating using accelerator mass spectrometry. The major advantage of this compound-specific technique is that ¹⁴C dates obtained for individual compounds can be directly linked to the animal fats processed in the vessels during their use. The researchers analyzed 15 pieces of pottery — mostly cooking jars and bowls — ranging in age from 4000 BCE to the 15th century AD [sic., CE]. They assigned a date using the new method and then compared their findings to the historical date verified previously by association with other artifacts. In all cases, "good agreement was obtained...."

The article is by Nicolas Garnier, Pascale Richardin,

Véronique Cheynier and Martine Regert wrote "Characterization of thermally assisted hydrolysis and methylation products of polyphenols from modern and archaeological vine derivatives using gas chromatography–mass spectrometry," *Analytica Chimica Acta* 493(2):137-157 (2003). Abstract: "If some ceramics, such as vinary amphorae attest the consumption and trade of wine in the Roman world, the first wine productions in Occident often stay undocumented. Chemical analysis of organic materials preserved in archaeological vessels is the only way to bring new lights about the elaboration and the consumption of this fermented beverage. To determine the preservation state of wine and other grape derivatives residues, we proceeded to in situ tetramethylammonium hydroxide (TMAH) treatment followed by thermally assisted hydrolysis and methylation - gas chromatography - mass spectrometry (THM–GC–MS). The objectives of the study were (i) the understanding of the pyrolytic mechanisms of proanthocyanidins and (ii) the assessment of the usefulness of thermochemolysis for the identification of phenolic markers from polymeric solid deposit in modern wine bottle and Roman amphorae. THM–GC–MS was revealed to be an efficient method for the characterization of fruit derivatives even if mixed with another organic material, such as pitch used to ensure the watertightness of the ceramic container. The preservation of tannins during millennia in archaeological context is here enlightened for the first time by using analytical pyrolysis. The proposed identification of vinary residues is now based on the detection of the association of more than 30 pyrolytic markers derived from di- and trimethoxylated benzenoid compounds. THM–GC–MS represents a new method for the rapid detection of wine traces in ancient ceramics, adapted to tiny samples (<0.1mg), allowing to precise the role and function of pottery during antiquity." The American Chemical Society also issued a press release about this in *Science Daily* (30 September 2003): <http://www.sciencedaily.com/releases/2003/09/030930055244.htm>.

Israel's Antiquities Authority Plans to Sell Pottery Shards: An article entitled "Antiquities Authority Considers Trading Finds on Open Market" by Amiram Barkat (Haaretzdaily.com, October 05, 2003/Tishrei 9, 5764), available on the Internet at <http://www.haaretz.com/hasen/pages/ShArt.jhtml?itemNo=346879&sw=antiquities>, reports that "The Antiquities Authority is considering selling pottery shards unearthed in archaeological digs on the open market. If the move is approved, it could be an international precedent - a state authority established to protect antiquities will be trading in them. Some of the suggestions so far concern include using shards as building materials and antique glass in women's jewelry. The Antiquities Authority says the initiative stems from acute budgetary distress. Since 2001, the authority's budget has been slashed by more than 20 percent and its income has sharply declined due to the construction recession. A few weeks ago, the Archaeological Council, the body in charge of the authority's budget, convened and rejected the initiative. But senior Antiquities Authority officials hope the move will be approved after they modified their proposal and obtained a legal opinion that selling pottery shards is not against the law. President Moshe Katsav, an amateur collector, says there is

no point in storing up millions of items that have no research value and are not required for exhibitions. Another supporter is the director of the Institute of Archaeology at Tel Aviv University, Professor Israel Finkelstein. He told Haaretz that he sees no point 'in keeping thousands of identical objects that have no real value, while there is no money to publish dig reports.' Finkelstein cautions, however, against taking steps without coordinating them with other countries. 'Antiquities trading is such a sensitive issue these days that if we launch it alone, the international community may ostracize us,' he said. Others strongly oppose the initiative. Dorfman's deputy, Dr. Uzi Dahari, described the proposed move as 'a national disaster' and warned that if carried out, the state would be drained of its assets within a few years. 'Archaeology is not oil; it's a cultural asset,' Dahari said. 'In recent years, all our neighboring states have understood this and have banned trade in antiquities. Try getting a shard out of Egypt today. You cannot renounce national cultural heritage to solve budget problems. We have no mandate to do that to the future generations.' 'It's almost like letting the police sell drugs,' said one university institution director."

"The shards' financial value is questionable and it is not yet clear how they would be sold. One possibility is to use the huge amount of shards as building material. Dr. Gideon Avni, director of excavations and surveys at the Antiquities Authority, cited a recent excavation of his in Lod during which contractors asked him to buy shards. 'I had about two million pieces I had no use for,' he recalled. The problem is that using shards in construction may have dire consequences: Future archaeologists may erroneously believe that under a villa in Shoham, for example, lies a Neolithic village. There is also a legal problem: The Antiquities Law of 1978 specifically stipulates that every antique discovered from that year on is owned by the state. Dorfman said he had a legal opinion saying they could still be sold, anyway. But it is feared that what will begin with selling worthless shards will lead to the commercialization of Israel's archaeological heritage. 'I tend to side with those opposing the trade,' said Dorfman, adding, however, that he was also seriously considering the opinions of antique collectors who were urging him to open the antiquities market to free trade. 'They say, rather than hide the archaeology in your stores, let it out, let it reach as many homes in Israel as possible. At the moment, I draw the line at selling whole articles.' 'Money is the curse of archaeology,' said Dahari. 'We cannot allow this process to begin.' Until the introduction of the Antiquities Law archaeologists would sometimes sell shards left on their digs. They did not receive significant sums for them. Dorfman said only economic feasibility surveys would enable estimating the initiative's economic value. He believes the shards have an economic value. 'You can take a nice shard, frame it, put a stamp of the Antiquities Authority on it and write something in English like: 'Discovered in the Byzantine convent in the Shoham area.' Maybe it could fetch \$2-3 dollars.' Another idea of his is to sell antique glass to jewelry makers. 'Inlaying antique glass in women's jewelry is all the rage now. Today, a merchant who wants something like that has to order a robbery. If I have large surpluses I don't need, why shouldn't I supply it? What's the big deal?'"

Previous Meetings

The Fifth World Archaeology Conference (WAC5) was held in Washington, DC from 21-26 June 2003. The Internet site has the final program and abstracts of papers at <http://www.american.edu/wac5/>. Among the approximately 1,170 scheduled presentations were 13 papers dealing with ceramics. To my knowledge the papers that are enumerated below were presented. Because of visa and travel problems several sessions were cancelled or diminished, including the presentation of papers in various symposia related to the cultural heritage of Afghanistan. In the session "Preserving the Cultural and National Heritages of Afghanistan," organized by Philip L. Kohl and Rita Wright, B. Lyonnet gave a paper entitled "The Ceramic Collections of the Kabul Museum (Afghanistan)" that focused on reorganizing the ceramic type collections that were in storage in that repository and that had been damaged and seriously disturbed by the Taliban among others. No abstract was published.

For those papers that were presented formally, the paper titles, authors and their affiliations, and abstracts follow. Several papers are available in their entirety and the URLs are included at the end of the abstracts.

"Exploring Communications from the Past in the Sonoran Desert, Arizona — Comparing Hohokam Rock Art Iconography and Ceramic Designs" by Todd Bostwick, (Archaeologist, City of Phoenix, Arizona, USA). Abstract: A variety of human, animal, and geometric images were used in the arts and crafts of the Hohokam Culture of the Sonoran Desert more than 500 years ago. This paper reviews what is known about those designs and discusses current theories about their meanings and purposes, including their possible spiritual significance. It is proposed that Hohokam rock art represents a form of ancient story-telling, as well as a means of communicating information about the landscape within which it was located. The paper compares the rock art of the Hohokam with their pottery designs and carved jewelry in an effort to better understand the overall repertoire of images that were used in ancient times in the Sonoran Desert. Possible relationships with other cultures, including those in Mesoamerica, are considered.

"Urban Archaeology of Port Adelaide: The Port Adelaide Historical Archaeology Project, South Australia" by Susan Briggs (Department of Archaeology, Flinders University, Adelaide, Australia). Abstract: The Port Adelaide Historical Archaeology Project started in February of 2002 with three principle aims: to examine the archaeological potential of working class Port Adelaide; to relate this potential to the public; and to develop response strategies to the destruction of the archaeological record of Port Adelaide including the lobbying of state and local government. This paper, to be given at the half way point of the three year project, will examine the headway made in relation to these three aims, however, particular attention will be paid to the archaeology of Port Adelaide's working class. The excavation as part of the Project in September and October 2002 is the only excavations to cover this aspect of Port Adelaide and is, in fact, only the second excavation undertaken in Port Adelaide. This excavation therefore provides the first assemblage for analysis and

comparison to sites around Australia and the world. The focus of the research is to examine class, poverty and the ideological meanings of ceramic patterns as found in Port Adelaide.

“Distribution Pattern of The Settlement Sites with Menhirs in SW Atlantic Europe and the Inference of the Socio-economic Organization of Their Builders” by David Calado (IPPAR. Instituto Português do Património Arquitectónico, State Department for Cultural Affairs, Portugal). Abstract: An intensive surface survey was undertaken to identify the sites with standing stones in a 50-km² area nearby the town of Lagos, Portugal. Seventeen large settlements with menhirs were detected during the survey. The settlements with menhirs appear to be related to an artifact set from the “Early Neolithic” period (Gomes, Cabrita 1997). Statistical analysis of lithic and ceramic artifacts suggested that these settlements date to the period between late 6th and first half of the 5th millennium BC (Calado 2000 a, b; Nocete 2001; Ramos 2002), corroborating Gomes and Cabrita’s earlier findings. This chronology is further supported by OSL dates from menhir n.3 at the Quinta da Queimada site. The upper half of the thick soil layer overlaying and sealing the implantation pit of menhir n. 3, was OSL dated to the transition of the 5th to the 4th millennium BC (Shfd 2013: 5925± 175 BT), providing a solid date ante quem for the erection of the standing stone. The erection of the menhir is substantially older than the OSL date. It is unlikely that the menhir was erected after middle of the 5th millennium BC, because Incised ceramics, typical of the second half of the 5th millennium BC onwards (Ramos 1989; Acosta, Pellicer 1990; Calado 2000 a), are absent from the site. The use of geographical models to understand the dense pattern of spatial distribution of the settlement sites with standing stones suggest that the early Food Producer communities in the area were numerous and completely sedentary at the transition from the 6th to the 5th millennium BC (Calado 2000 a, b; Nocete 2001; Ramos 2002). Download this paper at <http://godot.unisa.edu.au/wac/pdfs/138.pdf>.

“Using Multi-Spectral Satellite Imagery and Reflectance Spectroscopy to Study Ceramic Production Areas at Ancestral Puebloan Sites in New Mexico” by Thomas Carr (Staff Archaeologist, Colorado Historical Society-State Historical Fund, Denver, CO, USA). Abstract: This project utilizes high-resolution visible to near infrared reflectance spectroscopy as a means of building spectral classes for multi-spectral analysis of satellite imagery. The test case for this project is the Galisteo Basin area of New Mexico. The Galisteo Basin contains a number of Ancestral Puebloan sites that show evidence of occupation from the middle AD 1200’s through the late AD 1400’s. Several pueblo sites in the basin contain known ceramic production areas, while several others are unknown. The results of this analysis suggest that Puebloan ceramic production areas possess unique spectral signatures that can be detected in remotely-sensed imagery. The results of this and previous studies clearly demonstrate the utility in conducting site sensitivity analyses that can lead to expedited archaeological site characterization for the purposes of effective and efficient archaeological resource management. Download the paper at <http://godot.unisa.edu.au/wac/pdfs/35.pdf>.

“Correlations of Climate and Culture Change in the

Primorye of the Russian Far East Ensuring the Formation of Proposed Bronze Age Cultural Complexes” by Jim Cassidy (Department of Anthropology, University of California Santa Barbara, USA). Abstract: Three competing archaeological complexes have been proposed as “Bronze Age” cultures, spanning a 1,500 year period, for the Primorye Region of the Russian Far East. These are the Senii Gei Culture that occupies the continental region; the Margarita Culture that is located on the East Coast; and the Lidovka Culture which overlaps both geographic landscapes. The classification of all three of these proposed “Bronze Age” archaeological cultures primarily rely on typologies of ceramics and stone tool industries. While the Senii Gei and Lidovka excavations have yielded small quantities of bronze artifacts and groundstone replicas of “Bronze Age” spears and knives, the Margarita sites have yielded neither. Further, none of the three have yielded any evidence of either the extraction of metal ores, or knowledge of metallurgical smelting processes. Based on fieldwork conducted in the Primorye Region over the last five years, this paper will review the archaeological evidence pertaining to these three cultures from an ecological perspective. Specific attention will be given to potential changes in cultural patterns as a result of influences from climatic oscillations, sea level fluctuations, and the alteration of coastal resources regimes. It is proposed that alterations of the Primorye climate and ecology resulted in the disruption of longstanding cultural traditions and facilitated the rapid formation of new subsistence strategies and a corresponding alteration of social interaction spheres. Download this paper at <http://godot.unisa.edu.au/wac/pdfs/72.pdf>.

“Amazonian Archaeology and Local Identities” by Denise Maria Cavalcante Gomes (Museu de Arqueologia e Etnologia, Universidade de São Paulo, Brazil). Abstract: Cultural History is still an influential approach in Amazonian Archaeology. Despite developments in Social Anthropology and Post-Processual Archaeology, which demonstrate that material culture can not always be correlated with language, categories like phases and traditions have been used as synonyms of some sort of ethnicity. The popularity of this traditional frame can partially be explained by our interest in understanding historically socio-political dynamics of native Amazonian societies. The aim of this paper is to discuss critically the use of ceramic classificatory categories – in the context of a doctoral dissertation project, developed in the Low Tapajós area – besides other archaeological information derived from fieldwork and its impact on local communities in the present. The general idea is to show the gaps between the construction of the archaeological discourse, concerned with scientific problems, and different expectations of identities that emerge from political agendas in this area of Amazonia. Even though we recognize these differences between method, theory and the construction of social identities there is a major concern with Public Archaeology.

“Physicochemical-Compositional Analysis with Social and Economic Interpretation on Ceramic Collections from Kenting National Park, Southern Tip of Taiwan” by Maa-ling Chen (Department of Anthropology, National Taiwan University, Roosevelt Rd. Sect. 4th No. 1, Taipei, Taiwan ROC). Abstract: The study of social boundaries that has been proposed needs

to be approached from analyses of both style and function, and of both decorative and technological variations. Related questions such as organization of craft production, social interaction, local exchange, and interregional or long-term social-political affiliation or trade in a regional aspect, have become major interests for archaeologists in recent years. All these approaches, shown by some recent research, would gain certain benefits from a compositional analysis on ceramics. In general, the selection and processing of raw materials are directly reflected in the compositional data. The compositional analysis distinguishes among sources of raw materials used in pottery manufacturing. Therefore, it helps to recognize the possibility that resources have been exploited locally versus nonlocally, thereby allowing the reconstruction of the organization of production and even the identification of some form of exchange from which raw materials were procured. However, the composition of pottery is in part determined by cultural practices. Therefore, the chemical composition of ceramics does not just reflect the composition of some specific unprocessed geological raw material source only, but also certain human behaviors involved in paste preparation, mixing of clays, choice of temper, and firing condition. Therefore, it should, at the same time, reflect certain technological variations. The purpose of this research project is mainly to attempt to apply the acid-extraction method to compositional analyses on ceramic collections from several sites in the southern Taiwan area. It is hoped that this project can obtain a certain understanding of or insightful information on the technologies and the manufacturing of ceramic assemblage in the area, based on the results of compositional analysis. Then, later, it might be possible to combine certain results from a stylistic analysis with the same ceramic collections to address the topics related to social boundaries, socioeconomic interaction, or exchange among population groups in an intraregional aspect. Download the paper at <http://godot.unisa.edu.au/wac/pdfs/93.pdf>. (36-page paper with many graphics and 6 color illustrations of sherds – 4 of 6 would not print).

“Braided Histories in Pueblo Rock Art, Murals, and Pottery” by Kelley Hays-Gilpin, Department of Anthropology, Northern Arizona University. Abstract: Traditional Hopi histories recorded for over a century, and stories still told day, reveal millennia of interactions and migrations among distant villages and people who spoke different languages. In their own view, Hopi history is not a history of one people, but a series of histories of clans who came together to become Hopi. Studying style, iconography, and technology of rock art together with murals and pottery supports the Hopi view, and can help complement traditional histories. In this case study, I examine the archaeology of 15th century Hopi settlements at Sikyatki, Awat’ovi, and Kawayka and explore relationships with Rio Grande pueblos via cross-media comparison and traditional histories.

“The Koguryo Pottery” by Choi Jong-Taik (Department of Archaeology and Art History, Korea University, Korea). Abstract: Attempts have been made to examine Koguryo pottery since the 1980s both in Jian, China and South Korea, while little interest has been paid to the overall aspects of Koguryo pottery. Chinese scholars have studied Koguryo pottery only

in terms of establishing chronology of burials, and only limited studies have been conducted in South Korea. This paper concerns the origin and development of Koguryo pottery by examining vessel types and manufacturing technology. Three developmental stages (or periods) are recognized: Early (before AD 300), Middle (AD 300-500), Late (after AD 500). Koguryo pottery can be characterized by its fine-grained clay, wheel-thrown technique, band pattern handle, and flat bottom.

“The Dynamics of the Peopling of the Southern Part of the Russian Far East during The Late Pleistocene” by Nina Kononenko (Russian Academy of Science, Vladivostok). Abstract: Recent discoveries in the Primorye region of the Russian Far East have significantly altered the established prehistory of this important area. New data from the Ustinovka Complex of sites and from Sukhaya Cave demonstrate that the lithic technology of the first inhabitants was apparently related to the Levallois blade technology of Siberia and Mongolia dating to 43,000 to 30,000 years ago. The subsequent Upper Palaeolithic microblade technology is well represented in Primorye, first appearing before the Last Glacial Maximum, and parallels other areas bordering the Sea of Japan. This technology was replaced by a bifacial point tradition, in association with early ceramics, around 11-10,000 years ago. Common features of this tradition throughout northeastern Asia support ideas of a late Pleistocene coastal migration around the western Pacific Rim. Some innovations found in the Ustinovka microblade complex are apparently explained by human dispersal in both south-to-north and north-to-south directions as people adapted to the gradually changing environments of the Pleistocene-Holocene transition.

“The Historical Anchorage of Kralendijk, Bonaire, Including the Wreckage of the Dutch Brigantine *Sirene* (1831)” by W. Nagelkerken (Stichting Marien Archeologisch Nederlandse Antillen (STIMANA), Curaçao, N.A.) and R. Hayes (Maritime Archaeological and Historical Society (MAHS), Washington, DC, USA). Abstract: The historical anchorage on the western coast of Bonaire, adjacent to Fort Orange and Kralendijk, the island’s center of population and government, has been surveyed and described as a submerged cultural resource site. The objective of this study was to determine the utilization of this site, based upon the distribution, classification, and source of production of artifacts exposed on the seabed. Approximately 600 artifacts were retrieved at depths of 10-20m in relation to a continuous 750m baseline set 100m offshore. Wine, onion, and case bottles, along with creamware, pearlware, whiteware and both English and Dutch delft ceramics were found. The majority was from Holland (65 %), with others from England (22 %), France (13 %) and Germany (1 %). Peak utilization of the anchorage occurred between 1775-1850, coinciding with major development of trading activities and resident population growth. However, artifacts ranged from the 16th-20th centuries. Nautical artifacts and ship features were found within the northern extreme of the anchorage. Archival data confirm the identification of this wreckage from the Dutch warship *Sirene*. This brigantine was lost in a violent storm that struck the island by surprise early in the morning of 24 June 1831. Following creation of a computer database, all conserved artifacts and recorded data were presented to the Bonaire government for

local museum display. A report of this study has been published. Download this paper at <http://godot.unisa.edu.au/wac/pdfs/141.pdf>.

“A Model of Sea-Going Trade in Early Historic Gujarat, India” by Nancy Pinto-Orton (Research Associate, University of Pennsylvania Museum, Philadelphia, USA). Abstract: This interdisciplinary study, combining archaeological, historical and ethnographic evidence, examines long distance maritime trade during the Early Historic period in Gujarat (ca. 100 BC-AD400). The findings show that small ports were vital to the development of long distance sea-going trade. Evidence from archaeological excavation and survey focuses on Red Polished Ware and associated ceramics found along the coasts of Gujarat. The *Periplus of the Erythraean Sea*, a Greek text written in the first century A.D., and an ethnographic survey of contemporary maritime people on the coastline of Gujarat reveal the complexity of maritime trade and traditions that have survived over time. This new research alters traditional interpretations of sea-going trade by emphasizing the importance of rural ports. Three theories of port settlement and trade found in the anthropological literature form a base for comparison. Leeds (1961) examines the “port-of-trade” model (Polyani 1975), and analyzes evidence from historical India. Bronson’s (1977) “upstream-downstream” model of trade in the early kingdoms of Southeast Asia, and the geographical model of ports by Weigend (1958) and Sinclair (1967) are reviewed. This critique suggests a fourth idea of how sea-going trade in Gujarat was organized.

“Terracotta Discs: The Non-Metallic Coins. A Comparative Study of Symbols With Punch-Marked Coins” by O. P. Srivastav (Centre of Advanced Study, Department of History, A.M.U., Aligarh, India), Abstract [condensed]: Symbols, frequently have been used in different art media. They occupy significant position almost in every kind of artistic expression. A symbol has the advantage of being compact in deprecation and helps in endowing the occasion, place or deed with a full expression of the significance intended to be attached to the particular occasion, place or deed. Art and religion constitute a significant factor in civilization. The material and spiritual aspects of a culture are represented in the artistic and religious manifestation. The significance of symbology in Indian art depicts human being and their environs in specific framework of time and space in the context of an edifying story, sacred myth, legend etc. However, symbols also play a role as a language. On the early indigenous coinage an extensive use of symbols and other devices are found. The punch marked coins, which are the earliest in the numismatic series, constitute a rich repertoire of symbols. Theobald,¹ who first closely examined these coins, has classified them into six groups consisting of, (1) human figure, (2) implements, arrows and works of man including the stupa or chaitya, bow and arrow etc. (3) animals, (4) trees or their branches and fruits, (5) symbols connected with solar, planetary or saivite worship and (6) miscellaneous and unknown. Download the paper at <http://godot.unisa.edu.au/wac/pdfs/148.pdf> (19 pages of text and illustrations).

The 9th Annual Meeting of the European Association of Archaeologists was held 10-14 September 2003 in St. Petersburg, Russia. The final program is on the Internet at

<http://www.eaa2003am.spb.ru/program.html>. There were 40 sessions, 18 round tables, and a total of 525 papers presented during the five days, among these were two symposia and one round table on ceramics and two dozen papers on ceramics scattered through other sessions. There were 47 ceramic or pottery papers in all, including five on ceramic figurines. Bill Barnett (Field Museum of Natural History, Chicago) was the discussant for the major invited session on the use of ceramics by hunters and gatherers in the Old World (detailed below).

The papers contributed to various sessions included the following: Tatiana Ilyina (Pushkin State Museum of Fine Arts, Moscow, Russia) and Maya Muratov (New York University, Institute of Fine Arts, USA) “Children and Birds: Hellenistic Terracotta Figurines from Pantikapaion”; Ishikawa (Kyushu University, Japan) “The Transformation of the Pottery Style Structure and the Appearance of Regionality during the Late to the Final Jomon Periods in Kyushu, Japan”; Liliana Janik (University of Cambridge, UK) “A Dual Origin for Pottery in Europe”; Simon Kaner (Sainsbury Institute for the Study of Japanese Arts and Cultures, Norwich, UK) “Twisted Strands: Towards a History the Exchange of Ideas about Pots”; Noriyuki Yamamoto (Sainsbury Institute for the Study of Japanese Arts and Cultures Norwich, UK) “Were Cord Marks on the Later Neolithic Pottery in Britain Actually Impressed?”; Natalia Ivanova (Samara State Pedagogical University, Russia) and Vladimir Myshkin (Samara State Pedagogical University, Russia) “Ceramics of the Nomads of the Samara Volga Region in V - I Centuries BC. The Technology of Making”; Simonetta Menchelli (Dipartimento Scienze Storiche Mondo Antico, Pisa University, Italy) and Nella Maria Pasquinucci (Dipartimento Scienze Storiche Mondo Antico, Pisa University, Italy) “Pyrotechnical Studies on the Roman Cooking Ware”; Ralph Rowlett (University of Missouri, USA) and Dragana Mladenovic (Belgrade, Serbia) “Coin Metallurgy and Associated Ceramic Pyrotechnology on the Titelberg”; Halina Dobrzanska (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Krakow, Poland) “Grey Pottery Firing Process in Up-Draught Kiln: What do Wasters Speak About?”; and Joanna Pyzel (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Poznan, Poland) “Houses of the Linear Band Pottery Culture in Kujawy (Poland).” Other papers were given by Alexander A. Bauer (Department of Anthropology, University of Pennsylvania, USA) “Import, Imitation, or Communication?: Pottery Style, Technology, and Coastal Contact in the Early Bronze Age Black Sea”; Iliia Palaguta (Institute for the History of Material Culture, Russian Academy of Sciences, St. Petersburg, Russia) “On the Interaction Device of Heterogeneous Ceramics Traditions”; Helena Starkova (Institute for the History of Material Culture, Russian Academy of Sciences, St. Petersburg, Russia) “‘Cucuteni C’ Ware in Tripolye Assemblages”; Katia Meunier (University Paris Pantheon/Sorbonne, Versailles, France) “An Example of Stylistic Evolution of Pottery in the Early Neolithic of the Paris Basin (France)”; Tatyana Popova (Peter the Great Museum of Anthropology and Ethnography, Russian Academy of Sciences, St. Petersburg, Russia) “Pottery Complex of Tripolian Settlement Rakovets (Specific Features and Parallels)”; Helena Starkova (Institute for the History of

Material Culture, Russian Academy of Sciences, St. Petersburg, Russia) "The Ceramic Assemblages of the Archaeological Contexts of Tripolye-Cucuteni Settlements"; Natalya Salugina (Institute of History and Archaeology of Povolgye, Samara, Russia) "The Ceramics of the Early Bronze Age of the Volga-Ural Region (The Technological Aspect)"; Natalia Ivanova (Samara State Pedagogical University, Russia) "Technological Analysis of Ceramic Assemblages of the Settlement Grigorievka I"; Anita Synnestvedt (Gothenburg University, Sweden) "Let the Pottery Talk - Pictures of Women's Everyday Life from Yesterday and Today"; and Tamara Sharovskaya (Institute for the History of Material Culture, Russian Academy of Sciences, St. Petersburg, Russia) "Pottery as Raw Material for Tools in the Eneolithic." There were also contributions relating to nautical archaeology: Sergiy Zelenko (Kiev National Taras Shevchenko University, Kiev, Ukraine) "Amphorae Complex from the Shipwreck of the 13th Century"; Natalia V. Ginkut (National Preserve "Chersonesos Taurica", Sevastopol, Ukraine) "Medieval Ceramics from a Shipwreck in the Black Sea near Omega (Sevastopol Coastal Area, Crimea)"; Irina Teslenko (Archeological Institute Crimean Branch, Simferopol, Ukraine) and Yona Waksman (France) "Glaze Pottery Complex from the Shipwreck Place Near Sudak (the Crimea)"; and Vladimir Nazarov (Institute of Archeology, Ukrainian Academy of Sciences, Kiev, Ukraine) "Pottery from the Flooding Part of Berezan Settlement."

A General Session entitled "Ceramic Studies," held on 13 September, included 12 contributed papers: Sofya Panteleyeva (Institute of History and Archaeology, Urals Branch, Russian Academy of Sciences, Ekaterinburg, Russia) "Prehistoric Pottery for the Site Chrono-Stratigraphy"; Sestier Claude (-), R. Martineau (UMR-CNRS 5594, Dijon, France), E. Chenu (ESIREM, Dijon, France), A. Elias (ESIREM, Dijon, France), R. Goydadin (ESIREM, Dijon, France), and E. Ladmiral (ESIREM, Dijon, France) "Impregnation of Porous Materials with Fluorescent Hardened Polymers (Acrylates and Epoxys): Application to the Study of Archaeological Pottery"; Sestier Claude and FATRAA (Frere-Sautot Team for Ancient Technology Research de l'Apab-Archeodrome de Bourgogne, France) "New Insights into the Production of Black Pottery and High Gloss Surfaces by Controlled Incorporation of Carbon: Experimental Evidences"; Sestier Claude and FATRAA (Frere-Sautot team for Ancient Technology Research de l'Apab-Archeodrome de Bourgogne, France) "Bone Tempering of Neolithic Pottery in Europe: A Technological Hypothesis"; Anna Shiyanova (Institute of Archaeology, National Academy of Sciences of Ukraine) "Principles of Preservation of Archaeologic Ceramics of the Early Farming Cultures of the East Europe"; Kostas Gallis (Faculty of History and Ethnology, Democritean University of Thrace, Greece) "Indications of Continuity in the Neolithic Pottery Production in Thessaly, Greece: The Transition from the Middle to the Late Neolithic"; Sestier Claude and FATRAA (Frere-Sautot Team for Ancient Technology Research, Apab-Archeodrome de Bourgogne, France) "From Pottery Pit-Kilns to Reduction Structures Used for Ancient Metallurgy: The Lesson of Some Basic Experiments"; José Antonio Ruizgil (Cadiz University, Spain) and Sergio Aparicio Peralta (Cadiz University, Spain) "A New

Approach on S.W. Spain Later Prehistory" [sic.]; Marina Oncevska Todorovska (Museum of City of Skopje, Makedonija) "Makedonian Grey Terra Sigillata, an Agreement of Proximity for Eastern and Western European Material Culture"; Karlene Jones-Bley (University of California, USA) "Chronology and Distribution of Ceramic Basal Motifs"; Derek Hall (SUAT Ltd, Perth, UK) "The Scottish Medieval Pottery Industry"; and Zsolt Vagner (Pecel, Hungary) "Archaeology of the Medieval and Post-Medieval Pottery Kilns in the Carpathian Basin."

A session titled "Use of Ceramics by Old World Hunter-Gatherers" was held on 13 September and was organized by Marek Zvelebil (University of Sheffield, UK) and Peter Jordan (University College London, UK), with Bill Barnett (Field Museum, Chicago, USA) serving as the discussant. Session Abstract: "This session explores the function, form, symbolic meaning of ceramics/pottery amongst prehistoric and ethnographically known hunter-gatherers in the Old World. Conventionally the use of pottery has been associated with the emergence of the Neolithic and the advent of farming. In fact, in the countries of the former Soviet Union, the Neolithic continues to be defined by the emergence of pottery, regardless of the nature of the subsistence economy. However, we now know that there is no exclusive association between ceramic use and farming, and that pottery use amongst hunter-gatherers was far more widespread than has hitherto been recognized. We know that the firing of clay is as old as Gravettian in places such as Dolni Vestonice whilst the earliest dates for clay vessels now date to the Late Paleolithic in China. New evidence from Siberia, East Asia and Eastern Europe shows the gradual spread of the use of ceramic vessels throughout this zone during the following 10 K yrs. It was hunter-gather societies that were responsible for the invention and dispersal of this innovation. The origins and the use of ceramics have no necessary association the advent of farming societies. Indeed, outside Europe and the Near East, farming and the use of pottery represent distinct technological traditions, operating independently from one another and having quite separate histories. The use of ceramics by hunter-gatherers appears to predate the emergence of farming by several thousand years. In this session, we aim to trace the origin and dispersal of ceramics from its putative centre of origin in China and the Far East. We propose to assess the practical impact this technological innovation had on hunter gatherers, their health and diet, further, we aim to assess the role of ceramics as a medium of symbolic expression and a focus of social relations between individuals and larger social groupings. The geographical focus will be on Eurasia, although other regions will be incorporated for comparative purposes." The organizers plan to publish the 12 papers from this session.

The papers given were: Peter Jordan (University College London, UK) "Ethnographic Insights into Hunter-Gatherer Uses of Ceramics"; Marek Zvelebil (University of Sheffield, UK) "Use of Ceramics in Prehistoric Hunter-Gatherer Contexts: Function, Style and Meaning"; Jeanette Werning (China) "Early Pottery in Non-Established Agricultural Contexts"; Zhao Chaohong and Wang Tao "The Discovery and Research on the Early Pottery in China"; Irina Zhushchikhovskaya "Dynamics of Pottery making in Hunter-Gatherer Cultures of

the Russian Far East"; V. Vetrov "The Oldest Traces of Ceramic Production in Eastern Eurasia and Problems in Traditional Periodicity in Archaeology"; Vladimir Timofeev (Institute for the History of Material Culture, Russian Academy of Sciences, St. Petersburg, Russia) "On the Problem of the First Pottery Appearance in the Forest Zone of Eastern Europe"; Milton Nuñez "On Asbestos Tempered Wares in Finland"; Ludvig Pappmehl-Dufay (Archaeological Research Laboratory, Stockholm University, Sweden) "The Pottery of the Pitted Ware Culture - The Case of Kopingsvik on Oland"; Pavel Dolukhanov and Detlef Gronenborn (Roemisch-Germanisches Zentralmuseum Mainz, Germany) and Andrei Mazurkevich (The State Hermitage, St. Petersburg, Russia) "The 'Ceramic Revolution' among Terminal Hunter-Gatherers in Eurasia"; and Ekaterina Kashina (State Historical Museum, Moscow, Russia) "Clay Anthropomorphic Figurines of the Eastern European Forest Zone in the Neolithic-Eneolithic Age."

A Round Table, "Perspectives of the Medieval and Post-Medieval Pottery Production Centres Researches in Europe," took place on 11 September and was organized by Zsolt Vagner (Pecel, Hungary). The Abstract reads: "Pottery is the most frequent and determinant find of medieval and post-medieval archaeology. This is why ceramic production sites are essential starting points for any research in Europe. Accordingly, the detailed analysis of potters' workshops is indispensable for pottery historical studies. At the same time the medieval industrial production and material culture characterized by multi-regional development. This justifies the more detailed archaeological, technological and technological historical study of the European medieval and post-medieval pottery production centres. The needs and the chances of the recent Archaeological Research development in Europe: the rising number of the industrial preliminary excavations and on other hand the chance of multi-regional and international studies, and the European financial aiding and competition system suggest and offer to start organizing a European Working Group about the medieval and post-medieval pottery production centres. The principal aims: 1) Creating a Database of the Medieval and Post-Medieval Pottery Production Centres in Europe, on the basis of a standardized record system. Several works was [sic.] born about medieval and post-medieval pottery production centres, but these are mostly local or regional studies. Any summarizing European study or database hasn't published yet. For any European researches extremely important taking the pottery production centres and the related information into consideration to produce an integrated Database by multi-aspects. 2) Organizing a European Research Cooperation about the medieval and post-medieval pottery production centres in Europe. Researching the history of the medieval and post-medieval pottery productions in Europe and discussion about the methodical questions of the researches. Obtaining a complex European picture indispensable important to apply many different sources and integrating different approaches. Developing the communication about the pottery production centre researches by different boards and program. We are looking for participants to discuss the perspectives of the medieval and post-medieval pottery production centres in Europe." Zoltan Vagner may be contacted via e-mail at

vagnerxolt@yahoo.co.uk.

The 49th Annual Midwest Archaeological Conference was held in Milwaukee, WI, 16-19 October 2003. Among the 149 papers and posters presented, six papers concerned archaeological ceramics: T. Emerson, A. Wilkinson, and K. E. Emerson, "A Preliminary Review of the Late Prehistoric Hoxie Farm Ceramic Assemblage"; A. Marquardt, "Absorbency and Thermal Conduction of Primitive Ceramic Replicas Variations in Clay Sources and Tempering Materials, Phase 3"; L. Naunapper, "Bell Type 2' Ceramics Recovered from the Bell Site"; K. Mollerud, "Up North: Ramey Incised Ceramics at the Aztalan Site"; J. A. Behm, "Historic Native American Ceramics from the Bell Site"; and D. Gaff, "Not a Lot of Pot: An Exposition Concerning a Rare Pottery Type in the Midwest." Additional information about the conference is posted at <http://www.uwm.edu/Dept/ArchLab/MACpreliminary.htm>.

The Eastern States Archaeological Federation (ESAF) 70th annual meeting was held 13-16 November 2003 in Mount Laurel, NJ, and was hosted by the Archaeological Society of New Jersey. Two papers among 50 presentations concerned ceramics. These were: "Estimation of Vessels Morphology from Sherds" by Mike Klein (Center for Historic Preservation, Mary Washington College) and "Majolica, Cut sponge and Hotel China: Important Examples Excavated from Water Dumps in Trenton" by William Liebeknecht (Hunter Research, Inc.).

The American Schools of Oriental Research (ASOR) held its annual meeting in Atlanta, Georgia from 19-22 November 2003. Among the 255 presentations, there were 13 that dealt with ceramic materials. One session was devoted exclusively to pottery: "Problems in Ceramic Typology" with Celia J. Bergoffen (SCIEM Project), Presider. The five papers were: Lynn Dodd Swartz (University of Southern California), "Innovation and Adaptation in Mesopotamia's Northern Frontier Zone: The Middle Bronze Age Pottery Assemblage at Kenan Tepe, Turkey"; Eli Yannai (Israel Antiquities Authority), "Pottery Vessels Imported from the Syrian-Lebanese Coast to Israel during the Middle and Late Bronze Ages"; Joanna S. Smith (Columbia University), "Local, Regional, and International Ceramics from Phlamoudhi, Cyprus"; Navah Panitz-Cohen (Hebrew University), "Wall Brackets in the Late Bronze and Iron Age I: A Cypriot Marker in the Levant?"; and Celia J. Bergoffen (SCIEM Project), "Canaanite Wheelmade Versions of Late Cypriot Handmade Pottery and Trade." There were two papers on ceramics in a session entitled "Artifacts: the Inside Story" with Elizabeth Friedman (Illinois Institute of Technology), Presiding: Otto Kopp (University of Tennessee at Knoxville), "Did Ancient Karak (Jordan) Potters Learn how to Make their Wares with less Calcite?"; and Anne McKinney Dehnisch (University of Texas at Austin), "Neutron Activation Analysis of Selected Iron Age Pottery from Tel Yin'am, Eastern Lower Galilee." There were individual papers in other symposia: Carolina Aznar (Harvard University), "Storage Jars and Exchanges in the Iron Age II Southern Levant"; Yorke Rowan (Smithsonian Institution), "Shifts in Material Culture Production: Evidence from the Early Bronze I site of Nahal Tillah, Israel"; Gloria London (Burke Museum), "The End of the Calcite Tradition in Cooking Pots, or merely a Pause?"; Tim Harrison

(University of Toronto), "Community Life, Household Production, and the Ceramic Industry of EBA Tell al-'Umayri"; and Seiji Kadowaki (University of Toronto), "Spatial Analysis of Lithic Tools from Tabaqat-al Buma, a Pottery Neolithic Settlement in Northern Jordan." Abstracts of the ASOR papers are on the Internet at <http://www.asor.org/AM/academic03.htm>.

Forthcoming Meetings

The Society for Historical Archaeology annual meeting in St. Louis held from 7-11 January 2004 features a 9 January symposium entitled "Compositional Perspectives on Ceramic Production and Distribution in New Spain." Organized by Patricia Fournier and Russell Skowronek, the session abstract reads: Ideas about the social and natural world that are represented in material form have value for the process of cultural transmission—they become easier to communicate and comprehend, allowing ideas to be acquired, recalled, understood and transmitted. Artifacts may serve as symbols and reflect how a way of life conforms to culturally established worldviews. Even common items as pottery, with determined sources of production and patterns of dispersal, provide entry into past, revealing practices, needs, decisions and choices, including style and consumption trends. This symposium presents findings from on-going investigations that involve compositional and documentary research concerning ceramics of the Spanish and Mexican periods of New Spain. Frequently overlooked or simply described, lead glazed wares, majolicas, and figurines are providing new information about the multiethnic societies that arose in New Spain. There are eight presentations (authors and abstracts printed below). The discussant is Thomas H. Charlton (University of Iowa). My thanks to Ron Bishop for sending me the session abstracts before publication.

"Plain Glazed Wares in Mexico: Why Do We Care?" by Patricia Fournier; Abstract: In spite of the fact that most Spanish colonial archaeological collections are formed mainly by lead-glazed ceramics, the development of coherent typological schemes has been limited compared to majolicas. For lead-glazed ceramics, there is scarce evidence concerning attribute variations in time or sources of production. This limits information on the cultural context of the production, use, and distribution of lead-glazed ceramics consumed in New Spain-Mexico. This paper addresses questions concerning the production of these ubiquitous wares using based on neutron activation and lead isotope analysis—contributing, we hope, to a greater appreciation of their cultural role.

"Compositional Perspectives on Mexican Glaze Ware Production" by Ronald L. Bishop, Patricia Fournier, M. James Blackman, and Lambertus van Zelst; Abstract: A compositionally-based investigation of archaeological ceramics is essentially spatial in nature, attempting to differentiate among resources used to produce pottery in an attempt to model distributional patterns. Working a scale of sampling that embraces much of Mexico, chemical data from instrumental neutron activation of ceramic pastes are combined with lead isotopic ratios of lead glazes to study the production and dissemination of Mexican Lead Glazed pottery. The attempt is made to monitor the movement of materials and technological

information in the culturally pluralistic Northern provinces of New Spain.

"El Paso del Norte: Part of Nuevo México or Nueva Vizcaya?" by Roy B. Brown; Abstract: The political border between Nuevo Mexico and Nueva Vizcaya was a diffuse depopulated area almost a 100 km across. Archaeological studies at El Carrizal Presidio site, the Casa de Huesos ranch site, and Mission de Guadalupe de El Paso del Norte (Chihuahua), Socorro and Ysleta missions as well as San Elizario Presidio (Texas), and the Paraje de San Diego campsite (New Mexico) have provided sufficient material correlates to argue that there was a coherent regional system. Neutron activation and lead isotope analysis of different ceramic types are allowing us to test this assertion.

"Majolica Studies: After Thirty Years What do We Know?" by M. James Blackman; Abstract: Chemical characterization of tin opacified lead glazed ceramics, "majolica," by Instrumental Neutron Activation analysis began nearly thirty years, attempting to distinguish colonial production in the New World from imported Spanish pieces. Subsequent investigations have identified several production locals in Spain, Italy, Mexico and Central and South America. The unique chemical signature of each of the production locals allows firm attribution of ceramic typologies to geographic location and facilitates the study of distribution and exchange mechanisms at colonial sites. This paper reviews earlier work and links these findings with current investigations of majolica from the California Missions, Mexico, Panama, and Peru.

"Ceramic Distribution Patterns in Spanish and Mexican Period California" by Russell K. Skowronek; Abstract: Throughout what was Alta California archaeologists have found in Spanish and Mexican Period missions, presidios, pueblos, and ranchos fragments of hand-modeled and wheel-thrown, unglazed, lead-glazed, and tin-glazed earthenwares. After a 5 year period of analysis, there is compelling evidence for local production and consumption of these unglazed ceramics. The project has now expanded to study the compositional patterns of pastes and glazes of both lead- and tin-glazed ceramic earthenwares. Preliminary evidence from these studies indicates localized production of lead-glazed wares. Other, non-locally-produced glazed ceramics supplied to the colony are providing interesting consumption patterns.

"Santa Clara Mission Docufacts: 1794-1845" by Tamara González Vega and Yuri E. Valdés Álvarez; Abstract: Documents related to mission daily life offer information that helps to interpret the archaeological record. Analyzing correspondence between Santa Clara Mission and political or church authorities provide archaeologists with heuristics to understand the historical processes in which missions were involved. Through the documentary records of Santa Clara everyday stories show up; merchandise exchanges between presidios, buying and selling of articles like ceramics, corn, flour and textiles; criminal punishments, marriage permits, church's maintenance and rulings about cattle ranching disputes. These data can help us to understand daily life at local and regional level.

"Yo prefiero las cuentas claras y el chocolate espeso: Supply Systems and Everyday Life at Mission Santa Clara (1777-

1828)” by Gabriel Francia; Abstract: The Fondo Piadoso, founded by the vicerealty government in New Spain, granted the Franciscans resources to establish missions in Alta California from 1769 on. Nevertheless, the administration of these resources was in charge of the Royal Treasury, controlling invoices and expenses at the California missions. A recently studied account book of Mission Santa Clara provides valuable information covering 49 years of supply details, material culture and mission life. In addition, this information may serve as a basis to construct hypothesis about the distribution and exchange networks for these goods in New Spain.

“Figurines as Actors: Rituals, Change and Continuity in the Valley of Mexico” by Tamara González Vega and Yuri E. Valdés Álvarez; Abstract: Anthropomorphic figurines of Mesoamerican tradition are part of symbolic and ritual spheres of the communities that produced them. We find them from the Pre-classic to the present in the Mexico Valley. One of the most interesting periods to study figurines is the moment of the European contact, about which little is known. Figurines reflect the breakup and making up of social, economic and political structures in this historical moment. Using a phenomenological and hermeneutic approach based on ethnographic, ethnohistoric and archaeological sources we intend to understand the meaning of figurines during a time of an imposed new world vision.

Archaeometry 2004 to be held in Zaragoza, Spain, 3-7 May 2004, is being organized by the University of Zaragoza in collaboration with the Spanish society of Archaeometry (SAPaC). The notification of the acceptance or rejection of abstracts will be in February 2004 (the due date for abstracts was 1 December 2003). The regular sessions include: 1) Field Archaeology; 2) Technology and Provenance of Stone, Pigments, and Plasters; 3) Biomaterials; 4) Technology and Provenance of Metals; 5) Dating), and 6) Technology and Provenance of Ceramics and Glass. There is a special session on the Evolution and Technology of Glazes. Additional information is available on the Internet at <http://161.116.85.21/mainpage/segunda-circular.htm> and there will be additional information about the ceramic-related sessions in the next SAS Bulletin.

Exhibits

Ceramic Trees of Life: Popular Art from Mexico is a bilingual exhibition at the UCLA Fowler Museum of Cultural History in Los Angeles that examines the symbolic “Trees of Life”, ceramic candelabra-like constructions that are a quintessential symbol of Mexico. The exhibition features more than 65 examples and continues until 14 December 2003. For additional information, see the Internet site at <http://www.fmch.ucla.edu>.

7000 Years of Iranian Art on Display in Spain. An exhibition of ancient Iranian art owned by the National Iranian Museum opened in the Spanish city of Valencia at the Valencia Fine Arts Museum (Museo de Bellas Artes) on 15 September 2003. This exhibition includes some 180 valuable historical relics which have been touring European countries for the past three years. The first European show of the items originally was held in October 2000 in Vienna, Austria, and received a large number

of visitors during a six-month period before moving to Bonn, Gent, and Basle, where it was displayed for five months. The show, scheduled to last for a month, and then moved to Seville and Saragossa. The collection includes porcelains from the Achaemenid era, ceramics from the early Islamic period, jewels, bronze tumblers and statues which represent 7000 thousand years of Iranian art. Gold objects from the Achaemenid era are also a part of the exhibition. Valencia is also the location of the Museo Nacional de Cerámica (National Ceramics Museum).

Internet Resources

The Origins and Ancient History of Wine, an online exhibit created by Patrick McGovern (University of Pennsylvania Museum of Archaeology and Anthropology) was featured in Science NetWatch, the AAAS (American Association for the Advancement of Science) Internet page in the 11 July 2003 issue of Science. The web site features an introduction and links about wine production during the Neolithic and in Mesopotamia and Egypt. A home page image has Pat peering into the world’s oldest wine jar (on display at the Museum and listed in the Guinness World Records), dating to 5400-5000 B.C. from Hajji Firuz Tepe, Iran. There is also a discussion about archaeological chemistry, and a glossary, map, and links to other Internet sites that will delight enthusiasts and archaeologists. The site is accessible at http://www.museum.upenn.edu/new/exhibits/online_exhibits/wine/wineintro.html.

Online M.A. in Ceramic History. Staffordshire University (Stoke-on-Trent, UK) has established an Internet site for the “History of Ceramics,” where one can investigate a range of opportunities to learn more about ceramic history. Staffordshire University is located in Stoke-on-Trent, the historic center of the British ceramic industry; one can participate in a unique M.A. History of Ceramics course delivered via distance learning methods. A reasonably modern computer and a link to the World Wide Web allow one to you fulfill the admissions requirements and join this educational opportunity (only basic computing skills are needed). There is a “Tour of the Course” for a comprehensive explanation of its aims and content; “About the Course” defines how the university approaches the history of ceramics, and outlines the contents of the M.A. “History of Ceramics”; “How We Deliver” informs about the use of computer supported distance learning to make the course an enjoyable, fulfilling, and interactive experience.

The goals of the course aim to provide an analytical framework for the interpretation and attribution of ceramic artifacts. It is intended to enable participants to make assessments regarding their social, technical and economic significance. In addition, it seeks to provide an understanding of the development of ceramic techniques and the part they have played in determining the characteristics of ceramic types within different historical and geographical contexts. A goal is to develop a confident and critical approach to the value and limitations of secondary sources in the history of ceramics, and to be able to assess the historical role of museums in conserving and presenting ceramic artifacts.

The M.A. “History of Ceramics” course comprises four taught modules and a major project. One module is compulsory

(the Core Module entitled “Issues and Debates in the History of Ceramics”) and the other three are Options (“The Marketing and Consumption of Ceramics,” “Excavation and Interpretation,” and “Ceramic Design: Issues and Concepts”). The course is available in full-time and part-time modes and postgraduate students may shift between these two modes as they progress through the course. It is also possible to study individual modules for interest or for professional development. Previous educational or professional experience can be credited against particular modules to make gaining qualifications simpler. All of the courses also have intermediate certification, with a postgraduate certificate being awarded if a student completes two modules and a postgraduate diploma for a further two. The award of M.A. comes on completion of the Masters project. It is not necessary to sign up for the whole M.A. course if you feel that is inappropriate or too costly in time or money. The M.A. “History of Ceramics course is credit-rated, and comprises 180 credits at the Masters level. Each taught module is rated at 30 credits and the final project is rated at 60 credits. All of the modules are taught using distance learning materials, and the method of delivery is discussed more fully in the “How We Deliver” section of the website. Additional information about the modules and the fee structure is available on the Internet at <http://www.ceramichistory.com>. One may also request a free CD-ROM sample from the course and join a mailing list at this website.

Old Mobile Archaeology, a website maintained by Gregory Waselkov at the University of South Alabama, has a section devoted to A Study of Colonial Ceramics. Seven examples of Lead-Glazed Coarse Earthenware, none of Faience Blanche, three of Faience Brune, two Majolica (Puebla Polychrome and San Luis Polychrome), and Delft are illustrated. There are descriptions and illustrations of these types and other wares; see http://www.southalabama.edu/archaeology/old_mobile/study/faience2001.htm and http://www.southalabama.edu/archaeology/old_mobile/faience/faience.htm.

Mineralogical Abstracts is available online free until 31 December 2003 as a courtesy of the Mineralogical Society of Great Britain and Ireland for researchers working in the fields of mineralogy, crystallography, geochemistry, petrology, environmental mineralogy and related topics. See <http://www.minabs.com>.

Ian Freestone - 2004 Pomerance Award for Scientific Contributions to Archaeology

The Pomerance Award is given annually by the Archaeological Institute of America. A list of past recipients, and information on nominations for future awards, may be found at <http://www.archaeological.org/webinfo.php?page=10101>. Here is the AIA statement on Freestone’s award:

Dr. Ian Freestone has researched the ancient technologies of glass and ceramics with great sensitivity to the geological resources that serve as their base. As Deputy Keeper of the Department of Scientific Research at the British Museum, he

has pursued a distinguished research career, trained and mentored students and managed the research staff of some 75 members. As Honorary Professor of the Institute of Archaeology, University College, London, and PhD examiner for ten other universities, he has had a major influence on the future of archaeological science. Dr. Freestone conceived and co-curated the exhibition, Pottery in the Making - World Ceramic Traditions, and is co-editor of a book that resulted from the exhibition. He has organized or co-organized ten meetings, both within the British Museum and internationally, that have been focused on the problem areas of archaeological science and on ways of making instrumental breakthroughs in the analysis and interpretation of material culture. These have included early vitreous materials, glass making and forming processes of the Roman and Medieval periods, ceramic petrology, archaeological stone and Raman spectroscopy.



Ian Freestone was trained as a geochemist and petrologist in the Earth Sciences Department at the University of Leeds. His core skills include petrographic and mineralogical techniques, scanning electron microscopy and microanalysis, and the interpretation of geochemical data in archaeology. His work focuses on technology, production and distribution, especially of early non-metallic materials involved in ceramic and glass production and extractive metallurgy. Dr. Freestone is as well known for research on the zinc smelters in Zawar, India, as for analysis of Roman, Byzantine and Islamic glasses. We must not forget to mention his research on medieval European enamels and glasses, especially those from Venice, or that he has characterized many ceramic and glass technologies that were developed in India and China.

His current work focuses on glass industries during and after the Roman period, using the techniques of trace element determination, strontium, oxygen and lead isotopes as well as bulk composition and microstructure, but he is also working on the technological development of porcelain in Europe. Of particular concern are ways that technologies develop, are embedded culturally, and then change as they are transferred. We will surely learn more from this brilliant researcher.

The Society for Archaeological Sciences (SAS) web page is <http://www.socarchsci.org>

SOCIETY FOR ARCHAEOLOGICAL SCIENCES

Income and Expenditure Summary January 1, 2002 to December 31, 2002

As of January 1, 2002:

| | | |
|----------------------------------|----|-----------|
| Bank of America Checking balance | \$ | 29,386.48 |
| UCR Campus Credit Union balance | \$ | 516.75 |
| TOTAL ACCOUNT BALANCES | \$ | 29,903.23 |

INCOME

| | | |
|-------------------------|----|-----------|
| Membership Income | \$ | 27,335.74 |
| Royalty | \$ | 422.73 |
| Grant (USF/NSF) | \$ | 7,155.00 |
| Interest (credit union) | \$ | 80.62 |
| TOTAL INCOME | \$ | 34,994.09 |

EXPENDITURES

| | | |
|---|----|-----------|
| Advertising | \$ | 0.00 |
| Annual Meeting | \$ | 0.00 |
| Banking charges | \$ | 671.02 |
| Bulletin printing/postage (v24:3/4, v25:1,2) | \$ | 3,374.90 |
| Bulletin, editor expenses | \$ | 200.00 |
| General Secretary Office supplies & expense | \$ | 329.81 |
| USF/NSF disbursement | \$ | 6440.00 |
| Web service (2001, 2002) | \$ | 443.45 |
| Payment for JAS subscriptions | \$ | 18,050.00 |
| Payment for Archaeometry subscriptions (2001, 2002) | \$ | 2,430.00 |
| Subscription overpayment | \$ | 33.05 |
| Taxes: | | |
| Federal | \$ | 0.00 |
| State | \$ | 10.00 |
| TOTAL EXPENSES | \$ | 31,982.23 |

As of December 31, 2002:

| | | |
|----------------------------------|----|-----------|
| Bank of America Checking balance | \$ | 12,317.72 |
| UCR Campus Credit Union balance | \$ | 20,597.37 |
| TOTAL ACCOUNT BALANCES | \$ | 32,915.09 |

Note: Web service costs for 2001 and 2002 were combined in this year's expenses. They were not available at time of 2001 expenditure summary as the web service was in transition (2002 costs incurred for web service totaled \$243).

Payment for 2001 and 2002 *Archaeometry* subscriptions were combined, as billing for both annual subscriptions was combined after 2001 expenditure summary was completed.

In June 2002, \$20,000 was moved from checking account to credit union account. This allows excess funds to accrue interest and ultimately will provide additional funds for SAS to use in a manner deemed appropriate (e.g., sponsoring a conference symposium, providing funding assistance to members attending and participating in archaeometry conferences, producing a small publication).

Society for Archaeological Sciences
2003 Budget
January 1, 2003 to December 31, 2003

Projected Income

| | |
|--|-----------------|
| Membership | \$ 7,000 |
| Interest | \$ 100 |
| Plenum royalties | \$ 400 |
| <i>Archaeometry</i> subscriptions | \$ 1,500 |
| <i>J. Archaeological Science</i> subscriptions | <u>\$19,000</u> |
| Projected Total Income | \$28,000 |

Projected Operating Expenditures

| | |
|--|---------------|
| Annual Meeting | \$ 230 |
| Banking Costs | \$ 800 |
| Bulletin printing/postage | \$ 3,900 |
| Office expense – President | \$ 100 |
| Office Expense – Bulletin | \$ 200 |
| Office Expense – Gen. Sec. | \$ 500 |
| Web Service | \$ 250 |
| Postage – other | \$ 500 |
| Printing – other | \$ 500 |
| Payment to Academic Press for <i>JAS</i> | \$19,000 |
| Payment to Blackwell for <i>Archaeometry</i> | \$ 1,500 |
| Taxes | \$ 20 |
| Miscellaneous | <u>\$ 500</u> |
| Projected Total Expenditures | \$28,000 |

Upcoming Conferences

3rd New World Luminescence Dating Workshop, which will take place at Dalhousie University, Halifax, Nova Scotia, Canada, 4 to 7th of July, 2004. The meeting should be of interest to luminescence dating specialists, geomorphologists, Quaternary geologists, archaeologists, and museum researchers. Dr. Dorothy I. Godfrey-Smith (Digs), Dept. of Earth Sciences, Dalhousie University, Halifax, NS, Canada, B3H 3J5; tel 902-494-1451, fax 902-494-6889; web: <http://is.dal.ca/~digs/t-intro.htm>

Archaeological Sciences of the Americas Symposium, September 23-26, 2004, University of Arizona Campus - Tucson, Arizona, 85721. Sessions will explore seven major topics in the field of archaeological science: 1) Catastrophes and Cultural Reaction, 2) Geoarchaeology, 3) Conservation Studies and Ephemeral Remains, 4) Spatial Analysis and Remote Sensing, 5) Chronometry, 6) Human-Environmental Interaction, and 7) Material Culture Studies. Applicants may choose the session in which they wish to present their work, but are encouraged to discuss how their research in archaeological science bridges

and reaches beyond topic headings. A printable application form is available online: <http://w3.arizona.edu/~anthro/asa.shtml>

Materials Issues in Art and Archaeology VII, November 29-December 3, 2004. http://www.mrs.org/meetings/fall2004/program/cfp_oo.html This symposium solicits papers on cutting-edge, interdisciplinary research used to characterize cultural materials, the technologies of selection, production and usage by which materials are transformed into objects and artifacts, and the science underlying their deterioration, preservation, and conservation. Studies are solicited that use the methods and techniques of materials research to understand degradation and promote long-term preservation of material culture and cultural heritage, e.g., works of art, culturally significant artifacts, and archaeological sites and complexes. 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 things important to them.

Papers can include a wide range of topics such as: Materials science applied to promote understanding and longevity of cultural heritage; analytical studies of art objects and archaeological artifacts, of particular interest developments in non-destructive techniques and replicative studies; reconstruction of ancient technologies, ancient landscapes, and site formation processes; production, microstructure, and performance parallels between ancient materials and processes and modern technologies; pairs of relevant technologies including damascene swordmaking and damascene copper semiconductor technology, nanoclusters in ancient glasses and glazes, and photovoltaics or digital storage media, intercalation of indigo pigments in clays compared to modern carbon compounds, hidden/buried layers and dopants in paintings and semiconductors, degradation of artists' materials and modern methods of improving polymer stability, and biomaterials in ethnography and medicine.

On the last day of the conference a workshop and demonstration at MIT entitled, "Color from Within Structure," will aim at understanding examples of production of polychromy in ceramics, metals, glasses, and textiles. Invited speakers include: Barbara Berrie (National Gallery of Art), John Bogaard (Carnegie Mellon Univ., Res. Ctr. on Materials of the Artist & Conservator), Ian Freestone (The British Museum), Chris McGlinchey (Museum of Modern Art - MOMA), Marion Mecklenberg (Smithsonian Center for Materials Research & Education), and Ken Sutherland (Philadelphia Museum of Art).

Symposium Organizers: Pamela Vandiver, University of Arizona, Dept. of Materials Science & Engineering, Mines Bldg., Tucson, AZ 85721; tel 520-400-2270; fax 520-621-8117; email: vandiver@mse.arizona.edu; Jennifer Mass, Winterthur Museum, Conservation Dept., Garden, & Library, Winterthur, DE 19735; tel 302-888-4808; fax 302-888-4838; email: jmass@winterthur.org; Alison Murray, Queen's University, Art Conservation Program, Dept. of Art, Kingston, ON K7L 3N6, Canada; tel 613-533-6000 x-74338; fax 613-545-6889; email: am26@post.queensu.ca; John Merkel, University College, Institute of Archaeology, 31-34 Gordon Sq., London WC1H 0PY, United Kingdom; tel 44-171-387-7050; fax 44-171-383-2572; email: j.merkel@ucl.ac.uk

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

Non Profit Org.
U.S. POSTAGE PAID
Tampa, FL
Permit No. 257

ADDRESS SERVICE REQUESTED

Please send subscription address changes to SAS Administration

SAS Bulletin

Society for Archaeological Sciences

SAS Bulletin Staff

Editor: **Robert H. Tykot**, Department of Anthropology, University of South Florida, 4202 E. Fowler Ave., SOC 107, Tampa, FL 33620-8100, USA; tel 813-974-7279; fax 813-974-2668; e-mail rtykot@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 Editors, Archaeological Chemistry: **Nora Reber**, Anthropology Program, University of North Carolina Wilmington, 601 S. College Road, Wilmington, NC 28403 USA; tel 910 962-7734; email reber@uncwil.edu

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

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

Associate Editor, Book Reviews: **Mark E. Hall**, Archaeological Research Facility, 2251 College Building, University of California-Berkeley, Berkeley, CA 94720, USA; email: hall@nbz.or.jp

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@mcmaster.ca

Associate Editor, Geoarchaeology: **Frederic B. Pearl**, Anthropology & Maritime Studies, Texas A&M University, PO Box 1675, Galveston, Texas 77553, USA; tel 409 740-4935; fax 409 740-4962; email fpearl@tamug.edu

Associate Editor, Meeting Calendar: **Colleen P. Stapleton**, Department of Liberal Studies, Mercer University, 160 Henry Parkway, McDonough, GA 30253, USA; tel 678-547-6565; fax 678-547-6389; email stapleton_c@mercer.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 Executive Officers 2003-2005

President: **Gregory Hodgins**, NSF Arizona AMS Facility, Physics and Atmospheric Sciences, 1118 E. 4th Street, University of Arizona, Box 0081, Tucson, AZ 85721-0081 USA; tel 520-621-3619; fax 520-621-4721; email ghodgins@physics.arizona.edu

Vice President/President-elect: **Aaron Shugar**, Archaeometallurgy Laboratory, Lehigh University, 5 East Packer Ave., Bethlehem, PA 18015, USA; tel 610-758-4701; fax 610-758-3526; email a.shugar@lehigh.edu; Smithsonian Center for Materials Research and Education (SCMRE), Museum Support Center, 4210 Silver Hill Road, Suitland, Maryland, 20746; tel 301-238-3700 x137; fax 301-238-3709; email shugarA@scmre.si.edu

Past 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

Secretary/Treasurer: **Colleen P. Stapleton**, Department of Liberal Studies, Mercer University, 160 Henry Parkway, McDonough, GA 30253, USA; tel 678-547-6565; fax 678-547-6389; email stapleton_c@mercer.edu

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

Vice President for Intersociety Relations: **TBA**

Vice President for Membership Development: **E. Christian Wells**, Department of Anthropology, University of South Florida, Tampa, FL 33620, USA; tel 813-974-2337; fax 813-974-2668; email cwells@cas.usf.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: **Julian Henderson**, Department of Archaeology, University of Nottingham, University Park, Nottingham NG7 2RD, England, UK; email: julian.henderson@nottingham.ac.uk

SAS Representative on the International Symposium on Archaeometry committee: **Sarah Wisseman**, Ancient Technologies and Materials (ATAM) Program, University of Illinois at Urbana-Champaign, 116 Observatory, MC 190, 901 S. Mathews, Urbana, IL 61801 USA; tel 217-333-6629; email wisarc@uiuc.edu

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*. Discounts also available on *Geoarchaeology* and other Wiley journals. Payable with major credit cards (+7%). ISSN 0899-8922.

SAS Administration

General Secretary: **Robert Sternberg**, Department of Earth and Environment, Franklin and Marshall College, Lancaster, PA 17604-3003, USA; tel 717-291-4134; fax 717-291-4186; e-mail R.Sternberg@FandM.edu