



SAS Bulletin

Newsletter of the Society for Archaeological Sciences

Volume 29 number 1

Spring 2006

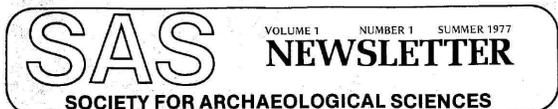
The Changing Face of the SAS Bulletin

Some of you may have noticed something a little different about the last issue of the *SAS Bulletin*: the name. While the title of the quarterly remains in tact (*SAS Bulletin*), the subtitle has been altered, from "Society for Archaeological Sciences" to "Newsletter of the Society for Archaeological Sciences." The rationale for this minor (but important) change has to do with the publication's image and the ways in which copies of it circulate among colleagues and at conferences. It is not unusual, for example, to see a colleague pick up a copy of the *Bulletin* at a meeting, scratch her/his head, and ask, "What is this? A Newsletter of some sort?" So, to all my colleagues out there who were wondering: yes, it *is* a newsletter. And now it says so on the cover.

In my attempt last year to update the name of the *Bulletin*, Professor Joseph B. Lambert (Department of Chemistry, Northwestern University) wrote in an e-mail, "I think it is a good time to decide on a new title for the periodical. And that coming from the person who gave it the current name in 1989... The name change came with Vol. 12, No. 1, when Pat Martin was the editor. Before that it was the *SAS Newsletter*. I thought that the original name sounded much too informal for what we wanted the periodical to do." My thanks to Joe for sharing this bit of institutional wisdom, and for prompting a walk down memory lane.

Looking beyond the name, SAS President-elect, Thilo Rehren (Institute of Archaeology, University College London), writes, "...at the end it is more important what use we make of the beast, and which reputation therefore it gains, than how it is called." Well said. To this end, I hope you find, in this issue, plenty of timely and useful information, where the overall package reflects the reputation (built up over many years) upon which the *Bulletin's* name-- and content-- have come to rest.

E. Christian Wells



Newsletter Editor: R. E. Taylor
Archaeological Research Unit, Radioisotope Laboratory, Department of Anthropology
University of California, Riverside—Riverside, California 92512

NEWS OF THE SOCIETY

WELCOME TO THE SAS

This newsletter represents the first publication of the newly organized Society for Archaeological Sciences. We are beginning the society with 100 Charter Members who joined the SAS between March and July 1977. It is their membership dues which allowed the SAS to initiate the process required to incorporate as a non-profit organization.

We are looking forward to a period of from one to three years during which time the SAS membership, through such channels as this newsletter, can develop a common consensus as to the issues confronting those actively involved in the pursuit of archaeometric research in the 1970's and beyond. It is our intention to build the SAS organization slowly and deliberately, expanding into activities and projects as a consensus among our members becomes clear.

Our first task is to create an organizational structure for the SAS and begin the process of communicating SAS's aims and goals to prospective new members. The first step was the creation of the Acting Board. The membership of the Board represents a cross section of the disciplines with input to archaeometry including anthropology, chemistry, geochemistry, geochronology, geography, geology, and metallurgy. It is the intention of the present board members to identify representatives of additional relevant disciplines who are interested in the goals and aims of the SAS to sit on the Acting Board to provide added input and counsel as we move forward.

SAS INITIAL ORGANIZATION

During the International Symposium on Archaeometry and Archaeological Prospection 1977, March 16-19, 1977 at the University of Pennsylvania in Philadelphia, five members of the Acting Executive Board met to lay the ground work for the formal organization and development of the SAS during the first year of its operation. The Board authorized the Acting Secretary to incorporate the organization as a non-profit corporation under the laws of the State of California and to pursue plans to disseminate information concerning the activities of the SAS potential members.

The Acting Executive Board of the SAS includes Rainer Berger (UCLA), Karl Butzer (Chicago), James B. Griffin (Michigan), P. Edgar Hare (Carnegie), Richard L. Hay (Berkeley), Vance Haynes (Arizona), Robert Madin (Pennsylvania), George Rapp, Jr. (Minnesota, Duluth), Max Saitzman (UCLA), and R. E. Taylor (UCR). R. E. Taylor was appointed Acting Secretary of the SAS and editor of the Newsletter.

ENCOURAGE YOUR COLLEAGUES TO JOIN SAS

Enclosed with this issue of the *SAS Newsletter* are membership materials. Please encourage interested colleagues to join the SAS. The more concerned individuals we have as members, the more rapid will be the development of our ability to solve problems and provide opportunities for expanded archaeometric research. Please feel free to duplicate any of the membership materials for multiple distribution. If you need more than 10 items, please contact the Acting Secretary and he will be happy to send you as many copies as you can use.

In This Issue

Employment Opportunities	2
Awards, Fellowships, and Training	2
Conference News and Announcements	5
Soil Analysis Support System (C. Wilson)	7
Ancient Starch Research (M. Allen)	7
Petrographic Image Processing (F. Fueten)	8
Remote Sensing and GIS (A. Sarris)	12
Archaeological Soil Science (J. Entwistle)	14
Bioarchaeology (G. F.M. Rakita)	15
Geoarchaeology (D. D. Kuehn)	16
Archaeological Ceramics (C. C. Kolb)	17
Book Reviews (S. N. Lengyel)	
<i>Proceedings of the ISA</i> (P. K. Chattopadhyay)	28
<i>The Ceren Site</i> (L. Hanes)	30
Upcoming Conferences (C. P. Stapleton)	31

1977: "SAS Newsletter"

Employment Opportunities

Chair/Curator of the Department of Anthropology, Denver Museum of Nature and Science. The new chair will: lead the growing Department of Anthropology as a skilled and committed administrator and supervise staff, students and a large volunteer corps; lead the museum's NAGPRA effort and be the primary contact with the museum's Native American Resource Group; undertake and publish grant-funded, regionally-focused research; oversee curation and care of the museum's collections in anthropology; deliver and support innovative public education programs, traveling exhibits on a world-wide range of anthropological topics, and permanent exhibits based on the museum's collections. The department presently consists on a Paleoindian archaeologist, an African diaspora ethnologist, a collections manager and an office manager; maintains collections in Native America ethnology and archaeology and World ethnology; and supports permanent and temporary exhibits and public education. Applicants must have a Ph. D., strong interest in museum-based science, a record of grants and peer-reviewed publications, strong leadership skills, and management experience. Applications will be accepted until the position is filled, however, to be guaranteed full consideration by the search committee, applications must be received by March 1 and include: letter of interest, curriculum vitae, and contact information for three references. Send inquiries and applications via email to: anthrochair.job@dmns.org.

Lecturer or Senior Lecturer in Human Evolution, Department of Anthropology, University College London. The Department of Anthropology at UCL (University College London) invites applications for a permanent post in Human Evolution, to commence from September 1, 2006. Appointment will be made on the Lecturer or Senior Lecturer scale, commensurate with experience (Salary range £28,010 - £44,947.00 plus London Allowance £2,400). Candidates should possess a PhD in a relevant subject as well as proven excellence in research and teaching. The successful applicant will bring an established research program that relates to human morphological or behavioral evolution. Applications including CV with names of three referees and a personal statement on research and teaching should be submitted by 28 February, 2006 to the Departmental Administrator, Anthropology, University College, Gower Street London WC1E 6BT, a.kocourek@ucl.ac.uk. Further particulars can be found at www.ucl.ac.uk/anthropology.

Visiting Scholar, Cotsen Institute of Archaeology, University of California-Los Angeles. The Cotsen Institute of Archaeology at UCLA (www.ioa.ucla.edu) invites applications for the annual Cotsen Visiting Scholar position. The Cotsen Institute of Archaeology is a vibrant, multidisciplinary environment with frequent lectures and other engagements that bring together UCLA's diverse archaeological constituencies. For the 2006-07 academic year, we invite applications for a postdoctoral fellow, rank open, to serve as a scholar in residence for the academic year and to teach a seminar in one term. We

especially encourage applicants whose research area is not represented among our current range of geographic and topical specialties. The postdoctoral fellow will be paid a stipend of \$40,000. Applications should consist of a CV including the names and addresses of three references; a 1500-word proposal that describes the intellectual project that the applicant would undertake during the year in residence; and a one-paragraph description of a seminar that she/he would like to teach. Ph.D. must be in hand at the time of application. Deadline for applications is March 1, 2006. Applications should be sent to: Cotsen Visiting Scholar Committee, The Cotsen Institute of Archaeology at UCLA, Fowler A-210, Los Angeles, CA 90095-1510 USA.

Awards, Fellowships, and Training

The Society for Industrial Archeology now offers Industrial Heritage Preservation Grants from \$1000 to \$3000 for the study, documentation, recordation, and/or preservation of significant historic industrial sites, structures, and objects. Awards are made to nonprofit organizations and qualified individuals. Grant program information: <http://www.siahq.org/grants/about.html>.

National Park Service's 2006 Archaeological Propection Workshop. The National Park Service's 2006 workshop on archaeological propection techniques entitled Current Archaeological Propection Advances for Non-Destructive Investigations in the 21st Century will be held May 15-19, 2006, at the Fort Frederica National Monument on St. Simons Island, Georgia. Lodging will be at the Quality Inn Island House on St. Simons Island, Georgia. This will be the sixteenth year of the workshop dedicated to the use of geophysical, aerial photography, and other remote sensing methods as they apply to the identification, evaluation, conservation, and protection of archaeological resources across this Nation. The workshop this year will focus on the theory of operation, methodology, processing, interpretation, and on-hands use of the equipment in the field. There is a tuition charge of \$475.00. Application forms are available on the Midwest Archeological Center's web page at <http://www.cr.nps.gov/mwac/>. For further information, please contact Steven L. DeVore, Archeologist, National Park Service, Midwest Archeological Center, Federal Building, Room 474, 100 Centennial Mall North, Lincoln, Nebraska 68508-3873 USA: tel: (402) 437-5392, ext. 141; fax: (402) 437-5098; email: steve_de_vore@nps.gov.

Late Quaternary Environmental Change in the Southern Hemisphere Tropics of Lowland South America. Applications are invited for this NERC-quota PhD Project. Lead supervisor: Dr. Francis E. Mayle (Univ. of Edinburgh, Francis.Mayle@ed.ac.uk). The overall aim is to improve understanding of Late Quaternary ecosystem and climatic changes in the Southern Hemisphere tropics of South America

(SHTSA). Although high-quality Quaternary palaeoenvironmental data exist for the Bolivian/Peruvian Andes (e.g. Lake Titicaca) and eastern Brazil, very little research has been undertaken in the continental interior of SHTSA. This project will test the following hypotheses: 1) SHTSA was more arid than present during the Last Glacial Maximum (LGM), in contrast to prediction from the Astronomical Theory and Bolivian Andean lake-level records. 2) The Bolivian lowland dry forests were reduced during the last glacial period compared with present, in contrast to prediction from the Pleistocene Dry Forest Arc hypothesis. 3) Late Quaternary changes in the extent of Pantanal wetlands (and hence methane emissions) are synchronous with polar ice-core methane records (if true, this would suggest a causal link). The study site for this PhD project is Laguna La Gaiba (LLG), a large 55 km² seasonally-flooded lake, located in the heart of SHTSA at a climatically and ecologically sensitive position on the Bolivian/Brazilian border between the Pantanal wetland to the east (the largest tropical wetland on Earth) and the Chiquitano Dry Forest to the west (the largest pristine tract of tropical seasonal dry forest on Earth). The Quaternary history of both of these ecosystems is unknown. This site is ideal for study because its extensive hydrological catchment from rivers that span the Pantanal and beyond means that its palaeo records likely reflect large-scale climate change in the heart of SHTSA. Preliminary pollen analyses and AMS 14C dates (ongoing PhD project) from the 6 meter LLG core suggest that the LGM climate may have been more arid than today and that the surrounding dry forest may be only Holocene in age. However, environmental reconstruction is hampered by difficulty in distinguishing between upland savanna vs. wetland habitats by pollen alone. The student will complement these pollen data by using recently-developed grass cuticle analysis, molecular delta 13C analysis, and diatom analysis to distinguish between upland savanna versus wetland/aquatic grasses, differentiate between terrestrial and aquatic carbon inputs, and reconstruct water-level changes, respectively. This multi-proxy approach will provide a much more complete and detailed palaeoenvironmental reconstruction than is possible from any single line of evidence. Training in grass cuticle analysis, integration with the pollen data, and tropical palaeoecology will be provided at Edinburgh. The student will visit Nottingham and Swansea to be trained in diatom and carbon isotope analyses, respectively. There will be opportunities to visit the study site for further sample collection. For application procedure, application form, info of funding etc, go to: <http://www.geos.ed.ac.uk/postgraduate/PhD/projects/> and follow the links. For pdf of project advert, showing maps of site and study area, go to 'Global Change' link. Note that deadline for first application round (and therefore best chance to get NERC quota funding) is February 14, 2006.

New Philadelphia Archaeological Research Project: Field School in Archaeology and Laboratory Techniques, May 23, 2006 to July 28, 2006. Sponsored by the National Science Foundation's Research Experiences for Undergraduates Program. Application Deadline: for best consideration, March 24, 2006. Application forms and additional information are available by following the links for the New

Philadelphia project on the University of Maryland's Center for Heritage Resource Studies web page, at: <http://www.heritage.umd.edu>. Additional background information is available from the University of Illinois web pages, at: <http://www.anthro.uiuc.edu/faculty/cfennell/NP>.

The New Philadelphia story is both compelling and unique. Many studies in historical archaeology that concentrate on African-American issues have focused on plantation life and the pre-emancipation era. The history of New Philadelphia is very different. It is a chronicle of racial uplift and centering on the success of an African-American family and their ability to survive and prosper in a racist society. In 1836, Frank McWorter, an African American who was born into slavery and later purchased his own freedom, acquired 42 acres of land in the sparsely populated area of Pike County, Illinois, situated in the rolling hills bounded by the Illinois and Mississippi rivers. He founded and platted a town, subdivided the property, and sold lots. McWorter used the revenues from his entrepreneurial efforts to purchase the freedom of sixteen family members, with a total expenditure of \$14,000 – a remarkable achievement. Families of African American and European American heritage moved to the town and created a multi-racial community. New Philadelphia likely served as a stopping place for the "Underground railroad" as enslaved African Americans fled northward escaping the oppression of southern plantations.

This NSF-REU sites program will help enhance undergraduate education in scientific methods and analyses in an ongoing long-term project at New Philadelphia. The primary goals of the project are to: 1) Understand the town's founding and development as a multi-racial integrated town; 2) Explore and contrast dietary patterns between different households of different ethnic backgrounds by examining faunal and botanical remains; 3) Reconstruct the townscape and town lot uses of different households from different ethnic backgrounds using botanical data and archaeological landscape features; 4) Elucidate the different consumer choices residents of different ethnic backgrounds made in a frontier situation and understand how household choices changed with the increased connection to distant markets and changing perceptions of racialization within the society.

The excavation and analysis of artifacts and archaeobiology data will provide students with a hands-on learning experience and mentoring process for students in an interdisciplinary setting. Ultimately, these different data sets will be integrated and the students will gain an understanding of the importance of scientific interdisciplinary research as they examine the growth and development of the town. This research will elucidate how individual members and families of this integrated community made choices to create their immediate environment, diet, agricultural practices, social affiliation, and consumer choices.

This archaeology project serves as an excellent opportunity for students to participate in many aspects of a scientific research program. Students will be divided into teams and they

will work collaboratively on an assigned town lot in New Philadelphia. Prior to excavations, each student will draw from the broader research goals of this project to create an individual and focused research design to be addressed in the course of their field school experience. The field school instructors will teach students about the different archaeological theories used to formulate such research designs, and the methods, sampling, and excavation strategies used in archeology to explore those questions.

Each team will be responsible for helping to develop a research design, retrieving archaeological data (material culture and archaeobiology data), cleaning and cataloging the materials, data entry, and analyzing artifacts and archaeobiological materials from one town lot. Student teams will work closely in a mentorship situation with Illinois State Museum, Research and Collection Center (ISM-RCC), University of Illinois (UI) and University of Maryland (UM) staff in order to acquire the necessary skills to perform scientific research. Each student will "specialize" in one form of analysis and they will report on their findings at the end of the summer session. This information will allow students to work as a team to reconstruct the landscape and lifeways of residents of this historic town. Evening lectures will be presented and the group will take several field trips to local historic sites and museums during the ten-week course.

At the end of the course student teams will make a presentation of their results. Field school staff and members of the community interested in this archaeology project will be invited to a half-day symposium to listen to and discuss the results presented by each team member. The presentation will allow for the dissemination of new information as well as group assessment and constructive critique of the work of each field school participant and the overall project.

With the help of field school instructors, this presentation will introduce students to the skill of public speaking and it will help provide them the techniques for communicating scientific results to a public audience. After this presentation and discussion, student teams will assess evaluations and create a strategy on how to best present this work to other audiences. They can also provide their assessments of the priorities that should be placed on the various research goals to be pursued in ongoing historical and archaeological investigations at the New Philadelphia site.

Each student is required to submit an application form, transcripts from all colleges attended, two letters of recommendation, and an essay. For best consideration, the final date for receipt of all applications materials is March 24, 2006. This field school is sponsored by the National Science Foundation's Research Experiences for Undergraduates sites program, and will select students based on their scholarly ability as well as their motivation and ability to perform scholarly and scientific research. Students from underrepresented groups are encouraged to apply. Students will be notified of acceptance no later than April 14, 2006.

Short Courses in Environmental Palaeoecology and Aquatic Ecology for MSc and PhD Students. Contact: David Hunt, Environmental Change Research Centre, Department of Geography, University College London, 26 Bedford Way, London WC1H 0AP, UK. Telephone: +44 (0) 20 7679 7575; Fax: +44 (0) 20 7679 7565; E-mail: d.s.hunt@ucl.ac.uk.

Ostracod Analysis. (Dr Jonathan Holmes, Environmental Change Research Centre, Department of Geography, UCL and Dr David Horne, Queen Mary, University of London and The Natural History Museum). Course Dates: 20th - 24th February 2006. Course Fees: £360. Ostracods are small aquatic bivalved crustaceans with calcite shells that are often preserved well in Quaternary sediments. The aim of this course is to provide participants with a theoretical and practical understanding of the role of ostracods in Quaternary palaeoenvironmental reconstruction. Emphasis is placed on non-marine ostracods and their application to Quaternary research.

Chironomids: Water Quality and Climate Change. (Steve Brooks, Natural History Museum and Dr Les Ruse, Environment Agency). Course Dates: 6th - 10th March 2006. Course Fees: £360. Chironomid (non-biting) midges are sensitive indicators of environmental change. They are responsive to a wide range of environmental perturbations including eutrophication, acidification, heavy metal pollution and climate change. Chironomid pupal exuviae can be used to monitor the water quality of lakes and rivers and chironomid larvae, preserved in lake sediments, can be used to make quantitative reconstructions of palaeoenvironmental change. The course consists of 12 lectures and 5 practical classes and introduces the principals of chironomid analysis. It is designed for people with an interest in water quality assessment and/or palaeoecology.

Stable Isotopes and Environmental Change. (Professor Tim Atkinson (UCL), Dr Mark Maslin (UCL), Dr Jonathan Holmes (UCL) Prof Melanie Leng, NERC Isotope Geosciences Laboratory, Dr Rob Mulvaney, British Antarctic Survey, Dr Dave Matthey, Royal Holloway, University of London, Dr Iain Roberston, University of Wales, Swansea). 13th - 17th March 2006. Course Fees: £360. The course is taught over 5 days and introduces the use of stable isotope geochemistry as an important tool in the solution of a range of palaeoenvironmental problems, specifically related to palaeoclimate reconstruction. The first part of the course describes theoretical and experimental principals, fractionation mechanisms of light elements, and natural variation of carbon, hydrogen and oxygen isotopes in nature. Some basic principals of mass spectrometry, standardization, and sample handling are described. The second part of the course deals with the application of stable isotope techniques to lacustrine, marine, groundwater and cave (speleothem) environments, together with ice cores and tree rings. Practical sessions will be based at UCL's Bloomsbury Environmental Isotope Facility (BEIF) and Royal Holloway's stable isotope laboratories in Egham.

Introduction to the Ecology and Identification of Aquatic Macrophytes. (Dr J.I. Jones, CEH Dorset). 30th April - 5th May 2006. Course Fees: unsalaried £350, salaried £700. This intensive 1 week residential course in Dorset will give an introduction to the factors influencing the growth and distribution of aquatic macrophytes as well as an introduction to the identification of the species themselves. The course will consist of 8 lectures and 5 practical classes. Topics covered include morphological adaptation, ecophysiology, interactions with other species, quantification and identification. The classes are led by Dr J.I. Jones of CEH Dorset.

Numerical Analyses of Biological and Environmental Data. (Professor John Birks, Department of Biology, University of Bergen and Environmental Change Research Centre, Department of Geography, University College London and Dr Gavin Simpson, Environmental Change Research Centre, Department of Geography, UCL). Course Dates: 15th - 26th May 2006. Course Fees: £750. Biological and environmental data are usually complex, consisting of many observations and many variables. This course provides an overview of the main techniques of multivariate data analysis that are relevant and useful in ecology and in the study of environmental change, particularly using "proxy" biostratigraphical data. Emphasis is on statistically robust and ecologically realistic numerical techniques for both descriptive and hypothesis-testing purposes. Lecture topics include exploratory data analysis, classification techniques, regression analysis, indirect (ordination) and direct (constrained ordination) gradient analyses, discriminant analysis, calibration and transfer functions, analysis of temporal and spatial data, and hypothesis testing by permutation tests, bootstrapping etc. Practical classes are led by Dr Simpson and provide "hands-on" training in the use of statistical and graphical software packages such as CANOCO, C2, and R. The course is relatively intensive and assumes that the course participants have a good familiarity with basic univariate statistical concepts such as correlation and regression, with standard multivariate methods such as principal components analysis, and with the use of PCs.

Introduction to Diatom Analysis. (Dr Viv Jones and Professor Rick Battarbee, Environmental Change Research Centre, Department of Geography, UCL). 5th - 9th June 2006. Course Fees: £360. This intensive one week course is designed for ecologists, palaeoecologists, and archaeologists, and focuses on non-marine diatoms. It provides a thorough grounding in diatom analysis and its applications, and assumes no prior knowledge of diatoms. The course consists of lectures and practical classes covering diatom morphology and systematics, evolution, habitats and ecology, taphonomy and preservation, training-sets and transfer functions, climate change, saline lake sediments, eutrophication, lowland lake sediments, acidification, and upland lake sediments. Practical classes focus on slide preparation techniques, counting, taxonomy, computing, and the analysis of material from estuarine, eutrophic and acid lake sediments. Participants are welcome to bring along their own material too, e.g., sediment samples, slides etc for personal tuition sessions.

Conference News and Announcements

36th International Symposium on Archaeometry, May 2nd - 6th, 2006, Quebec City, Canada. The aim of the Symposium is to promote the development and use of scientific techniques in order to extract archaeological and historical information from the cultural heritage and the paleoenvironment. It involves all Natural Sciences and all types of objects and materials related with human activity. In general, papers should deal with the development and/or application of scientific techniques for extracting information related to human activities of the past, including the biological nature of man himself and the environment in which he lived. Papers that deal with weathering and deterioration of archaeological objects or monuments will be welcome provided they are relevant to one of the main themes of the Symposium. Papers that deal solely with conservation techniques or the development of materials for conservation are outside the scope of this conference and normally will not be accepted. The subjects covered by the Symposium are grouped into the following fields that form the sessions under which the papers will be presented either as oral or poster. The Symposium has six regular sessions plus a theme session selected by the local organizing committee. It also includes a special sub-session. Regular sessions are as follows: field archaeology (remote sensing and prospecting) and environmental archaeology; dating (organic and inorganic materials); biomaterials (DNA, diet, organic residues analysis and agricultural archaeology); technology and provenance I (stone, plaster, and pigments); technology and provenance II (ceramics and glass); special sub-session: isotope studies of glass; technology and provenance III (metals); special theme session: early man in America. The symposium will be held at the *Laboratoires d'archéologie of Université Laval*, situated at the Séminaire de Québec within the historic city walls of Old Quebec City, Canada. For more information please consult our conference website at <http://www.isa2006.ulaval.ca>. The organizing committee will also provide information on possible travel arrangements and available accommodations during the Symposium on the conference website. During the symposium the organizing committee will take the participants on a sightseeing tour of Quebec City. A symposium banquet will also be organized (at additional cost to the participants). The day after the symposium, a sightseeing trip will be offered for interested participants (also at additional cost). Further information will be included with the website. Registration fees for the conference are as follows: Before March 1st, 2006: symposium participants: 300 \$US; students: 150 \$US (prove of student status is required). On March 1st, 2006 or later: symposium participants: 350 \$US; students: 175 \$US. Please note that these fees include access to all sessions, coffee breaks, five lunches, the conference bag including the printed conference program complete with abstracts, and the sightseeing tour of Quebec City. Important deadlines: deadline for early registration and payment of registration fee: February 28th, 2006; Deadline for hotel reservations: February 28th, 2006; symposium reception and registration: May 1st, 2006; sessions: May 2nd - 6th, 2006; symposium excursion or departure: May 7th, 2006; To encourage the active participation of students in

the Archaeometry Symposium, the standing committee offers two prizes of 200 \$US each, for the best posters representing the work of students enrolled in programs leading to degrees in science or archaeological science. Students must attend the symposium to claim their prizes. For more information, consult the website, or contact: Anja Herzog, ISA 2006 / CÉLAT, Pavillon Charles-De Koninck, Université Laval, Québec (Québec), G1K 7P4, Canada; Phone: +1 (418) 656-2131 ext.: 15147; Fax: +1 (418) 656-7911; E-mail: info@isa2006.ulaval.ca; Symposium Website: <http://www.isa2006.ulaval.ca>.



Québec, the host city of the 2006 ISA

HOLIVAR2006 - Natural Climate Variability and Global Warming. Environmental Change Research Centre (ECRC), University College London, 12-15th June, 2006, London. To find out more, register and/or submit an abstract please use the links below. <http://www.holivar2006.org> <http://www.holivar2006.org/registration.php>. The HOLIVAR2006 Open Science Meeting will examine how and why the natural climate system varies on different time-scales over the Holocene, and will assess the relative importance of natural processes and human activity in explaining global warming. The program includes: Millennial Time Scales; Decadal to Centennial Time Scales; Climate Variability in the Last 2000 Years; Rapid Hydrological Change. Speakers include: Rick Battarbee (UCL, UK), John Birks (University of Bergen, Norway), Paul Valdes (University of Bristol, UK), Frank Oldfield (University of Liverpool, UK), Eystein Jansen (University of Bergen, Norway), Michel Crucifix (Hadley Centre for Climate Prediction and Research, UK), Bas van Geel (University of Amsterdam, Netherlands), Juerg Beer (EAWAG, Switzerland), Michael E. Mann (Pennsylvania State University), Hugues Goosse (University of Ghent, Belgium), Dirk Verschuren (University of Ghent, Belgium), Martin Claussen (Potsdam Institute for Climate Impact Research, Germany), Ray Bradley (University of Massachusetts, USA). Poster sessions: Posters will follow the four main themes of the conference and delegates should submit an abstract by 1st April 2006. Fees: 110 and 55 for students. (Fees increase to

130/65 from 31st March 2006). The deadline for registration is 1st May, 2006. The deadline for poster abstracts is 1st April 2006.

The 10th International Paleolimnology Symposium, June 25-29, 2006, at Duluth, Minnesota, USA. The online registration and hotel reservation as well as the list of plenary speakers (all confirmed) will become available on November 7 or shortly thereafter. Please go to <http://www.geo.umn.edu/paleolim10/> to learn more about the Symposium. The webpage currently includes information on the meeting theme as well about the host city of Duluth and visa information for the foreign participants. The early registration at a reduced rate and abstract submission will close April 1, 2006. Registration at a higher rate will continue through May 20, 2006. Hotel reservation at very attractive conference rates will close May 25, 2006. Conference co-chairs: Emi Ito (eito@umn.edu) Limnological Research Center, and Department of Geology and Geophysics, University of Minnesota; Daniel Engstrom (dre@smm.org) St. Croix Watershed Research Station, Science Museum of Minnesota.

Geomorphology and Earth System Science conference. The British Geomorphological Research Group announces its 2006 annual conference, "Geomorphology and Earth System Science." The meeting will be held in the heart of England, at Loughborough University, UK from Wednesday June 28th to Friday June 30th, 2006. For more information, please visit the GESS website at <http://www.lboro.ac.uk/departments/gy/gess/index.htm>. The conference will focus on understanding the relations between geomorphological processes and global change: Interaction of surface processes with climate, land-use and tectonics at regional and global scales and on instrumental, Holocene, and longer timescales. The manifestation, propagation, and preservation of geomorphological indications of change at these scales. Managing and mitigating the geomorphological implications of large-scale environmental change. Tools for understanding the roles of geomorphology in the Earth system, including modeling, remote sensing and geochronology. In addition to the BGRG membership and wider, international geomorphological community (IGU), we hope to welcome those affiliated with cognate international organizations including geological societies, quaternary research associations, and geophysical unions.

American Quaternary Association Biennial Meeting, Bozeman, Montana, USA, August 17-20, 2006. Theme: Ocean/ Atmosphere Interactions and Continental Consequences: Environmental Forecasting from the Quaternary Sciences. Meeting website: <http://bsi2.msu.montana.edu/amqua/meeting>. The 2006 AMQUA Program will focus on the intersection of two important areas: the rapidly advancing science of ocean/ atmosphere interactions and their continental impacts, and the increasing concerns with environmental forecasting. Several recent documents (Clark et al. 2001, National Research Council 1999, 2001, 2002, 2004, 2005) have identified the urgent need for developing predictive and risk-assessment capabilities in

the face of future environmental changes. At the same time, modern and paleo studies are leading toward recognition that climate variability at interannual to multidecadal and centennial scales is strongly controlled by ocean/atmosphere interactions and feedbacks - manifested in quasi-cyclic phenomena such as ENSO, NAO, PDO, AMO, etc. These ocean/atmosphere dynamics have strong influences on climate variability in continental interiors, and climate variability across a range of timescales influences - both directly and indirectly - processes in geomorphological, hydrological, ecological, and cultural systems. Much attention has been directed towards Pacific Basin influences on the North American interior, but accumulating evidence indicates that the Atlantic Basin also has strong effects. Fundamental characterization and validation of ocean/atmosphere dynamics and its continental consequences represents one area where Quaternary sciences can contribute to environmental forecasting. Furthermore, studies of these dynamics extending into the past 1ka to 100 ka years indicates that climate variability driven by ocean/atmosphere dynamics can change in frequency and magnitude, and that abrupt climate change with far-reaching environmental consequences can originate from nonlinearities in the ocean/atmosphere system. Thus, Quaternary sciences can make important contributions to risk assessment and vulnerability reduction, which are both vital components of environmental forecasting. The 2006 AMQUA Program will bring together a diverse group of speakers, including (1) scientists who are at the forefront of understanding ocean/atmosphere interactions and their continental effects (climatic, ecological, geological, cultural), (2) scientists whose recent work illustrates how studies of Quaternary history can be applied toward predictive and forecasting capacities in environmental policy and resource management, and (3) selected speakers from the management and policy domain who can articulate how Quaternary scientists can contribute to environmental forecasting, and facilitate communication and interaction between the science and management/policy communities.

The Second International Symposium on Biomolecular Archaeology will take place in Stockholm, Sweden, September 7-9, 2006. Please visit our symposium website at www.archaeology.su.se/isba2. The general aim of the symposium is to stimulate research in the subject area and to encourage the exchange of information between researchers in different disciplines. Focus of the symposium will be the application of biomolecular techniques to archaeological questions, this ideally in combination with "traditional" archaeological research methods. The symposium will have five plenary sessions during two days, followed by an excursion the third day. Session themes: New techniques, Degradation/diagenesis, Food production and consumption, Migration and cultural transmission, Settlement and spatial organization. The registration fee is 100 EUR, or 50 EUR for PhD students. Lunches, coffee/tea, pre-symposium pub, reception, banquet and the proceedings publication are included in the registration fee. The Proceedings will be published in the *Journal of Nordic Archaeological Science*; see www.archaeology.su.se/arklab/jonas for details.

Soil Analysis Support System for Archaeologists

Clare Wilson, School of Biological and Environmental Sciences, University of Stirling

The Natural Environment Research Council UK (NERC) has recently awarded £204k to a collaborative project between the Departments of Biological and Environmental Sciences and Computing Science, University of Stirling. The project will develop SASSA: a web-based Soil Analysis Support System for Archaeologists. SASSA will act as a repository for geoarchaeological information in the form of case studies, provide decision support on field and laboratory analyses linked to archaeological questions through the use of case-based reasoning and decision trees, and allow exchange of information through user forums and a WIKI engine. One of the main features of SASSA will be its interactive, easy-to-use interface, whose aim is to foster an improved exchange of experience than has been traditionally the case regarding the application of soil science to archaeology.

Further details on the project can be found at www.SASSA.org.uk. The SASSA project website provides information and news on the development of SASSA (Soil Analysis Support System for Archaeologists). The aim of SASSA is to demonstrate the range of archaeological questions which can be addressed using field and lab-based earth science techniques. SASSA will provide support for curators in defining soil analyses that can be used to address archaeological research questions, and for field archaeologists involved in recording and sampling soils. When complete it is envisaged that SASSA will provide: examples of the archaeological questions that soil analysis can contribute to, illustrated by case studies; help with field recording and interpretation of archaeological deposits; guidance on appropriate analytical techniques linked to archaeological questions; a background tutorial and glossary of soil terms; a forum for interaction between archaeologists and soil scientists.

Ancient Starch Research

Mitch Allen, Left Coast Press, Inc.

Left Coast Press, Inc. is pleased to announce publication of *Ancient Starch Research*, edited by Robin Torrence and Huw Barton. This 256 page, large format publication with over 200 illustrations, was compiled by two dozen archaeologists and is the first volume to address the use of starch molecules in archaeological research.

Numerous new studies are using starch discovered in archaeological contexts to improve our knowledge of past human behavior and environmental variation. Given the substantial body of successful research, the time has clearly come for a comprehensive description of ancient starch research and its

potential for archaeologists. This book fills these roles by describing the fundamental principles underlying starch research, guiding researchers through the methodology, reviewing the results of significant case studies, and pointing the way to future avenues for research.

Contributors to this volume come from five continents and include Jenny Atchison, Maria del Pilar Balbot, Jane Balme, Huw Barton, Wendy Beck, Rebecca Conway, Alison Crowther, Judith Field, Richard Fullagar, Beth Gott, Michael Haslam, Mark Horrocks, Lisa Kealhofer, M. Alexandra Korstantje, Carol Lentfer, Tom Loy, Tracey Lu, Peter Matthews, James F. O'Connell, Jeff Parr, Gail Robertson, Delwen Samuel, Linda Scott Cummings, Michael Therin, Robin Torrence, Donald Ugent, Bonnie Williamson, and Richard Wright.

Co-editor Robin Torrence is a Principal Research Scientist in the Department of Anthropology, Australian Museum, Sydney. She is author or editor of seven books and almost 100 articles on archaeological science. She served as Treasurer of the World Archaeological Congress and was recipient of the Society for American Archaeology's 2002 Excellence in Archaeological Analysis Award. Co-editor Huw Barton has the Wellcome Trust University Award in Bioarchaeology, School of Archaeology and Ancient History, University of Leicester. He has a Ph.D. from University of Sydney and has done field work in Australia and Southeast Asia.

Ancient Starch Research is available in a cloth edition for \$69.95 by phone at (800) 426-3797 or by email at orders@uapress.arizona.edu. ISBN 1-59874-018-0. The Publisher, Left Coast Press, Inc., is a new scholarly and professional publisher of archaeology, anthropology, and related disciplines. The Press is distributed in the US by University of Arizona Press, in Canada by University of British Columbia Press, and in the rest of the world by Berg Publishers. More information on the press is available at www.LCoastPress.com.

Petrographic Image Processing of Thin Sections Using the Rotating Polarizer Stage

*Frank Fueten,
Department of Earth Sciences, Brock University*

The petrographic microscope is a basic tool employed by many geologists to identify minerals, estimate grain size or shape and to obtain modal percentages of minerals in thin sections. Unfortunately, the use of image processing systems to obtain this data has been limited (Fabbri, 1984; Launeau et al., 1990; Simigian and Starkey, 1989; Starkey and Samantaray, 1993). In plane-polarized light many minerals are colorless, which makes it impossible to distinguish grain boundaries between two adjacent colorless grains. Similarly, in cross-

polarized light the interference colour displayed depends on the mineral type, the orientation of the indicatrix of the grain with respect to the polarizers and the thickness of the thin section. Hence, two adjacent grains may have similar interference colors at some orientations of the thin section with respect to the polarizers. This problem of lack of contrast is commonly overcome by rotating the microscope stage with respect to the fixed polarizers. The human brain and vision system have no problem keeping track of individual grains as they rotate around the field of view. Unfortunately this procedure is a major obstacle for an image processing system, as the computer has to track the behavior of a point within a grain in colour space (ranges of birefringence or pleochroism), as well as the motion of that point as the thin section is rotated.

Fueten (1997) presented the design of a fully automated polarizing stage for a petrographic microscope, which allows a thin section to remain fixed while the polarizers are rotated. Hence any point within a grain is registered to the same pixel at all positions of the polarizers, greatly simplifying the computational requirements. The stage is used in conjunction with a computer with a video capture board. By selectively obtaining data from images with different polarizer positions, the stage greatly enhances the potential for petrographic image processing.

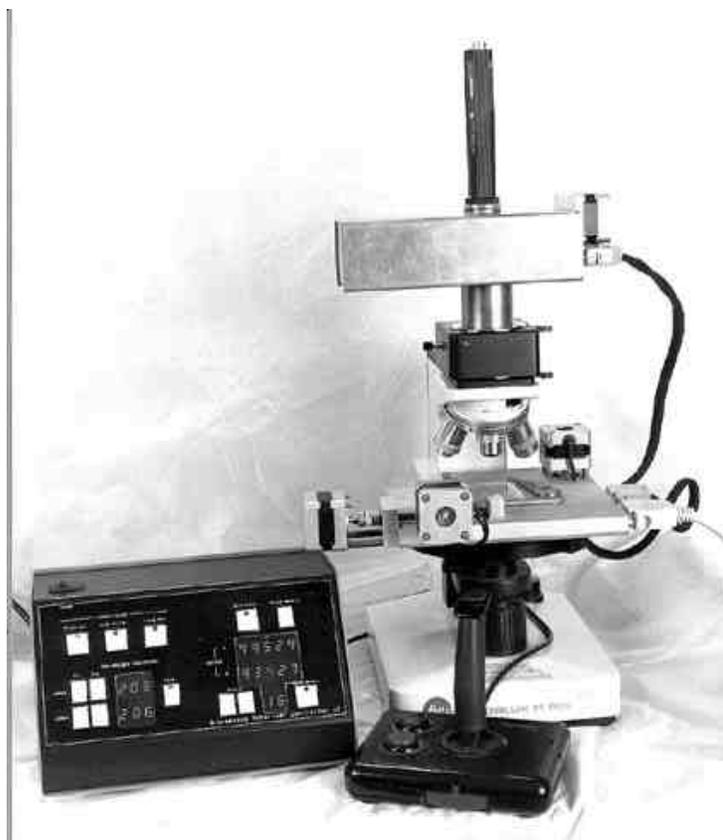
This introduction briefly reviews the design of a rotating polarizer stage, presents some of the data that can be collected with the stage and illustrates how the data can be used to solve a number of common petrological problems.



Fueten at the scope

Stage Design

The basic design of the stage is that the polarizer and analyzer are each placed inside a gear, with each gear connected to a stepper motor by a notched belt. The stepper motors rotate the gears; the notched belt ensures that no slippage occurs. One step of the motor corresponds to a 0.9 degree rotation of the polarizing filter; hence a 180 degree rotation of the polarizer is equivalent to 200 steps.



Fueten's rotating polarizer stage

For optimum functionality, the stage must have the ability to switch from plane to crossed-polarized light, the polarization directions of the polarizers must be known, and the upper and lower polarizers must remain crossed during analysis. The stage fulfills all of these requirements and can be placed directly on the stage of a variety of microscopes and macrosopes. The current stage design differs from the model presented by Fueten (1997). The lower polarizer of the automated stage is contained within a base plate, remains in the light path and cannot be removed. It is rotated via the stepper motor for plane and crossed-polarized light observations. The upper assembly is placed below the video camera and contains the upper rotating polarizer with stepper motor and a neutral density filter for plane light observations. Gearing for the upper polarizer is identical to that of the lower polarizer, ensuring that both polarizers rotate synchronously. Because one of the applications of the stage is to calculate limited crystallographic orientations of quartz c-axes, an accessory plate consisting of a sheet of clear overhead transparency, is permanently placed below the upper polarizing filter. This anisotropic plastic produces a retardation of approximately 115nm and does not alter the appearance of minerals appreciably but does however allow for the calculation of limited quartz c-axis orientations. The new stage design has the advantage of an unobstructed view of the thin section and overcomes problems of focusing that are encountered when the upper rotating polarizer is placed below the microscope lens. A specially designed control box

with a microcontroller drives all stepper motors and communicates to the computer with the video board through the serial port.

To cross the rotating polarizers, an image is captured without a sample inserted in the light path. The brightness of the image is calculated; in this case the red, green and blue values for the pixels within the image are added. The upper polarizer is then rotated by a set amount in one direction, another image is captured and its brightness compared to the first image. If the second image is brighter than the first one, the direction of rotation of the upper polarizer is reversed and the amount of the step is reduced. A standard optimization procedure is followed until the brightness is minimized and the rotating polarizers are crossed. The rotating polarizers remain crossed by simply rotating synchronously, even if plane light is used and the upper polarizer is out of the light path.

To set the polarization direction of the polarizers to a known orientation, a similar procedure is used after the polarizers have been crossed. The fixed polarizing filter on the microscope is inserted into the light path while the upper assembly is switched to the neutral density filter position. The brightness minimization procedure described above is then run, with the exception that both polarizers are rotated synchronously to keep them crossed. After the polarizers have been crossed and aligned, routines on the computer keep track of the position of the polarizers with respect to the axes of the thin section.

Data Types Collected

The generic design of the stage allows for the implementation of a wide variety of applications and the types of data gathered can be tailored to that application. The types of data presented here can be used to identify mineral types, measure grain size, shape and limited crystallographic orientation data. The computer connected to the stage is a 200Mhz PC with a Matrox Meteor video capture board, capable of grabbing frames at a resolution of 640x480 pixels in 24 bit colour (8 bit each of red, green and blue). Each image captured requires approximately 1 Mb of storage space, hence a complete set of images for a 180 degree rotation of the polarizers under both plane and crossed-polarized light would require approximately 400 Mb. To reduce storage requirements, a composite data set is constructed that contains selected information obtained during a 180 degree rotation of the polarizers, first under crossed-polarized, then under plane light. Combining data from different images into a composite image is possible as each pixel remains registered to the same point within a grain in the stationary thin section for all orientation of the polarizers. For each pixel the following data set is computed from the set of images.

Using Crossed-polarized Light

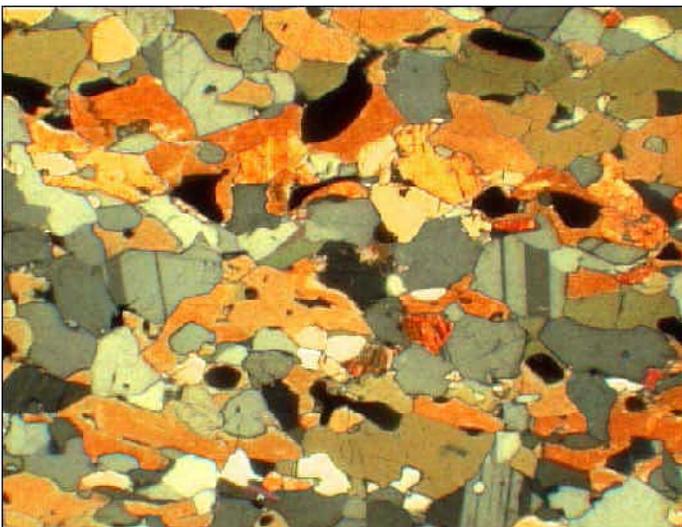
The data collected using crossed-polarized light include the average value, maximum intensity value, maximum position value and gradient. Each data is presented as an image.

Average Value

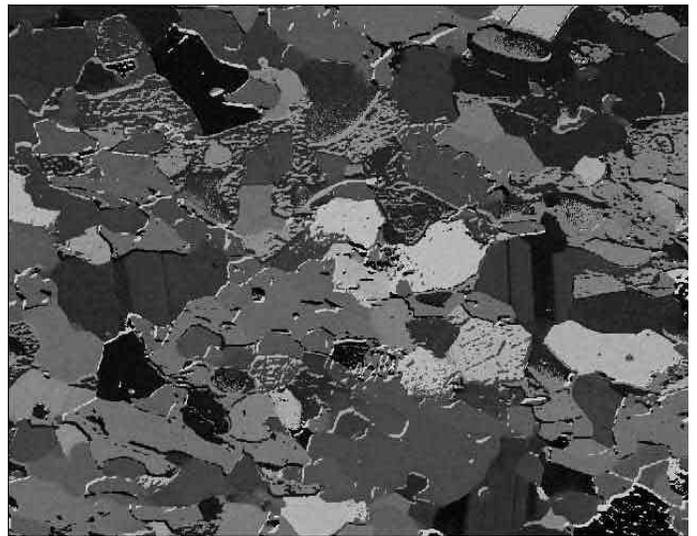
The average red, green and blue component for each pixel during the rotation of the polarizers is computed during the sampling process. In appearance (see image below), this image is closest to interference colors displayed in a single image. One of the main advantages of this image is that the effect of noise present in single images is diminished by this type of averaging (Gonzalez and Woods, 1992).

*Maximum Intensity Value*

The maximum intensity value corresponds to the maximum interference colour of a pixel within a grain during rotation of the polarizers through 180° (see image below). The intensity of a pixel is calculated using the intensity value in Hue, Saturation, Intensity (HSI) colour space ($I = (\text{red} + \text{green} + \text{blue}) / 3$; Gonzalez and Woods, 1992). Maximum intensity variation of pixels within different grains of the same mineral in this image are directly related to the orientation of the crystal lattice to the plane of the thin section. Variations due to the orientation of the polarizers which are seen in single images have been eliminated. This property is exploited for the calculation of quartz c-axes as outlined below.

*Maximum Position Value*

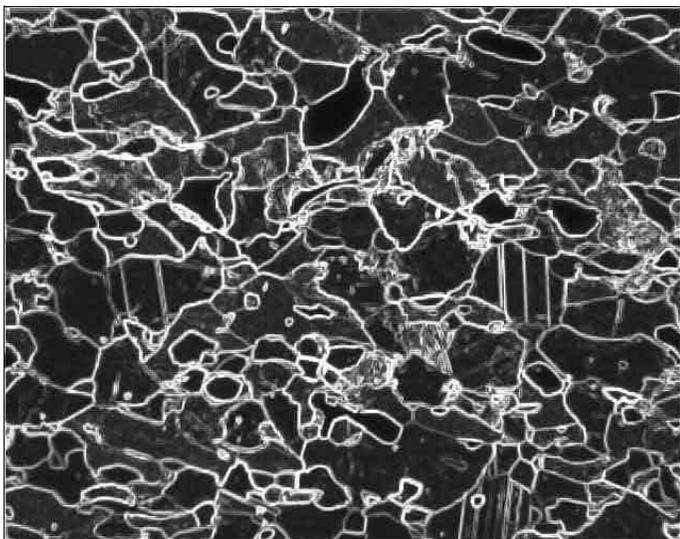
Position values record the orientation of the polarizing filters, i.e., the step number, when a pixel reaches its maximum and minimum value. For a 180 degree rotation of the polarizers, position values have a range of 1-200, as a pixel can reach its maximum or minimum value at any one of the 200 steps. Position values are represented as 8 bit grey scale images (see image below). They aid in the distinction of twins, which may have very similar maximum and minimum intensity values, but reach these values at different orientations of the filters. They also aid in the determination of partial crystallographic orientation of some minerals such as phyllosilicates or quartz (Goodchild and Fueten, in prep.).

*Gradient Value*

The gradient value is used for the determination of grain boundaries following the procedure outlined by Goodchild and Fueten (1998). A gradient operator, which compares the intensity of a pixel with that of its neighbors in both the positive x and y directions is passed over each incremental image. For each pixel the maximum gradient value is added to an incremental gradient array. The gradient at visible boundaries between grains is larger than gradient values in the interior of grains. A total gradient array is built up by addition of incremental gradient values while the polarizing filters are rotated through 180 degrees. Following the acquisition of a complete data set, the total gradient array is scaled to an 8 bit range, with values in the range of 0 - 255. This image (see image at top of next page) is viewed as a gray-scale image with high/bright values representing grain boundaries while low/dark areas form the interior of grains.

Plane Polarized Light

For observations under plane light, the neutral density filter is rotated into the light path. The neutral density filter compensates for the increase in brightness of the thin section under plane light and eliminates the need to adjust the light source on the microscope. The data collected under plane-



polarized light include the minimum plane intensity value (see image below), the maximum plane intensity value and the minimum position value. The procedures to obtain these data are similar to those described above, except that the minimum intensity of a pixel and its corresponding polarizer position are stored.



Potential Applications

The generic design of the stage and of the data types collected allow for the design of a wide variety of applications, dealing with common petrological problems. The sections below illustrate a number of such applications which have either been completed or are currently under development.

Edge Extraction and Grain Shape Measurements

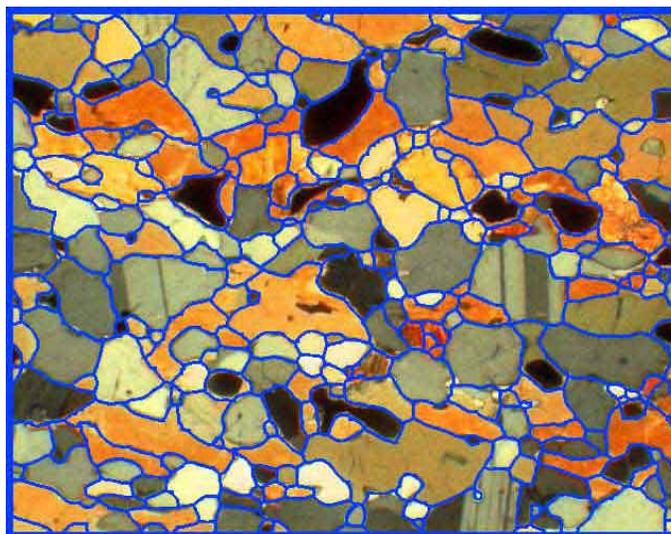
Edges are extracted from a gradient image obtained using the rotating polarizer stage microscope. The edge extraction procedure (Goodchild and Fueten 1998) uses 10 steps and 7 separate routines to extract the edges. This extraction procedure has some similarities to the procedures implemented in the Canny

edge detector (Canny 1986). However, the procedure does not require any further calculation of gradients since the input is already a gradient. Furthermore, output of this procedure consists of closed edges only. Such edges are ideal input for calculations of grain size or shape which are easily calculated on closed shapes.

Most edges are determined accurately, however, the solution is not perfect. In clean thin sections, the algorithm produces edges which require little to no editing. However, the procedure fails to determine the edges of small, narrow grains and produces unsatisfactory results in rocks that contain alterations or regions with a fine grained matrix. Boundaries can be either added or deleted by simple manual editing.

Mineral Identification

At present a supervised classification scheme utilizing maximum intensity and minimum plane light images is used. Seed grains for each mineral are selected by the user. The mode for each seed grain is calculated in RGB space (see image below). The modes for all unknown grains are then calculated and unknown grains are assigned to the seed mineral species with the closest mode. This centroid based minimum distance classification works well for colored minerals but is largely unable to distinguish quartz and feldspar. A project using a neural net - based classification is currently in progress (Thompson and Fueten, in prep). This approach utilizes colour and texture parameters for the different image sets. Initial results are encouraging.



Quartz c-axis Orientation

The determination of crystallographic orientations of quartz crystals plays an important role in the microstructural analysis of quartz bearing rocks. Optical methods do not yield a full description of the orientation of the lattice but are restricted to measuring the orientation of the c-axis only. The method developed for the use of the rotating polarizer stage is similar in principal to those of Beyna et al (1990) and Heilbronner and Pauli (1993) in that image processing techniques are applied to

captured images and c-axes are calculated for each pixel. The technique is discussed in detail in Fueten and Goodchild (in prep.). It relies on the mineralogical principle that the maximum intensity or brightness occurs when the c-axis is at angles of 450 and 1350 with respect to the lower polarizer vibration direction. Maximum intensity and position data for each pixel in a quartz grain can be used to determine the trend and plunge angle, though not plunge direction for quartz grains (Fueten and Goodchild, in prep.). The technique is fast, accurate and can be performed on regular thin sections.

Pore Space Measurements

Pore space (or holes in thin sections) will always be dark under cross polarized light and always be light under plane polarized light. By combining data from the maximum intensity and the minimum plane light image pixels fulfilling both criteria can be identified and isolated. A project, developing a set procedure to identify pore space, is currently in progress.

References

- Benya, G., Leymarie, P., Buffet, G., and Laurent, N. 1990. Principe de l'analyse des fabriques d'axes C du quartz par le traitement d'images numeriques. *C.R. Acad. Sci. Paris*, t.310, Serie II, 1233-1239.
- Canny, J. 1986. A computational approach to edge detection in IEEE Transactions on Pattern Analysis and Machine Intelligence *PAMI*-8(6), 679-698.
- Fabbri, A. G. 1984. *Image Processing of Geological Data*. Van Nostrand-Reinhold, Wokingham, U.K. 224 pp.
- Fueten, F. 1997. A computer controlled rotating polarizer stage for the petrographic microscope. *Computers and Geosciences*, 23, 203-208.
- Gonzalez, R. C., and Woods, R. E. 1992. *Digital Image Processing*: Addison-Wesley, 716 pp.
- Goodchild, J. S., and Fueten, F. 1998. Edge detection in petrographic images using the rotating polarizer stage. *Computers and Geosciences*, 24, 745-751.
- Heilbronner, R. P., and Pauli, C. 1993. Integrated spatial and orientation analysis of quartz c-axes by computer aided microscopy. *Journal of Structural Geology*, Vol 15, nos. 3-5, 369-382.
- Launeau, P., Bouchez, and Benn, K. 1990. Shape preferred orientation of object populations: automatic analysis of digitized images: *Tectonophysics*, v. 180, nos. 2-4, 201-211.
- Simigian, S., and Starkey, J. 1989. Image: Modified for use on a microcomputer-based system: *Computers and Geosciences*, v. 15, no. 3, 237-254.
- Starkey, J., and Samantaray, A. K. 1993. Edge detection in petrographic images: *Journal of Microscopy*, v. 172, no. 3, 263-266.

For More Information

Visit the website: <http://spartan.ac.brocku.ca/~ffueten/stage/WelcomeF.html>.

Ross, B. J., Fueten, F., and Yashkir, D. 2001, Automatic mineral identification using genetic programming. *Journal of Machine Vision and Applications*, v. 13, 61-69.

Thompson, S., Fueten, F., Bockus, D., 2001, Mineral identification using artificial neural networks and the rotating polarizer stage, *Computers and Geosciences*, v. 27, 1081-1089.

Remote Sensing and GIS

Apostolos Sarris, Associate Editor

Open Position in Geophysical Prospection at the Institute of Archaeology of the University of Berne. The Institute of Archaeology of the University of Berne seeks to establish a new division for geophysical prospection and invites applications for a three year position (50 %). The position is to commence on April 1, 2006 and is renewable for another three years. The monthly salary will be approximately 3.000 CHF (13 months per year). The person appointed will be expected to teach one course every second term. A further main duty will be to execute in frame of the field projects of the institute at least two seasons of geophysical prospection, one during the spring break, a second during the summer break. Additionally there may be requests from external field projects, which will be compensated by a higher salary. Most of the projects of the institute are located in countries around the Mediterranean or in the Middle East. The institute disposes at the moment of two caesium-gradiometers, a resistivity meter, and substantial surveying and computer equipment. Furthermore the possibility exists of assistance by the Institute of Geophysics at the ETH Zurich. The ideal candidate will have a completed study of archaeology with adequate experience in geophysical prospection methods or a completed study of geophysics with a decided emphasis and interest in archaeology. Knowledge in surveying methods, AutoCAD and/or GIS is desirable. The candidate should have a strong interest in conducting own research, e.g. in the frame of a dissertation and should speak German or have the willingness to learn it. However at the beginning teaching may take place in English. Further Information can be acquired by Prof. Dr. Michael Heinzlmann, Institute of Archaeology, Div. Mediterranean Archaeology, Longgass-Str. 10, CH-3012 Bern, Tel. ++41-(0)31-6318993, e-mail: michael.heinzlmann@arch.unibe.ch.

6th International Conference on Archaeological Prospection, Rome, Italy September 14-17, 2005. The

6th International Conference on Archaeological Prospection took place at the National Research Council of Rome, Italy on 21-24 September 2005. The Conference was organised jointly by the Institute of Technologies Applied to Cultural Heritage (CNR), the International Society for Archaeological Prospection (ISAP) and the Special Project on Safeguard of Cultural Heritage (CNR). Site based studies included examples of the application of geophysical methods in Egypt (T. Herbich), Peru (J. W.E. Fassbinder, M. Reindel), Iran (A. Schmidt, T. Horsley and H. Fazeli), Slovakia (I. Kuzma, J. Tirpak), Czechoslovakia (R. Krivanek), Italy (H. Becker, M. Ciminale, D. Gallo & R. Fancovich, S. Campana, C. Felici) and Greece (A. Sarris, N. G. Papadopoulos, M. Elvanidou, E. Kappa, V. Trigkas, E. De Marco, E. Seferou, G. Stamatis, K. Kouriati, M. Katifori, M. Kaskanioti).

Further examples of integrated prospection studies was presented by W. Neubauer, K. Locker, A. Eder-Hinderleitner, P. Melichar (regarding the Neolithic circular Ring Dich Systems in Austria), P. Capizzi, P. Cosentino, G. Fiadaca, R. Martorana, P. Massina, L. Romano (regarding the site of Himera at northern Sicily), E. Erkul, C. Klein, W. Rabbel, H. Stuempel (regarding the site of Metaponte in southern Italy), M. Fedi, G. Florio, B. Garofalo, M. La Manna, A. Pontrandolfo, A. Santoriello, F.U. Scelza, M.G. Soldovieri (regarding the site of Fratte in Southern Italy), L. Orlando (magnetics and GPR analysis at a site in central Italy), M. Kats, I. Modin, A. Gidasov, S. Sokolov, A. Pelevin, G. Belova, A. Krol (regarding the site of Kom Tuman, ancient Memphis, Egypt), B. Ullrich, C. Meyer, C. Barlieb (regarding the Munigua moulds in Spain), M. A. Mohamed Ali, H. Burkharft, B. Khalil, T. Herbich, K. Grzymiski, A. El Haj (dealing with the prospection of Meroitic sites - Meroe City at Sudan), A. Kattenberg, C. Gaffney (with respect to magnetic responses of estuarine environment – case studies from the Netherlands and the U.K.), V. Kozlov, M. Kats, I. Modin, A. Gidasov, L. Kurkovskaja, S. Sokolov, A. Pelevin, A. Kalachnikov, P. Pushkarev (regarding the search for ancient Eliko in Greece), M. Pipan, E. Forte, M. Sugan, G. Dal Moro, P. Gabrielli, I. Finetti (on the usage of magnetic gradiometry, 2D electrical tomography and 3D multi-fold GPR at the site of Aquileia, Italy), G. Ranieri, P. van Dommelen, K. McLellan, G.P. Deidda, L. Sharpe, A. Trogu (on the application of geophysical methods within the framework of the Terralba Rural Settlement Project), E. Finzi, R.G. Francese, G. Morelli, N. Praticelli, L. Vettore, A. Zaja (regarding the multi temporal prospection of a roman thermal complex at Montegrotto Thermae in Padova, N. Italy), M. Fedi, G. Florio, B. Garofalo, M. La Manna, C. Pelegrino, A. Rossi, M.G. Soldovieri (on gradiometric and GPR survey at the archaeological Park of Pontecagnano-Faiano, S. Italy). One more presentation addressed the contribution of aerial photography in the discovery of Late Bronze Age settlements in the southern Caucasus.

Sessions on processing, interpretation and visualization of the geophysical data consisted of papers related to the inversion of the resistivity data (M. G. Drahor, G. Gokturkler, M.A. Berge, O. T. Kurtulmus; N. G. Papadopoulos, P.I. Tsourlos, G.N. Tsokas, A. Sarris; G. Ranieri, L. Sharpe, A. Trogu), GPR

visualization and processing techniques (R. Sala, J. Serra, M. Lafuente; O. Hyundok, S. Jongwoo, D. Goodman, Y. Nishimura; D. Goodman, Y. Nishimura, H. Hongo, N. Higashi, H. Inaoka; F. Soldovieri, R. Persico), magnetic processing and filtering techniques (B. Tsivouraki-Papafotiou, G.N. Tsokas; D. Chianese, V. Lapenna, M. Machiato; L. V. Eppelbaum) or other visualization and prospection techniques (M. Watters; J. Thiesson, A. Tabbagh). One more application was presented by A. Godio, L. Sambuelli and L. V. Socco on micro-geophysical prospection of statues in the Museo Egizio of Turin, Italy.

A wide range of applications has been also presented in the session on shallow depth determination. Examples included case studies from Italy (Palatino Hill and the town of Lonato at Brescia) by E. Cardarelli, S. Piro and E. Finzi, R.G. Francese, G. Morelli respectively, Greece (use of electrical tomographies at Marathon) by G. Tsokas, P. Tsourlos, G. Steinhauer, A. Stambolidis, G. Vargemezis and Mexico (GPR measurements at Cacaxtla) by L. Barba, J. Lopez, T. Villa, J. Blancas. GPR prospection at the San Miguel De Los Reyes Hieronymite Monastery at Valencia, Spain was presented by F. Garcia, I. Rodriguez, I. Tort Ausina, J. Moltalva, M. Ramirez, R. Capuz, R. Martinez, J. Benloch. Finally, P. Jaworski, W. Malkowski, T. Mikocki, M. Muszynska, K. Misiewicz and T. Schenk, T. Goldmann, R. Wutzler presented their case studies from Libya and Germany respectively.

Of extreme interest was the session on technical aspects of archaeological prospection. N. Linford, P. Linford, L. Martin and A. Pyne gave an overview of the recent caesium magnetometry surveys carried out by the English Heritage. Even more impressive was the comparison of the different GPR systems and antenna configurations at the Roman Site of Carnuntum, presented by S. Sirri, A. Eder-Hinterleitner, P. Melichar, W. Neubauer. B. Berard and J. M. Maillol moved in a similar presentation on using the rapid multi-offset method of GPR acquisition, while A. Arai, M. Honda, H. Kamei and T. Sekiguchi presented their work on 3D resistivity survey using surface potential. A. Kamei, K. Sato, T. Tsukamoto, I. Kanaya, A. Okamoto, Y. Miyoshi, M.A. Atya and N.M. Ahmed moved in a different direction towards the 3D modelling of Al Zayyan Temple using 3D laser scanners.

The final session of the conference was devoted to the archaeological feedback. G. Gaffney, J. Gater, J. Leckebusch, J. Tychener, J. M. Maillol, B. Berard, M. Forte, S. Pescarin, R. W. Vernon, J. G. Mc. Donnell and A. Schmidt presented their own experiences on the comparison of the results of prospection with the actual archaeological finds. Many more issues were presented through the different poster sessions, while at the same time a technical exhibition offered a first hand experience of the new developments in software and hardware.

34th Annual Meeting and Conference of Computer Applications and Quantitative Methods in Archaeology, Fargo, April 18-21, 2006. The annual CAA conference pro-

vides the premier venue for the presentation and dissemination of studies on state-of-the-art and advanced computer technologies useful in the study of, preservation of, and access to archaeological resources. The conference also attracts museum specialists, graphic artists, geographers, physical anthropologists, design professionals, and more. The theme for CAA2006 is Digital Discovery: Exploring New Frontiers in Human Heritage. Conference papers (long and short forms), symposia, posters, workshops, and roundtable panels are welcome on any topic pertinent to CAA. Topics to be covered at the conference include but are not limited to the following: Virtual Reality Modeling: Site and Architecture Modeling; Augmented and Immersive Environments; Game Engines. Simulations and Complex Modeling: Paleoenvironments; Predictive Modeling; Artificial Intelligence. 3D Data Capture, Manipulation, and Analysis: Object Modeling (laser, CT, photogrammetry, etc.); Object Reconstruction (pottery, bone, etc.); Computer Aided Shape Analysis. Field Applications: Software; Hardware; Wireless Applications; GPS Applications; Geo-Archaeology. Remote Sensing: Subsurface Prospecting; Low and High Altitude Sensing. Mapping and Spatial Technologies (GIS and others): Intra-site; Region and Beyond; Terrain Mapping. Informatics: Databases; Digital Libraries, Archives, Portals; Data Mining; Standards and Best Practices; Internet Applications; Multimedia Presentations. Education: Classrooms; Museums; Other Informal (digital videos, audio tours, TV, etc.); Remote Learning. Cultural Heritage Resources Management: Heritage and the Public (tourism, public trust, etc.); Professional Heritage Management. Bio-Archaeology and Human Biological Heritage: Osteological and Fossil Studies; Mummy Studies; Forensics; Anthropometry; Genetic/Population Modeling. Quantitative Applications: Statistical Analyses; Mathematical Modeling; Predictive Modeling. Archaeometry: Chronology; Provenance Studies. Maritime Archaeology: Data Capture; Nautical; Underwater Sites.

11th International Conference on Ground Penetrating Radar: GPR Advancements: Expanding the Boundaries, Columbus, Ohio, USA, June 19-22, 2006. The 11th International GPR Conference will take place at Ohio State University in Columbus, Ohio. The theme of GPR 2006 was chosen to recognize the significant achievements that have been made in GPR over the past thirty years, and to emphasize the fact that GPR is continuing to evolve technically as applications for GPR expand. The meeting will be held at the Blackwell Hotel on the OSU campus. The topics of the Conference include among others the following: Antennas, Archaeology, Agrigeophysics, Borehole Radar, Concrete/Pavement Evaluation, Data Processing/Display/Interpretation, Environment/Hydrology, Forensics, Geology/Geotechnic Engineering, Glaciology/Ice/Permafrost, Inverse Problems/Tomography, Mining/Tunnelling, NDE/NDI, Numerical Modeling/Analysis, Novel GPR Systems, Sedimentology, Advanced Signal/Image Processing, System Performance, Survey Design/Methodology, Utility Detection, UXO/Mine Detection. Authors are invited to submit papers (minimum of 4 pages) on, but not limited to, the above topics relating to ground penetrating radar for review. Review decisions will be notified by February 24, 2006. Accepted papers should

submit final version in PDF format by April 12, 2006. Depending on the reviewers' recommendation, each accepted paper will be designated for either oral or poster presentation. All accepted papers will be included in the final conference proceeding. More information can be found at <http://gpr.osu.edu>.

Archaeological Soil Science

Jane Entwistle, Associate Editor

Ben Lawers Historic Landscape Project. In the last decade, largely associated with the advent of simultaneous multi-elemental capabilities of inductively-coupled plasma instruments, the geoarchaeological literature has seen a growing number of studies that use multiple elemental distributions, combining both major and trace elements, to identify, and differentiate spatially, specific activities. Despite this, the use of soil chemistry as a complementary investigative tool is often viewed sceptically by archaeologists, and pedologists need to be more rigorous in the application of soil geochemistry in order to improve the technique's profile within the archaeological community. As part of the Ben Lawers Historic Landscape Project (<http://www.benlawers.org.uk/>), a multi-disciplinary research project based on the north side of Loch Tay in the Central Highlands of Scotland, Clare Wilson (Stirling University, UK) and others have been 'ground-truthing' this much used technique. The multi-disciplinary nature of the project provided an opportunity for sampling a documented post-medieval site alongside archaeological and historical investigations. Areas of known function and land-use (e.g., byre, hearth, house, yard, outfield, infield) were sampled to 'ground-truth' the multi-element soil data and initial results are highlighting significant patterns and trends in the geochemistry of these soils and archaeological sediments that may, in part, be explained by patterns of former human activity (Wilson, C.A., Davidson, D.A., Cresser, M.S. [2005] An evaluation of multielement analysis of historic soil contamination to differentiate space use and former function in and around abandoned farms. *The Holocene*, 15 [7], 1094-1099).

SASSA is a web-based system to provide soil science support and advice to archaeologists. The NERC (Natural Environment Research Council, UK), as part of their grant support for 'knowledge transfer', are funding a collaboration between the departments of Biological and Environmental Science and Computing Science, University of Stirling, UK for the development of a Soil Analysis Support System for Archaeologists (SASSA). This web based system is aimed at field archaeologists and curators and will provide access to geoarchaeological information in the form of illustrative case studies, provide decision support on field and laboratory analytical techniques through the use of case-based reasoning and decision trees, and allow exchange of information through user forums and a WIKI engine. One of the main features of SASSA will be its interactive, easy-to-use interface, whose

aim is to foster an improved exchange of experience regarding the application of soil science to archaeology. The development of SASSA will be guided by two advisory groups; an Academic Advisory Group (AAG) to advise on scientific content, and a User Advisory group (UAG) to advise on the structure, content and user interface design of SASSA. To find out more or to become involved, visit the SASSA project website (www.sassa.org.uk).

Forthcoming Symposia and Conferences.

Geoarchaeology 2006 (co-sponsored by the Quaternary Research Association), University of Exeter, UK, 12-15th September. The conference will cover all aspects of geoarchaeology, with sessions on: Fluvial geoarchaeology, floodplains and terraces; Coastal environments and archaeology; Geoarchaeology and environmental change; Soils and archaeology; New techniques in geoarchaeology. Invited keynote speakers include Karl Butzer, Greame Barker and Jim Rose. Further details will shortly be available at <http://www.ex.ac.uk/sogaer> or send submissions (title, authors and abstract) to Professor Tony Brown (a.g.brown@exeter.ac.uk).

Recent books/journals. *Environmental Archaeology* (2005), John Matthews (coordinating editor) (available from Hodder Arnold, price c. £23, ISBN 0-340-80871-3). The text outlines and discusses a range of methods used to reconstruct and interpret past interaction between humans and the environment. *Practical and Theoretical Archaeology* (2005), Paul Goldberg and Richard McPhail (available from Blackwell Publishing, price c. £35, ISBN 0-632-060441). An up-to-date overview of geoarchaeology and how it can be used in the effective study of archaeological sites. *Shaping Medieval Landscapes: Settlement, Society, Environment* (2004), Tom Williamson (available from Windgather Press – www.windgather.co.uk - price c. £20, ISBN 0-9545575-8-1). The influence of environment and geography on the history of the British medieval landscape is authoritatively discussed. *Landscapes*. Published twice yearly, this recently established peer reviewed journal seeks to be both accessible and scholarly. Edited by David Austin, Professor of Archaeology, University of Wales, Lampeter, and Paul Stamper, Lead Inspector for Historic Designed Landscapes, English Heritage. Whilst focus is largely on the British Isles, it also covers subjects outside the UK. See <http://www.windgather.co.uk/landscapes.htm> for more information.

Bioarchaeology

Gordon F.M. Rakita, Associate Editor

Science, Evolution, and the Kitzmiller Decision. As many SAS Bulletin readers may know, on December 20th, 2005, Judge John Jones III of the U.S. District Court for the Middle District of Pennsylvania presented his ruling in the *Kitzmiller et al. v. Dover Area School District et al.* case involving Intelligent Design. The full Kitzmiller decision can be downloaded from <http://www.pamd.uscourts.gov/kitzmiller/>

decision.htm. The relevance of this court case and its outcome is not simply the defense of the theory of evolution (in and of itself an important thing) but the defense of the definition of science.

The case revolved around the policy of the Dover school board to require biology teachers to make a statement at the beginning of ninth grade biology classes that promoted the idea of Intelligent Design. Intelligent design, a theory that holds that some aspects of biological life are too complex to be explained by evolution via natural selection, has become a favored idea of many who seek to restrict the teaching of scientific evolution in public schools and replace it with old creationist arguments wrapped up in fancy new clothes. The basic argument has been around at least since the Reverend William Paley made his argument from design based upon the complexity of mammalian eyes in 1802, but has received modern currency in Michael Behe's *Darwin's Black Box* (The Free Press, 1996).

Despite Behe and other Intelligent Design proponents' vigorous defense of the Dover school board policy during the trial, Judge Jones concluded that the policy constituted a violation of the establishment clause of the first amendment to the U.S. Constitution (as well as violating the Constitution of the Commonwealth of Pennsylvania). Jones found that the Intelligent Design movement was well-demonstrated to be associated with and have historical antecedents in a religious movement. This determination was made in part on the basis of an examination of successive drafts of the book the Dover policy suggested students consult about Intelligent Design (*Of Pandas and People*, Foundation for Thought & Ethics, 1993) which involved wholesale changes of the term "creation" into "intelligent design." These changes coincided with a court decision in 1987 (*Edwards v. Arkansas*) in which the U.S. Supreme Court struck down the teaching of "creation-science" in public schools.

Of greater relevance to SAS members is the court's rejection of Intelligent Design as a scientific theory. The court sided with the U.S. National Academy of Science (NAS, and other scientific organizations like the American Association for the Advancement of Science) in their definition of science. The NAS states in their publication *Science and Creationism: A View from the National Academy of Science* (National Academy Press, 1999, p. 25) that the publications of Intelligent Design proponents "...do not offer hypotheses subject to change in light of new data, new interpretations, or demonstrations of error. This contrasts with science, where any hypothesis or theory always remains subject to the possibility of rejection or modification in the light of new knowledge."

Judge Jones found that while Intelligent Design as a theory may be true, it is emphatically *not* science. Indeed, it fails as science on three grounds. First, it invokes supernatural causation. Second, the irreducible complexity argument is based upon faulty logic (i.e., refutation of some aspect of evolutionary

theory is not confirmation of Intelligent Design theory). Third, that Intelligent Design proponents' attacks on evolutionary theory have been soundly refuted. The judge also held that Intelligent Design has no following in the scientific community, has not generated peer-reviewed publications, and has not been subjected to testing.

Proper logical argumentation, peer-reviewed research and publication, testing of falsifiable hypotheses, and appeals to natural causation are the hallmarks of good science. Yet, Intelligent Design proponents have sought (and continue to seek) to broaden the definition of science to the point where it will accommodate supernatural causes. Indeed, Behe admitted under cross examination in the case that his expanded definition of science would allow astrology to be included in the sciences (M. Behe testimony under cross, October 18th, 2005; Transcripts of the *Kitzmilller* case can be accessed at: <http://www2.ncseweb.org/kvd/?path=trans/>). Ultimately, Judge Jones concluded that "Science cannot be defined differently for Dover students than it is defined in the scientific community..." (p. 70 of his decision).

SAS members have accepted the fact that science as an epistemological standard is a powerful framework for understanding and explaining how the empirical world works. Science is not simple experimentation or quantification, but is a specialized method for establishing the correctness of conclusions and integrating those conclusions into a systematic body of knowledge. In at least this one legal case, the Judicial branch of the government agrees. Does the *Kitzmilller* decision spell the end to the Intelligent Design controversy in the United States? Unfortunately, it does not. The Ohio and Kansas state public school boards continue to tinker with their respective science education standard and the Cobb County school board of Georgia, which a required sticker on Biology texts that proclaims, "evolution is a theory, not a fact." Thus, attacks on science continue, and it behooves SAS members to continue to defend the definition and process of good science.

Upcoming Meetings and Sessions of Interest to Bioarchaeologists. The following are sessions and symposia organized for upcoming professional meetings that may be of interest to Bioarchaeologists:

American Association of Physical Anthropologists, 75th Annual Meeting, Anchorage, Alaska, March 8-11, 2006, see: <http://www.physanth.org/annmeet/> for more information. March 9th - Thursday Morning: From the Arctic to Arizona: A Celebration of Charles F. Merbs' Contributions to Physical Anthropology. Organizer and Chair: Jane E. Buikstra; Skeletal Biology I. Contributed Papers. Chairs: Jo L. Buckberry & Kenneth C. Nystrom. March 9th - Thursday Afternoon: Pre-Contact Forager Adaptations to Northwest Coastal Alaska: The Bioarchaeology of Point Hope. Organizers and Chairs: Charles Hilton, Debbie Guatelli-Steinberg, and Ken Mowbray. March 10th - Friday Morning: Human Biology I: Skeletal Biology, Forensics, Functional Morphology, and Genetics. Contributed Posters. Chair: Graciela S. Cabana. March 10th - Friday

Afternoon: Human Biology II: Skeletal Biology, Growth, and Variation. Contributed Posters. Chair: Lynnette Leidy Sievert; Genetic Perspectives on Human Evolution and Prehistory. Organizer and Chair: Dennis H. O'Rourke. March 11th - Saturday Morning: Skeletal Biology II. Contributed Papers. Chair: Lorena M. Havill.

Society for American Archaeology, 71st Annual Meeting, San Juan, Puerto Rico, April 26 - 30, 2006, see: <http://www.saa.org/meetings/> for more information. April 27th - Thursday Morning: Symposium: Bioarchaeological Insights into Ancient Imperialism: Perspectives from the Old and New Worlds. Organizer: T. Tung, Chair: C. Kellner, Moderator: T. Tung. April 27th - Thursday Afternoon: Symposium: The Dead Tell Tales: Jane E. Buikstra and Narratives of the Past (Part I). Organizer & Chair: M. Lozada. April 27th - Thursday Evening: Symposium: The Dead Tell Tales: Jane E. Buikstra and Narratives of the Past (Part 2). Organizer & Chair: B. O'Donnabhain. April 28th - Friday Morning: General Session: Bioarchaeology. Chair: T. Hailey. April 28th - Friday Afternoon: Poster Session: Bioarchaeology; General Session: Bioarchaeology and Mortuary Analysis in the U.S. Chair: J. Douglass. April 29th - Saturday Afternoon: General Session: Bioarchaeology and Mortuary Analysis in South and Central America. Chair: S. Grasso; General Session: Bioarchaeology and Mortuary Analysis in the Old World. Chair: M. Roskandic; Symposium: In the Wake of the Archaeology of Death: Twenty-Five Years After. Organizer & Chair: J. Johnson & R. Jeske.

Geoarchaeology

David D. Kuehn, Associate Editor

Career opportunities in geoarchaeology have never been better and in this issue of the *SAS Bulletin* I will examine some of the opportunities available to students. These include scholarships, research grants and funds for travel to professional meetings.

GSA – Archaeological Geology Division Student Paper Award. The Archaeological Geology Division of the Geological Society of America offers a Student Paper Award in the form of a travel grant to attend the annual GSA Meeting, the next one to be held in Philadelphia on October 22 – 25, 2006. The award is in the amount of \$650.00 and will be given on the basis of the evaluation of an abstract of a paper or poster to be presented by the student in the Archaeological Geology Division session at the upcoming GSA meeting. The deadline for submissions is usually mid-September. For details and application procedures, check the Division website at: <http://rock.geosociety.org/arch/>.

Claude C. Albritton, Jr. Fund for Archaeological Geology. A memorial fund in honor of Claude C. Albritton is offered under the auspices of the Archaeological Geology

Division of the Geological Society of America. The awards, which total up to \$650.00, are available to graduate students who meet the following criteria: (1) have an interest in obtaining an M.S. or Ph.D. degree in earth sciences or archaeology; (2) have an interest in applying earth science methods to archaeological research; and (3) have an interest in a career in teaching and academic research. Awards are given in the form of scholarships in support of thesis or dissertation research and have an emphasis on field or laboratory aspects of the research. The deadline for submission of applications is March 1, 2006. For more information and an online application, contact <http://rock.geosociety.org/arch/>. The Awards Committee Chair is Scott Pike (pike@lynchburg.edu).

Jonathan O. Davis Scholarship Fund. An annual scholarship to graduate students studying the Quaternary geology of the Great Basin or adjacent areas is available in the form of the Jonathan O. Davis Scholarship Fund. The endowment, administered by the Desert Research Institute, includes a grant in the amount of \$4,000.00 to support field research. The deadline for submission is February 2, 2006. For more information contact Barbara Jackson at (775) 673-7454 (voice). Email: bj@dri.edu. Website: <http://www.dri.edu/Opportunities/JonathanDavis.html>.

Predoctoral Fellowships, Smithsonian Institution. A \$17,000.00 annual stipend is available for predoctoral research at the Smithsonian Institution. This fellowship is open to university students enrolled as candidates for the Ph.D. or equivalent. Applications must include an abstract that outlines the proposed research at the Smithsonian and a statement of why the Smithsonian is appropriate for the research. Research fields covered by the Fellowships include archaeology, geological science, and materials characterization and conservation. The deadline for applications is January 15, 2006 (anticipated). The contact address for the Fellowships is: Office of Fellowships, Smithsonian Institution, 750 Ninth Street NW, Suite 9300, MRC 902, P.O. Box 37012, Washington, D.C. 20013-7012. Email: siofg@si.edu. Website: <http://www.si.edu/ofg/Applications/SIFELLapp.htm>.

Canon National Parks Science Scholars Program. Scholarships ranging from \$1000 to \$78,000 are available to doctoral graduate students who conduct dissertation research in National Parks. The program is co-sponsored by Canon USA, Inc., the National Park Service, the National Park Foundation, and the American Association for the Advancement of Science. Winning students receive \$26,000 per year for up to three years to conduct research while honorable mention winners receive single scholarships of \$1000. The scholarships are awarded in four general research areas: (1) social sciences (drawing on disciplines such as economics, political science, and sociology); (2) cultural sciences (drawing on disciplines such as ethnography, cultural studies, and archaeology); (3) physical sciences (including disciplines such as geology, hydrology, and atmospheric sciences); and (4) biological sciences (including disciplines such as botany, ecology, and conservation biology). The deadline for applications is May 3, 2006 (anticipated).

Contact: Dr. Gary E. Machlis, Program Coordinator, Canon National Parks Science Scholars Program, College of Natural Resources, Room 16, University of Idaho, P.O. Box 441133, Sixth and Line Streets, Moscow, Idaho 83844-1133. Email: gmachlis@uidaho.edu. Website: <http://www.nature.nps.gov/canonscholarships/>.

William P. McHugh Memorial Fund. The William P. McHugh Memorial Fund offers awards to encourage the study of Egyptian geoarchaeology and prehistory. The Fund's goal is to encourage knowledge of Egypt and the Near East through study and research and to aid in the training of American specialists in academic disciplines that require familiarity with Egypt. The amount of the fellowship is \$600.00 and the application deadline is January 5, 2006. Contact address: American Research Center in Egypt, Emory University Briarcliff Campus, 1256 Briarcliff Road, NE, Building A, Suite 423W, Atlanta, GA 30306; arce@emory.edu; http://www.arce.org/fellowships/funded_fellowships.html.

Geoarchaeology Publications. Finally, our readers should be aware of some important developments regarding geoarchaeological publications. First, Blackwell Publishing has announced the impending publication of a new book on geoarchaeology by Paul Goldberg (Boston University) and Rich Macphail (University College London) entitled *Practical and Theoretical Geoarchaeology*. The text will include chapters on sedimentology, stratigraphy, soils, geomorphic environments, human impacts, experimental archaeology, and field and laboratory methods. The book should be widely available by the Spring of 2006 and a review of it will appear in a forthcoming issue of the SAS Bulletin. For more information contact: <http://www.blackwellpublishing.com/0632060441>. There will soon be a new addition of George Rapp and Christopher Hill's book *Geoarchaeology: The Earth Science Approach to Archaeological Interpretation*. A revised version of this important work will be available from Yale University Press in April, 2006. Lastly, the Soil Science Department at the University of Wisconsin, Madison has published the text *Soil Chemical Analysis* by M. L. Jackson. Previously available in xerox-copy form, this popular manuscript has proven a valuable adjunct to archaeological research.

Archaeological Ceramics

Charles C. Kolb, Associate Editor

The column in this issue includes three topics: 1) Death Notices; 2) Reviews of Books on Archaeological Ceramics; and 3) Previous Meetings.

Two of Fred Matson's Students

Robert Harold Johnston (1928-2005), who passed away on 19 October, served in the Marine Corps during World War

II, and then studied art at what was then Kutztown State Teacher's College in Pennsylvania. He earned a master's degree in art from Columbia University and taught at Lock Haven University while simultaneously studying for a doctorate in archaeology at The Pennsylvania State University, which he earned in 1970. His initial archaeological research was in Pennsylvania but some of his earliest foreign archaeological expeditions were to Turkey and Afghanistan. He ultimately made more than 50 foreign expeditions. Johnston started at the Rochester Institute of Technology as Dean of the College of Fine and Applied Arts, a position he held for nearly 20 years. He later was director of the institute's Chester Carlson Center for Imaging Science. Although he is best known for his work in digitizing the Dead Sea Scrolls, Bob also conducted radiographic analyses of Near Eastern pottery. His doctoral committee was chaired by Fred Matson and his dissertation was *Pottery Practices during the 6th-8th Centuries B.C. at Gordion in Central Anatolia: An Analytical and Synthesizing Study* (Pennsylvania State University, University Park, PA).

Louana Mae Engelhart Lackey (1926-2005), a ceramic historian and ethnoarchaeologist, passed away on 9 December. She attended the University of Chicago's Lab School and the Art Students League of New York, and obtained her BA (1972) and doctorate (1978), both from American University in Washington, DC. Fred Matson was the external dissertation committee member. Her dissertation became *The Pottery of Acatlán: A Changing Mexican Tradition* (University of Oklahoma Press, 1982). She conducted research on contemporary potters in Mexico, Central America, Spain, and Italy, and wrote extensively on the work of present-day studio potters and ceramic artists in the United States, Canada, Nepal, South Korea, Latvia, Finland, and Britain. She was also the author of a biography of a Montana ceramic artist, *Rudy Autio* (American Ceramic Society, 2002). Louana was a frequent contributor to *Ceramic Monthly*, author of chapters in two volumes of *Research in Economic Anthropology*, and co-organizer of the Ceramic Ecology symposia held annually at AAA meetings since 1989. At her death she was working on a book on majolica ceramics fabricated in Puebla, Mexico; a colleague will complete this work.

Fred Matson, age 93, currently lives in Baltimore and maintains his interest in ceramic research.

Reviews of Books on Archaeological Ceramics

(Note: due to space limitations, the review of *Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean* will appear in the next issue of the *SAS Bulletin*)

Janet Levy and Andrew Middleton, eds., *Radiography of Cultural Materials*, 2nd ed.; Amsterdam, Boston, Heidelberg, London, and New York: Elsevier (Butterworth-Heinemann imprint), 2005. ISBN: 0-7506-6347-2, 208 pages, \$54.95/£34.00/€49.95 (paper). Editors Lang and Middleton are with the British Museum and have prepared a new edition of the "classic"

original which was published originally in hardcover 1997 (Oxford, UK and Boston, MA: Butterworth-Heinemann) and was designed for use by museum professionals, object conservators, archaeologists, and art historians. The second edition, available in paperback for the first time, includes new case studies and images, as well as entirely original sections on digital imaging, quality control, and animal mummies. The contents include prefaces to the first and second editions, acknowledgements, a list of the ten contributors (most are or were affiliated with the British Museum), nine chapters, and a very detailed 10-page index. Each chapter is accompanied by its own references. The editors note that radiography refers to a process which includes the production of a hard copy image, while radiology is a broader term and its use does not necessarily result in the production of a radiograph (p. vii).

In Chapter 1, "Radiography: Theory" (pp. 1-19, 19 figures, 3 case study boxes), Middleton and Janet Lang (both with the British Museum's Department of Conservation, Documentation and Science) provide essential basic background on the radiation employed in radiography, consider the properties and generation of X-rays, characterize X-ray beams and objects and discuss the Inverse Square Law. Chapter 2, "Radiographic Images" (pp. 20-48, 17 figures, 1 color plate, 3 case studies) has four authors: Lang and Middleton are joined by Janet Ambers (with the museum's Department of Conservation, Documentation and Science), and Tony Higgins (now at the University of Westminster but formerly with the museum's Department of Scientific Research). In the main, the recording of radiographic images is detailed, with splendid discussions of the characteristics of film and paper, xeroradiography, and digital radiography; the latter differentiates direct vs. indirect capture. Image processing, filtering, Fourier transform, stereoradiography, tomography, and "practical" radiography are also reviewed. The subsequent contribution by Janet Levy, "Metals" (pp. 49-75, 26 figures, 3 color plates), reviews the identification of metals, metal artifact function, the problem of corrosion, methods of manufacture, and porosity, casting thickness, and texture. Composite object with soldered joints and welding are also documented, as are finishing processes such as relief decoration and inscriptions. Middleton contributes "Ceramics" (pp. 76-95, 20 figures, 2 color plates), providing a concise discussion of the characteristics of the clay fabric, the identification of inclusions, forming and fabrication techniques, (there is an emphasis on primary techniques: slab-building, moulding, and wheel-throwing), secondary forming, hybrid and composite vessels, and prospects for future analyses.

In Chapter 5, "X-rays and Paper" (pp. 96-111, 18 figures, 2 color plates), Vincent Daniels and Janet Lang provide the reader with a new appreciation of radiography. Daniels is currently with the Conservation Department, Royal College of Art. In this brief essay, the authors discuss the basic methods of examining paper, α -radiography, low energy X-rays, electron transmission and electron emission radiography, and then turn to specific areas of study: paper formation, watermarks, metal particles in paper, paints and inks, and collages. They also explain the importance of selecting the most suitable film for

radiographing paper and discuss issues in developing the film. "Paintings" (pp. 112-129, 16 figures, 7 color plates) by Catherine Hassell (History of Art Department, University College London) provides the reader with a clear discussion of the condition of paintings, layers of painting, supports (panels and canvas), compositional changes, painting techniques, and the detection of forgeries. Chapter 7, "Radiography: Archaeo-human and Animal Remains" (pp.130-154, 26 figures, 6 color plates, 1 case study), is co-authored by Reg Davis (formerly at the Institute of Cancer Research/Physics Department, Royal Marsden Hospital, London) and Janet Ambers (British Museum, Department of Conservation, Documentation and Science). Davis reviews clinical methods and techniques of analysis, considers the advantages of three radiographic techniques, and reviews radiographic survey techniques, illustrating his presentation with discussions of Egyptian and Colombian mummies. He very briefly considers paleopathology and considers Oetzi (the "Ice Man"), and British remains from Christ Church and St. Brides. Ambers is allotted just over three pages to discuss the radiography of animal remains (your reviewer wishes that there was a fuller discussion of this topic).

Fleur Shearman and Simon Dove prepared "Applications of Radiography in Conservation" (pp. 133-174, 22 figures, 1 color plate); both are with the British Museum's Department of Conservation, Documentation and Science. In a brief chapter they are able to cover selected highlights on the topic and review the aims of conservation, the examination of excavated metal objects, artifact and archaeological assemblage identification, repair and restoration, and assessing decoration appearing on metals. The final chapter, "Restoration, Pastiche and Fakes" (pp. 175-187, 8 figures, 1 color plate) by Susan La Nice, who also with the museum's Department of Conservation, Documentation and Science, provides the reader with a glimpse at the issue of object authenticity. She examines the detection and restoration of ceramics, metals, wood, and stone artifacts, and the creation of imitations. Notable examples where radiography is essential are in detecting fakes in banknotes, gemstones, and mummies, and there is a valuable discussion of Sasanian and Risley Park silver vessels.

As the contents of this new edition demonstrate, radiography is an invaluable tool for the study of a diverse array of cultural materials including metals, ceramics, paper, paintings and human and animal remains. These experts in the field have prepared clear, concise, and compelling assessments and case studies of the radiography of different materials, describing the techniques that may be employed. The publication of this second edition brings us up-to-date on radiographic analyses of material culture supplanting both the initial edition of this work and *Imaging the Past: Electronic Imaging and Computer Graphics in Museums and Archaeology*, edited by Tony Higgins, Peter Main, and Janet Lang (London: British Museum, 1996). This new edition of *Radiography of Cultural Materials* is a useful primary reference work as well as a basic text for students interested in the subject. Publisher's website: http://www.elsevier.com/wps/find/homepage.cws_home.

Alan K. Bowman and Michael Brady (eds.), *Images and Artefacts of the Ancient World*; Oxford: Oxford University Press for the British Academy, 2005. 64 pp., halftones, color photographs, figures, ISBN 0-19-726296-1, \$55.00/£35.00 (paper). The 15 interdisciplinary papers in this volume, prepared by engineering scientists, archaeologists, and historians, explore the diverse ways in which recent developments in imaging, image analysis, and image display may be applied to three-dimensional objects of material culture from the classical world in order to enhance our understanding of the time period and context from which the objects came. Seven of the papers are scientific and technical; the other eight have an archaeological or historical focus. These contributions, edited by Alan K. Bowman (Camden Professor of Ancient History, University of Oxford; Fellow of the British Academy) and Michael Brady (BP Professor of Information Engineering, University of Oxford; Fellow of the British Academy), demonstrate how academics and scientists are thinking about subjectivity of interpretation, visual cognition, and the need to improve the presentation of evidence. The editors contend that the historian "acts out a perceptual-cognitive task of transforming often noisy and impoverished signals into semantically rich symbols that have to be set within a cultural and historical context." Engineering scientists, equipped with a range of sophisticated techniques, equipment and highly specialized knowledge are not always as aware as they might be of the range and the exact nature of problems faced by archaeologists and historians in interpreting objects of material culture. By providing the opportunity for scholars from these communities to explain to each other what they are doing and how, the 15 papers explore the ways in which the scientific contributors and the historians are thinking about subjectivity of interpretation, visual cognition, and the need to improve methods of presenting evidence so as to feed directly back into their own scientific thinking and to encourage innovation in their approach to developing methods of image-enhancement and interpretation of objects. In addition, these studies lead to improvements in techniques of providing high quality images of important and valuable collections of original artifacts to scholars who cannot always study the originals directly, e.g. long-distance research. In addition, these imaging techniques also offer the researcher valuable means of documenting original materials which may be fragile or in a deteriorated condition. The volume is profusely illustrated with black-and-white and color images. The 15 papers are revised from oral presentations given at a joint British Academy/Royal Society symposium in December 2000.

The contents include: Michael Brady and Alan K. Bowman, "Introduction" (pp. 1-5); Alan K. Bowman and R. S. O. Tomlin, "Wooden Stylus Tablets from Roman Britain" (pp. 7-14, 6 figures); Michael Brady, Xiao-Bo Pan, Viet Schenk, Melissa Terns and Nicholas Molton, "Shadow Stereo, Image Filtering, and Constraint Propagation" (pp. 15-30, 17 figures [1 in color]); Carlo Vandecasteele, Karel Van Lerberghe, Johan Van Rompay, and Patrick Wambacq, "Digitising Cuneiform Tablets" (pp. 31-34, 3 figures); Jan O. H. Swantesson and Helmer Gustavson, "Interpretation of Ancient Runic Inscriptions by Laser Scanning" (pp. 35-43, 7 figures); Michael Greenhalgh,

“Virtual Reality, Relative Accuracy: Modelling Architecture and Sculpture with VRML” (pp. 45-58, 8 figures [5 in color]); Andrew D. Fitzgibbon, Geoff Cross and Andrew Zisserman, “Automatic Creation of Virtual Artefacts from Video Sequences” (pp. 59-68, 13 figures [2 in color]); Hugh Denard, “At the Foot of Pompey’s Statue: Reconceiving Rome’s *Theatrum lapideum*” (pp. 69-76, 7 figures [3 in color]); Luc Van Gool, Marc Pollefeys, Marc Proesmans and Alexey Zalesny, “Modelling Sagalassos: Creation of a 3D Archaeological Virtual Site” (pp. 77-87, 14 figures [7 in color]); and Andrew M. Wallace, “Three-dimensional Laser Imaging and Processing in an Archaeological Context” (pp. 89-98, 10 figures [2 in color]). The other contributions are: Jan J. Koenderink, “Movements of the Mental Eye in Pictorial Space” (pp. 99-108, 9 figures); Christopher J. Howgego, “The Potential for Image Analysis in Numismatics” (pp. 109-113, 11 figures); Eleni Schindler Kaudelka and Ulrike Fastner, “Italian *Terra sigillata* with Appliqué Decoration: Digitising, Visualising and Web-publishing” (pp. 115-123, 12 figures [1 in color]); Roberto Cipolla and Kwan-Yee K Wong, “Shape from Profiles” (pp. 125-130, 13 figures); R. A. H. Heave and A. J. N. W. Prag, “The Skull as the Armature of the Face: Reconstructing Ancient Faces” (pp. 131-143, 15 figures [7 in color]); and Alf Linney, Joao Campos and Ghassan Alusi, “Reconstruction of a 3D Mummy Portrait from Roman Egypt” (pp. 145-150, 8 figures [3 in color]). The majority of these papers will hold the interest of readers of the *SAS Bulletin*; four contributions have value to ceramic studies, notably, “Digitising Cuneiform Tablets” by Vandecasteele et al.; Wallace’s “Three-dimensional Laser Imaging and Processing in an Archaeological Context”; Schindler Kaudelka and Fastner’s “Italian *Terra sigillata* with Appliqué Decoration: Digitising, Visualising and Web-publishing”; and, particularly, Cipolla and Wong’s “Shape from Profiles.” Each chapter has its own references and there is no index. These highly technical presentations provide the reader with a state-of-the-art assessment of computer imaging and its relationship to archaeological and historical data, objects, and sites. There is further information about the volume’s content and ordering available on the Oxford University Press Internet site: <http://www.oup.co.uk/>.

Raman Spectroscopy in Archaeology and Art History edited by H. G. M. Edwards and J. M. Chalmers; Berlin, Heidelberg, London and New York: Springer, 2005, xxii + 508 pp. ISBN: 0-85404-522-8, \$299.00 (Hardcover). <http://www.springeronline.com/>. This new book highlights the important contributions Raman spectroscopy makes as a non-destructive method for characterizing the chemical composition and structure and in determining the provenance and authenticity of objects of archaeological and historical importance. It brings together studies from diverse areas and represents the first dedicated work on use of this technique in this increasingly important field. Coverage includes: An Introduction to Raman Spectroscopy, including practical aspects of Raman spectroscopy and complementary techniques; Dyes and Pigments; Artefacts; Biological Materials and Degradation; Jewellery and Precious Stones. The book contains a broad selection of real-world examples in the form of case studies to

provide the reader with an appreciation of the procedures that might be employed to derive spectroscopic information from some of the most challenging specimens and systems. Color illustrations of objects of investigation and a database of 72 Raman spectra of relevant minerals are included. With its extensive examples, the volume is of particular interest to specialists in the field, including researchers and scientific/conservation staff in museums. Academics would find it an invaluable reference to the use of Raman spectroscopy. The contents include: Section I: Introduction: Introduction to Raman Spectroscopy; Practical Raman Spectroscopy and Complementary Techniques; Section II: Dyes and Pigments: Overview: Dyes and Pigments; Case Study: Prehistoric Art; Case Study: Painters and Decorators: Raman Spectroscopic Studies of Five Romano-British Villas and The Domus Coedii at Suasa, Italy; Case Study: Xth Century Manuscript Beato de Valcavdo; Case Study: Micro-Raman and GC-MS of Frescoes; Case Study: Field and *in situ* identification of pigments in works of art by micro-Raman and visible-NIR reflectance spectroscopies: a polychrome 16th-century Italian fresco and black-coloured Etruscan pottery; Case Study: The Analysis of Dyes by SERRS; Section III: Artefacts; Overview; Case Study: Raman spectroscopy: a powerful tool for the analysis of museum objects; Case Study: Glasses, Glazes and Ceramics — Recognition of the Ancient Technology from the Raman Spectra; Case Study: Fifteen Years of Artefacts Investigations by Raman Microscopy; Case Study: Phase Analysis of Third Millennium Syrian Ceramics by Micro-Raman Spectroscopy; Section IV: Biological Materials and Degradation; Overview: Biological Materials and Degradation; Case Study: Raman Spectroscopy and Archaeological Biomaterials: Ochred Bones and Resin Tembet; Case Study: Chinese Scrolls and other Fluorescent samples; Case Study: Ancient Textile Fibres; Case Study: Application of Raman spectroscopy to corrosion products; Overview: Jewellery and precious stones; Case Study: Diamonds, Gemstones and Pearls: From the Past to the Present; Case Study: Analysis of nephrite jade using Raman microscopy and X-ray fluorescence spectroscopy; Case Study: Mesoamerican Jade; Section V: Databases; Database of 74 Raman Spectra of Standard Minerals of relevance to metal corrosion, stained glass or Prehistoric rock art; Section VI: Summary: Summary and Future. This expensive and specialized volume provides a current and very detailed assessment of Raman spectroscopy and is not designed for the casual reader. The case studies are persuasive and the ceramic studies especially enlightening.

Excavations on the Site of the Jerusalem International Convention Center (Binyanei Ha’uma): A Settlement of the Late First to Second Temple Period, the Tenth Legion’s Kilnworks, and Byzantine Monastic Complex: The Pottery and Other Finds, Benny Arubas and Haim Goldfus (directors and editors), Supplementary Series Number 60, Portsmouth, Rhode Island: *Journal of Roman Archaeology*, 2005, 296 pp., 209 illustrations. ISBN 1-887829-60-1, list price \$99.00, Web price to individuals \$69.50; ordering information: JRA, 95 Peleg Road, Portsmouth, Rhode Island 02871, USA; Internet site: <http://www.journalofromanarch.com/>, telephone 401/683-1955,

e-mail jra@JournalofRomanArchaeology.com. The volume includes a preface, acknowledgements, and 13 chapters (five with ceramic content), viz.: 1. "Introduction to the excavations" by B. Arubas and H. Goldfus (pp. 1-16); 2. "Pottery of the Iron Age and Persian periods" by G. Lehmann (pp. 17-24); 3. "An Iron Age stone weight and Persian and Hellenistic seal impressions" by G. Barkay; 4. "Pottery and pottery production in the Second Temple period" by A. Berlin (pp. 29-60); 5. "The stone vessels" by B. Arubas and H. Goldfus; 6. "Spindle whorls and loom weights" by B. Arubas and H. Goldfus; 7. "The Roman legionary pottery" by J. Magness (pp. 69-194), including Yuval Goren's "Appendix: The Pottery technology" (pp. 192-194); 8. "The glass" by Y. Gorin-Rosen; 9. "The coins" by G. Bijovsky; 10. "A gemstone" by B. Arubas and H. Goldfus; 11. "Worked bone artefacts" by B. Arubas and H. Goldfus; 12. "The 1968 excavations" by R. Rosenthal-Heginbottom (pp. 229-282); and 13. "Pottery of the late 1st and 2nd c. A.D. from the 1949 excavations" by M. Herskovitz (pp. 283-296). The descriptive ceramic studies and the information presented on the kilns are valuable contributions to ceramics and archaeology.

China Westward: Bibliography and Research Guide: Chinese Porcelain and East-West Maritime Trade, 12th to 15th C., Pei-kai Cheng, chief editor, and Guo Li, Maggie C. K. Wan, Sharon Wai Yee Wong, editors. Hong Kong: Chinese Civilisation Centre, City University of Hong Kong, 2005. ISBN 962-8885-49-9, bilingual Chinese and English, HK \$118.00. To order, telephone (852) 2110 0019, fax (852) 2120 0029 or e-mail service@cp1897.com.hk [office hours are Monday-Friday 9 a.m.—5:30 p.m.]. This volume derives from a research project at the Chinese Civilisation Centre, City University of Hong Kong. Entries are arranged by subject matter into seven categories: Archaeological Discovery of Ceramics (sub-divided into geographical sections, e.g. Fujian, Zhejiang), Study of Ceramics, Export of Chinese Ceramics, Chinese Ceramics in Southeast Asia, Underwater Archaeology, History of Navigation and Maritime Trade, and Scientific Testing of Historical Ceramics. Within each category the entries are listed by date, beginning with the earliest, instead of alphabetically by author. This unusual bibliographic structure gives the reader a better idea of how the research has been advanced, but if one is looking for a specific author, there is a useful index of authors at the end of the volume. Six indices allow the book to be subtitled a "research guide." While all the entries are in English language publications, extensive Chinese research on ceramics is not included, but the volume provides Chinese translations that can be used as a standard by Chinese researchers. The earliest entry is for Fay-Cooper Cole, *Chinese Pottery in the Philippines* (1912-1913). The cover illustration depicts a Chinese dish from the Royal Nanhai (c. 1460) shipwreck, which is in the collection of the Southeast Asian Ceramics Museum.

Materials Issues in Art and Archaeology VII, Pamela Vandiver, J. Mass, A. Murray, and J. Merkel (eds.). Proceedings of the Materials Research Society Volume 852, Warrendale, PA; Materials Research Society, 2005, xxiii + 378 pp. ISBN 1-

55899-800-4; \$75.00 members, \$86.00 U.S. list price, \$99.00 non-U.S. list price. Ordering information at <http://www.mrs.org/publications/books/>. Nine of the 38 papers in this volume concern ceramics; the titles of these articles, authors' names, and the abstracts follow. "The Role of Microstructure, Nanostructure and Composition in the Brilliant Red Slip of Roman Terra Sigillata Pottery from Southern Gaul" by Philippe Sciau, Sabrina Relaix, Yolande Kihn, and Christian Roucau (pp. 241-246). Abstract: Terra sigillata ceramic is a fine ware produced during the Roman period. Its great success was due to its remarkable gloss, also called slip, which provides a bright deep red aspect. TEMEELS and XRD techniques were used to understand the sub-microscopic origins of this singular aspect. Analysis investigations on five samples of two important Gaul workshops are described here. It appears that those samples have the same slip structure: sub-microscopic hematite and corundum crystals in a glass matrix. The matrix does not contain metallic ions, hematite is substituted in Al and Ti while corundum is substituted in Fe. The two crystal populations are homogeneously dispersed in the matrix and, together, give the specific red-orange colour to the sigillata.

"Craft Knowledge as an Intangible Cultural Property: A Case Study of Samarkand Tiles and Traditional Potters in Uzbekistan" by Pamela B. Vandiver (pp. 331-352). Abstract: Reverse engineering past craft technologies involves using the basics of materials science and engineering to a new end: their preservation and continuation. Examples are presented of the glazed tile technologies of Samarkand, Bukhara and other Silk Route cities of Uzbekistan that date from the thirteenth century A.D. but that continue to the present. The UNESCO charter for the preservation of Intangible Cultural Properties has enlightened the goals and results of the research and has linked together archaeological materials research and conservation science in an exciting new partnership.

"Understanding Bronze Age Faience in Britain and Ireland" by Alison Sheridan, Katherine Eremin, and Andrew Shortland (pp. 217-229). Abstract: Around 350 Bronze Age faience beads and pendants are known from Britain and Ireland, mostly from burials of cremated human bone. Their relationship with Near Eastern and Mediterranean faience has long been debated. A National Museums of Scotland (NMS) led international research project is investigating their origin, composition, manufacture and use (*inter alia*) for a *Corpus* of faience from Britain, Ireland and adjacent parts of mainland Europe. Non-destructive controlled-pressure scanning electron microscopy with energy dispersive microanalysis (CP-SEM-EDS), X-ray fluorescence (XRF) and binocular microscopy provide compositional and textural information without sampling or coating. Wavelength-dispersive electron microprobe (EMP) analysis of rare polished samples provides additional and more accurate compositional information. The results demonstrate that direct derivation from Egyptian or Mediterranean faience traditions can be ruled out. The beads and pendants were manufactured on a small-scale basis, using mostly a mixed alkali paste and glaze from plant ash sources (including seaweed) and a copper-based glaze colorant probably derived from bronze. Tin (or its oxide) seems

to have been deliberately added. Various forming and glazing techniques were used. We have demonstrated, for the first time, that some beads were worn during cremation; and we have further investigated the effects of cremation on faience by experimentally cremating a pig wearing a newly-made faience necklace.

“Technical Study of Pigments and Paintings in Archaeological Ceramics From Northwestern Argentine Region: An Archaeometric Approach and Implications for Their Conservation through SEM-EDS” by Guillermo A. De La Fuente (pp. 255-262). Abstract: The ancient technology involved in the application of pigments and paintings used by potters to decorate ceramic vessels is one of the most interesting aspects of ceramic technology in the past. Potters have used in the past several sources to decorate the vessels in order to achieve the colours desired and fix them in the vessels throughout the firing process. We present the results of a technological and chemical characterisation of pigments and paintings through the application of Scanning Electron Microscopy-Energy Dispersive Spectroscopy to ceramics from the Middle Period (ca. 650 AD – 900 AD) at Northwestern Argentine region.

“Investigations of the Decorative Techniques and Conservation Condition of a Majolica Altar by Andrea della Robbia” by Michela Ombelli, Costanza Miliani, and Assunta Morresi (pp. 73-80). Abstract: A multi-disciplinary approach that involved chemical and microstructural characterization was used to aid technological interpretation and conservation condition evaluation and treatment of a della Robbia ceramic masterpiece. The majolica altar was manufactured by Andrea della Robbia in 1490 and has been preserved at St. Mary of the Angels in Assisi, Perugia, Italy. This study characterized the glaze and pigments used by the artist, and furthermore, present information used to establish guidelines for restoration.

“Raman μ -Spectrometry, A Unique Tool for on-Site Analysis and Identification of Ancient Ceramics and Glasses” by Ph. Colomban (pp. 265-279). Abstract: Raman micro-spectroscopy allows remote, non-destructive analysis of materials. Our laboratory was among the first to apply this technique to frescoes, oil and parchment painting. For five years we have focused our efforts on horn, ivory, tortoise shell and ancient ceramics and glasses. Crystalline and amorphous phases can be identified in both body and surface layer, including the glaze/glass-coloring nanosized pigments (e.g. in lustre ware, the first nano-optic device). Recent generation instruments are portable, which allows for on-site examination, for example, in a museum. In nanostructured, nanocrystalline/amorphous silicate glasses, glazes and most of their pigments, Raman parameters and their multivariable analysis are used to recognize compositions as well as to classify them as a function of their processing. This overview addresses the procedure, choice of the exciting radiation, control of the Raman resonance, data processing and extraction of relevant parameters such as the index of polymerization and different signatures that may be characteristic of specific glazes and pigments. Didactic examples are chosen among pottery that representative of the

different production technologies used in the Roman, European (Medici, Meissen, Chantilly, Mennecey, Saint-Cloud, Sèvres), Islamic (Iznik, Kütahya, Safavid) and Asian (Vietnam) worlds.

“Recent Case Studies in the Raman Analysis of Ancient Ceramics: Glaze Opacification in Abbasid Pottery, Medici and 18th Century French Porcelains, Iznik and Kütayha Ottoman Fritwares and an Unexpected Lapis Lazuli Pigment in Lajvardina Wares” by Ph. Colomban (pp. 153-160). Abstract: We demonstrate the potential of Raman spectroscopy as an on-site technique for the characterization of ancient ceramics. This non-destructive analysis offers a way to get information on the process and even sometimes on the date of ancient artifacts. Much information remains written in the microstructure of ceramics bodies and in the nanostructure of glasses, glaze and enamels. Raman signatures are specific to the technology that was applied to a given starting batch and to the process of manufacture. Recent studies that demonstrate: i) the use of cassiterite for opacification and its role in Islamic three-color wares and polychrome lustred pottery from the Abbasid to Fatimid period, ii) the invention of the “hybrid-paste porcelain” by the Duke of Medici, known as Medici porcelain and of the “softpaste” porcelain by the French manufactures in the eighteenth century (Chantilly, Mennecey, Saint-Cloud), iii) the development of the underglaze pigment technology by Iznik and then Kütayha Ottoman potters, iv) the use of lapis lazuli gem as an unexpected pigment in the Iran Lajvardina wares. Finally we explore the relationship between glass makers and potters.

“Estimation of Firing Temperature and Compositional Variability of Archaeological Pottery by Differential Scanning Calorimetry” by A. Giordana, E. Peacock, M. McCarthy, K. Guilbeau, P. Jacobs, J. D. Seger, and W. G. Ramsey (pp. 311-317). Abstract: Digital Scanning Calorimetry (DSC), a thermal characterization technique, can be used to rapidly obtain a rough upper estimate of the firing temperature of archaeological pottery as well as an indication of its composition. The technique involves heating a small sample (10-20 mg) of ground ceramic above the vitrification temperature, cooling and reheating. The curves of the two heating cycles are then compared. The validity of the technique was evaluated by a blind test in which 35 tiles fired at different temperatures were analyzed without knowing their firing point, and by analysis of archaeological pottery samples assumed to be local or imported based upon stylistic criteria.

“Morphological and Chemical Analyses of Manganese Dioxide Accretions on Mexican Ceramics” by Caitlin R. O’Grady (pp. 183-192). Abstract: Microscopic analysis of West Mexican ceramics in the collection of the Department of the Arts of Africa, Oceania and the Americas at the Metropolitan Museum of Art has established five different morphological types of manganese dioxide (MnO₂) accretions. The accretions result mostly from a combination of bacterial and weathering activity in postdepositional contexts. Optical microscopy, scanning electron microscopy with energy dispersive x-ray analysis (SEM-EDS) and x-ray fluorescence (XRF) were

successful; whereas microchemical spot tests, x-ray diffraction (XRD) and Raman spectroscopy proved inconclusive in the identification and differentiation of the five morphologies. Accretion morphology and substrate characteristics, together, suggest scenarios for the mechanism of formation and offer a qualitative tool for authentication. Accretions were documented using photomicrography, categorized based on empirical observations; sampled and analyzed using SEM-EDS and NDXRF.

Previous Meetings

The *2nd International Conference on Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean: Archaeology and Archaeometry* was held in Aix-en-Provence, Marseille, and Arles, April 13-16, 2005; details are provided on the Internet site: <http://www.mmsch.univ-aix.fr/lrcw2/index.htm>. The presenters and their papers included, in the main, European scholars. John W. Hayes (Oxford, Honorary Conservator at the Royal Ontario Museum) gave the inaugural paper, and, in the "First Session: Recent Researches on Production Centres," Dominique Pieri (Université de Paris I) presented an invited paper: "Les centres de production d'amphores en Méditerranée orientale durant l'Antiquité tardive: état de la question." Five other presentations were made: S. Santoro and E. Pinotti, "Cooking wares produced in Italy and exported in the Mediterranean: a first archaeometrical and archaeological revision on the base of a digital data bank"; N. Poulou-Papadimitriou and E. Nodarou, "La céramique protobyzantine de Pseira: la production locale et les importations"; A. Yamgaki, "Amphores Crétoises: Les Types TRC10 et TRC12"; A. Vokaer, "La Brittle Ware en Syrie de l'époque byzantine à l'époque omeyyade"; and J. Nacef, "L'atelier d'Henchr ech Chkaf (Tunisie)." The "Second Session: Archaeometry and Origin of the Mediterranean Ceramics: New Perspectives" began with an invited presentation by Claudio Capelli (Università di Genova, Italy) with the collaboration of Michel Bonifay (CNRS, Aix-en-Provence), "Approche archéométrique et archéologique des productions africaines de l'Antiquité tardive"; followed by four papers: G. Guiducci, "Late Roman cooking ware from Dyrrachium (Albania): a first morphological and archaeometrical approach"; Y. Waksman and J.-C. Treglia, "Marmites et poêles "égéennes": le répertoire typologique des exportations à longue distance et leurs caractéristiques géochimiques"; G. Schneider, M. Daszkiewicz, K. Bartl, and A. Vokaer, "Some new results of archaeometrical analysis of Brittle wares"; and C. Brun, "Etude technique des céramiques de l'atelier de Sidi Khalifa (Pheradi Maius, Tunisie): céramiques culinaires et sigillées." The "Third Session: Typology, Chronologie and Contents of Mediterranean Amphorae 5-7th c" was initiated by an invited paper by Nicolas Garnier (LNG, Clermont-Ferrand), "Analyse chimique des résidus organiques amorphes conservés dans les amphores," with seven accompanying presentations: F. Amores Carredano, E. García Vargas and D. Gonzalez Acuña, "Late Roman amphorae at Hispalis (Seville, Spain) and the Mediterranean trade"; R. Baldassari and E. Monti, "I contenitori da trasporto a Classe e

a Ravenna tra V e VII secolo"; A. Opait, "From Dr 24 to LR Amphora 2"; K. W. Slane, "LR Amphora 2 in the NE-Peloponnese"; A. Sazanov, "Les amphores méditerranéennes d'époque protobyzantine au nord de la Mer Noire: chronologie et typologie. Synthèse"; A. Ardet, "Les amphores daciques entre le IVe et le VIIe s"; and H. Hassani, "Amphores de l'Antiquité tardive au Maroc."

The "Fourth Session: Regional Contexts, 1: Mediterranean" featured an invited paper by Paul Arthur (Università di Lecce, Italy), "Pots and boundaries: On cultural and economic areas between Late Antiquity and the early Middle Ages." Five other presentations were: D. Bernal Casasola, "Contextos cerámicos en el área del estrecho de Gibraltar (ss. V-VII d. C.): Análisis regional de la dinámica comercial tardo romana"; A. V. Ribera i Lacombay, M. Rosselló Mesquida, "Contextos cerámicos de mediados del siglo V en Valencia y sus alrededores"; A. Augenti, R. Branzi Maltoni, A. Cirelli, and B. Tulli, "Ceramica comune di uso domestico e da cucina a Classe e Ravenna tra V e VII secolo d.C."; V. Carsana, V. D'Amico, and L. Del Vecchio, "Nuovi dati ceramologici per la storia economica di Napoli tra tardo antichità ed altomedioevo"; and M. Aoyagi, T. Mukai, and C. Sugiyama, "Céramique tardive d'un site romain de Somma Vesuviana, Italie." The "Fifth Session: Regional Contexts, 2: Southern Gaul" began with an invited paper by Claude Raynaud (CNRS, Lattes), "Vaisselle commune en Gaule du Sud-Est à la fin de l'Antiquité: Production et diffusion", followed by a workshop with a hands-on presentation of the pottery collections from excavations in Marseille. The "Sixth Session: Shapes and Functions of Mediterranean Cooking Wares 5-7th c" commenced with an invited presentation by Miguel A. Cau Ontiveros (Institutió Catalana de Recerca i Estudis Avançats – ICREA/universitat de Barcelona - ERAUB, Espagne), "Mediterranean Late Roman Cooking Wares: Some Evidences from the Balearic Islands and the Iberian Peninsula." The other papers were: A. C. Ramos, R. R. De Almedia, T. Laço, and C. Viegas, "Les céramiques communes du VIe s. du complexe industriel de salaisons de poisson de Lagos (Portugal)"; J. Ikäheimo, "Cooking in the Eternal City: Five Centuries of Cookware from Ancient Rome"; P. M. Blanc, "La céramique commune en pâte basaltique de Syrie du Sud (IVe - VIIIe s.), technologie et typologie"; A.-S. Martz, "Les vases à cuire de Zeugma aux Ve-VIIe s"; M. Daszkiewicz, E. Bobryk, and G. Schneider, "Analysis of the functional properties of kitchenware"; and K. Carr, "Late Roman Coarse Wares and cooking wares from Leptiminus, Tunisia." The "Eighth Session: Late Roman Pottery and Economic History" had an invited paper by S. Loseby, (University of Sheffield), "Pottery and the economic history of Late Antiquity", followed by five papers: F. A. Cuteri, M. T. Ianelli, M. Paoletti, and A. Battista Sangineto, "La Calabria tra Tarda Antichità ed Alto Medioevo attraverso le indagini nei territori di Vibona Valentia, della Massa Nicoterana, di Stilida-Stilo: Ceramiche, commerci, strutture"; S. Genovesi and M. Paoletti, "Le anfore tardoantiche della villa di S. Vincenzino a Cecina (III-I sec. d. C.): Un possibile modello per le Ile dell'Etruria settentrionale costiera?"; A. F. Ferrazzoli and M. Ricci, "Elaiussa Sebaste: productions and trade of a Cilician city from V to VII cent. A.D."; J. Lund,

“Transport amphorae as a possible source for the economic history and land-use of the Akamas peninsula, Western Cyprus, ca. 300 BC-AD 700”; and S. Gabrieli, A. Kaldelis, and M. P. C. Jackson, “Stumbling into the darkness: trade and life in post-roman Cyprus.” Closing remarks about the conference were presented by J. Gurt (Universitat de Barcelona, Spain).

The poster session included 45 presentations: Alfano, M. Rinaldi, and S. Schiavo, “Common wares from ancient Volcei morphological and archaeometrical analyses”; L. Alapont and C. Ballester, “Ánforas y cerámica común de un conjunto funerario de Alcasser (Valencia)”; F. Amores Carrdano, E. García Vargas, D. González Acuña, and J. López Torres, “Late Roman coarse and cooking wares at Hispalis (Seville, Spain: a first typology and its contexts (V-VII)”; D. Artizzu, S. Cara, and R. M. Manuza, “Materie prime e tecniche utilizzate nella produzione locale di ceramica comune a Sinnai (Sardegna-Italia)”; D. Benea, “Centres de poterie romaine tardive dans le sud-ouest de la Dacie”; C. Bonanno, “Caronia Marina (Messina): l’insediamento in località Pantano”; F. Burragato, M. Di Nezza, A. F. Ferrazzoli, and M. Ricci, “Late Roman I amphora types produced at Elaiussa Sebaste: archaeometrical analysis”; V. Cabras, “Studi di diffusione e distribuzione di una classe ceramica e delle sue imitazioni”; S. Cara and S. Sangiorgi, “La ceramica grezza proveniente da due scavi archeologici nella città di Cagliari (Sardegna-Italia): definizione di possibili attestazioni alla Pantellerian Ware”; F. Carboni, “Rome, thermes de Trajan: contextes d’abandon (Ve-VIe siècles)”; G. Cassani, and M. Odone, “Olle altomedioevali all’interno del castello di Atlimis (Ud), Italia”; Y. Cerova and M. Bonifay, “Céramiques culinaires des Ve-VIe s. à Byllis (Albanie)”; F. Chiocci, “Corti (SV), Liguria: la ceramica da cucina di produzione regionale dagli strati di V-VI sec. d. C.”; C. Corti, N. Giordani, and A. G. Loschi Ghittoni, “La circolazione delle anfore tra tardoantico e altomedioevo nell’antica Emilia: il contributo delle analisi archeometriche”; C. Corti and A. G. Loschi Ghittoni, “Produzione di ceramiche ad Impasto grezzo nelle aree del medio corso del Po tra tardoantico e altomedioevo: la bassa pianura modenese e il delta padano”; D. Cottica, “At the edge of the Empire: coarse wares from late antique Galatia”; and X. Deru, “La céramique commune et les amphores dans les horizons tardifs de Reims (Marne).”

Other posters included those by M. Di Filippo and B. Toro, “Vertical magnetic gradient survey to detect buried kilns: the Arva archaeological site”; P. Dyczek, “Amphorae from Valetudinarium at Novae (Moesia Inferior)”; J. A. Expósito Álvarez and D. Bernl Casasola, “Ánforas orientales en el extremo occidente: Las importaciones de LR1 en el sur de Hispania”; A. Fernández Fernández, S. Vieito Covela, and F. E. Pérez Losada, “Influencias mediterráneas sobre producciones tardías regionales en el noroeste peninsular: la cerámica de engobe rojo de la villa de Toralla (Vigo)”; V. Gagliardi, “Le anfore e la ceramica fine da mensa del territorio dell’antica Kaulonia: nuovi dati sull’economia dei Bruttii in età tardoantica”; C. Guarnieri, G. Montevicchi, and C. Negrelli, “Contesti di età tardoantica da recenti scavi urbani faentini: residenze e distribuzione delle ceramiche da cucina e da

trasporto”; K. W. Jacobsen, “Transport Amphorae in the Copper Mining Industry of Cyprus”; R. Domínguez, Járrega, “The end of the roman amphorae in the coastal Hispania Tarraconensis (Catalonia) in the 6th-7th centuries: The flat-based amphorae”; E. Klenina, “Kitchen pottery 4th-6th C. AD from Novae: The relationships between form and function”; F. Marty, “Les céramiques communes tardo-antiques du golfe de Fos (Bouches-du-Rhône)”; F. Maselli Scotti, V. Degrassi, D. Gaddi, and L. Mandruzzato, “Amphorae and coarse ware from the Late Roman-early Medieval layers of the ‘Lotto 8, Cittavecchia’ site at Tegerste/Trieste (Italy)”; C. Maudet, T. Silvino, M. Duffraisse, and C. Hänni, “Analyses génétiques des résidus organiques conservés dans les amphores de Parc saint-Georges à Lyon”; B. Maurina and C. Capelli, “Anfore tardoantiche dall’insediamento fortificato di Loppio-S. Andrea (Trentino, Italia)”; C. Mengarelli, “Località Colle Palazzo (Velletri Roma): la ceramica dal contesto tardo antico”; P. H. Mills and N. Beaudry, “The ceramic coarse wares from the basilica excavations at Ras el Bassit”; P. Monsieur and H. Verreyke, “Amphores tardives au Picenum (Marches, Italie)”; and N. Nin and P. Reynaud, “Céramique commune, céramique culinaire et amphores de l’Antiquité tardive à Aix-en-Provence: les sites des Thermes et de la Seds.”

Posters were also presented by T. Patilli, “La ceramica comune di Ferento (Viterbo)”; E. Pellegrino, “Les céramiques de l’Antiquité tardive à Xanthos, le secteur de la maison du Nord-Est de l’acropole lycienne”; J. Piton and M. Bonifay, “Amphores africaines tardives à Arles (France)”; S. Polla and C. Capelli, “Aspetti produttivi e proprietà funzionali della ‘calitic ware’”; C. Toskay Evrin, “Preliminary observations on the Kelenderis (Aydincik-Rough Cilicia)-Yılanlı Island Shipwreck: cargo amphorae and a jug”; S. Vargas, T. M. Casal, R. López, M. Moreno, and E. Salinas, “Contextos cerámicos tardo antiguos en Corduba”; S. Vargas, E. Castro, M. Moreno, and G. Pizarro, “Los conjuntos cerámicos tardo antiguos de un edificio cristiano en el sector occidental de Corduba”; V. Vidrih Perko, M. Zupanèè, and B. Zbona Trkman, “Contribution to the Local Production of Istrian Amphorae”; C. Viegas, “Les céramiques tardives dans les sites du sud-ouest de la péninsule ibérique”; A. Waldner, “La céramique culinaire d’Ephèse: vue d’ensemble des récipients de cuisine utilisés pendant l’Antiquité tardive”; and D. Williams, “Roman Amphorae: A Digital Resource.”

The *Southeastern Archaeological Conference* annual meeting held 2-6 November 2005, in Columbia, South Carolina, was the site of a session entitled “Historic Low Fired Earthenwares in the Carolinas.” The papers (<http://www.southeasternarchaeology.org/2005seac.html>) elucidated what historical archaeologists know currently about the origins, production and meaning of low fired earthenwares referred to as Colonoware, Colono-Indian ware, and River Burnished or Catawba pottery. The presentations examined old questions and recent research into these wares. The session was organized by Natalie Adams of New South Associates and Carl Steen of Diachronic Research Foundation. Presenters include Carl Steen, Chris Espenshade, Nicole Isenbarger, Ron

Anthony, Matthew Tankersley, Linda Carnes-McNaughton, Tom Beaman, Brett Riggs, Steve Davis, and Mark Plane. At the end of the session there was a show-and-tell discussion moderated by Natalie Adams.

The *72nd Annual Meeting of the Eastern States Archaeological Federation* was held from 9-13 November 2005 in Williamsburg, Virginia. Among the 42 papers presented, three concerned ceramics: Mitchell T. Mulholland, F. Timothy Baker, and Timothy Binzen (U Mass Archaeological services), "Rhyolites, Flints, Pots, Baskets, and Beads: A Historic Period Native American site in Hingham, Massachusetts: A Work in Progress"; Brad Duplantis (Louis Berger Group, Inc.). "Inner Coastal Plain Woodland Period Pottery Assemblages from 44SN244, Southampton County, Virginia"; and John Mullin, Megan Rupnik, and Robert Hunter (Louis Berger Group, Inc.), "The Sycolin Pottery: A Previously Unidentified Early 19th Century Kiln in Loudon County, Virginia."

The *Southeast Asian Ceramics Museum*, Bangkok University, Rangsit campus, was the site for a lecture entitled "Otein Taung: A Medieval Earthenware Production Site at Bagan, Myanmar", given by Bob Hudson on November 26, 2005. Hudson, who has conducted fieldwork in Myanmar, currently holds an Australian Research Council Postdoctoral Fellowship and is with the Archaeology Department, University of Sydney, Australia. He reported on two large mounds at the Burmese capital, Bagan (Pagan), known as Otein Taung or 'pottery hill', which comprise layers of ash, charcoal and potsherds. Excavations were conducted by Hudson and Nyein Lwin of the Archaeology Department, Bagan. Radiocarbon dates suggest that this open-field earthenware firing site operated over six centuries, both before and after the 11 to 14th centuries' Bagan period. Excavations revealed an extensive range of domestic utensils, building materials and religious artifacts. The lecture focused on the range of pottery produced, and how the site relates to Bagan and to the original potters. He also reported on the current status of the site, which is in the midst of a somewhat controversial restoration program.

The *American Anthropological Association 104th Annual Meeting* held in Washington, DC, November 30 to December 4, 2005 featured the presentation of 2,850 papers or posters. Among these were 13 papers on ceramics. Ten of these were in Ceramic Ecology XIX: Recent Research on Ceramics 2005 and the names of the presenters and their affiliations, titles, and abstracts were listed in the previous *SAS Bulletin* 28(4), 2005. The three other ceramics papers were: Byron Hamann (University of Chicago), "Nahuatl Potsherds," which detailed the use of sherds in Late Postclassic and early Colonial periods of central Mexico as a part of a linguistic category of "things used up"; Aribidesi Usman (no affiliation listed), "An Initial Assessment of the Production and Exchange of Pre-19th-Century Ceramics on the Northern Frontier of Old Oyo Empire, Central Nigeria," which reported INAA data on 201 excavated specimens from northern Yoruba; and Deborah Winslow (University of New Hampshire), "Common Markets, Community Commitments: Sri Lankan Potters in Transition,"

which documented the shift from wheel-made pottery to the use of mechanical presses and associated cultural changes as seen over a 30-year period.

The *2005 Jamestown Conference*, hosted by the Jamestown Rediscovery Project and Colonial Williamsburg, was held on 1 December 2005 in Williamsburg, Virginia. One paper among 16 presentations dealt exclusively with ceramic materials. Seth Mallios (San Diego State University, South Coastal Information Center) presented "A New Dating Technique for Historical Sites: Vessel-Based Temporal Histograms." Additional information is available at <http://www.apva.org/jtconf.htm>.

The *107th Annual Meeting of the Archaeological Institute of America* was held 5-8 January 2006 in Montréal, Québec, Canada. There were 20 presentations that focused on ceramics, including three posters; one session with 7 papers was devoted to ceramics. This session was entitled "Evidence from Ceramics" and chaired by John Oakley (American School of Classical Studies at Athens): "Etruscan Pottery and Pithekoussai" by Angela Murock Leatherman (University of Massachusetts, Amherst); "Ionian Renaissance? Late Fifth- and Fourth-century B.C. Amphora Types in the Eastern Aegean" by Mark L. Lawall (University of Manitoba); "The Chalcidike Painted Ware from Argilos: New Evidences of Ionian Migration in Northern Greece at the End of the Sixth Century B.C." by Martin Perron (Université de Montréal); "Elyminization, not Hellenization?" by Jeanette M. Cooper (University at Buffalo); "From Sherds to Behavior: The Distribution of Attic Black Gloss in Sicily" by Justin St. P. Walsh (University of Virginia); "Lerna in the Peloponnese: Geometric through Classical" by Brice Erickson (University of California at Santa Barbara); and "Reanalysis of Tarsus Lead Glaze Ware Production" by Billur Tekkok (University of Cincinnati). Another session, "Early and Middle Bronze Age Crete and Thera", was chaired by John Cherry (University of Michigan) and included "Site History, Sequences, and Gaps: Ceramic Continuity and Change at Akrotiri, Thera at the Onset of the Middle Bronze Age" by Irene Nikolakopoulou; and "Excavations at Akrotiri, Thera" by Peter M. Day (University of Sheffield) and David E. Wilson (University of Western Ontario). The session "Food and Identity" was chaired by John Donahue (The College of William and Mary) and included "Garum and Romanitas in Roman Crete" by Jane E. Francis (Concordia University).

The Gold Medal Colloquium for Joseph and Maria Shaw: Harbors and Foreign Connections in the Aegean, January 6, organized by Philip Betancourt (Temple University) and Nanno Marinatos (University of Illinois at Chicago), incorporated "Minoanization at Miletus: The Middle Bronze Age Ceramics" by Amy Raymond (University of Toronto), the symposium, "Pompeii", chaired by Christopher Parslow (Wesleyan University), and "All Fired Up: The Architectural Terracotta Industry of Pompeii" by Benjamin Costello, IV (State University of New York at Buffalo). The session "Image and Context" chaired by Gerald Schaus (Wilfrid Laurier University) had two ceramic papers: "Lakonian Black-Figure Kylikes: Tyrtaeus and

the Phidition” by Ciara Van Velsor (State University of New York at Buffalo); and “The Forger’s Art: A Black-Figure Column Crater at the University of Ottawa” by Antonia Holden (University of Ottawa) and Judy Logan (Canadian Conservation Institute). The poster session included three contributions on ceramics: “All Fired Up: The AIA Tucson Greek Kiln Project” by Jared Benton and Jennifer Kendall (University at Buffalo, SUNY), Eleni Hasaki (University of Arizona), and Alan R. May (Tucson Society of the AIA); “Late Neolithic Pottery from Wadi Ziqlab, Jordan” by Kevin T. Gibbs (University of Toronto); and “Painters on Pots?” by John Muccigrosso (Drew University). A Joint AIA/APA Colloquium, “The Athenian Agora: Celebrating 75 Years of Discovery,” was organized by Stephen Tracy (American School of Classical Studies at Athens) and included two presentations on ceramics: “The Persian Destruction Deposits and the Development of Pottery Research at the Excavations of the Athenian Agora” by Kathleen Lynch (University of Cincinnati), and “Ostraka from the Athenian Agora” by James P. Sickinger (Florida State University). A symposium entitled “Ancient Corinth,” chaired by Guy D. R. Sanders (The American School of Classical Studies at Athens), incorporated “Funerary Ritual at Kenchreai: Pottery from the Roman Cemetery” by Melissa Morison (Grand Valley State University). Lastly, a colloquium entitled “Archaeological Projects of the American Academy in Rome” and chaired by Archer Martin (American Academy in Rome), had a paper, “Italian Bronze Age Pottery and Twenty-First-Century Scholarly Communication” by Susan S. Lukesh (Hofstra University) and R. Ross Holloway (Brown University).

The 39th Annual Meeting of the Society for Historical Archaeology was held in Sacramento, CA 11-15 January 2006. Of particular note was a symposium, “Objects of Colonialism: Methodological and Theoretical Advancements in the Investigation of Locally Made Earthenware Vessels from Colonial Sites,” organized by Sarah Ginn and chaired by Ginn and Russell Skowronek. Symposium Abstract: In colonial sites of the Spanish New World, archaeologists frequently recover low-fired, undecorated, locally produced earthenware vessels. Ubiquitous in the archaeological record, these ceramics are given various names in different regions of the Spanish Borderlands. They are often termed “Colonoware” in the East and Southeast, “Hispanic ware” in the Southwest, and “Missionware” in California. Encoded in these ceramic objects is the story of culture change and ethnogenesis. It is up to us as anthropologists to regionally tease out this story. Additionally, locally produced ceramics offer a lens through which to compare culture contact situations between borderland communities and, from that, be able to more clearly understand colonialism within the context of the Spanish borderlands. This symposium seeks to highlight advancements in the methodological and theoretical investigation of these objects of colonialism. In addition, it seeks to spark discussion between researchers across borderland communities. Ginn’s paper was titled “Investigating Culture Contact through “Missionwares:” A Study of Ceramics in Spanish Colonial California.” Abstract: Once living in dispersed village communities, Native

Californians who labored in Missions were now interacting in new ways with those of other indigenous communities and a diverse group of Spanish settlers. It is through material culture, such as “Missionware,” that we can elucidate this interface of an eclectic ethnic *mélange*. By investigating the ways in which “Missionwares” were created, we can identify the production and reproduction of influencing cultural traditions. Using experimental archaeology and detailed attribute analysis of archaeological collections, this paper comparatively investigates the patterned ways in which diverse traditions are produced and reproduced through “Missionwares” from California Missions.

Nine other papers concerning ceramic materials were also presented: Maureen J. Brown (Texas Historical Commission) and Nancy Reese, “French, Spanish, and Native American Ceramics from Fort St. Louis,” Abstract: The distributional analysis of the ceramic assemblage recovered from Fort St. Louis, Robert Cavalier Sieur de La Salle’s 1685-1689 French settlement, and the overlying Spanish colonial site of Presidio La Bahia, play a key role in identifying settlement patterns and activity areas within this unique multi-component occupation site. Various types of French colonial, Spanish colonial, and Texas coastal Native American ceramics are represented and reflect the origin and interaction of people “on the edge.” The French colonial ceramics from Fort St. Louis are also compared to the ceramic assemblage recovered from La Salle’s 1686 shipwreck *La Belle*. Rhondca Cranfill (University of Georgia), “Mineralogical Investigation and Comparison of Merida Wares, Morgan Jones Wares and Spanish Orange Micaceous Wares,” Abstract: Merida ware is a type of Iberian unglazed earthenware found in colonial North America. Samples are found at a number of early English settlements including St. Mary’s City and Jamestown. Due to a wide geographical area of manufacture, exact provenance is not known. Archaeometry and geological techniques have been employed to define Merida ware and its different styles along with the provenance. Definitions of at least two subfabrics of Merida have been identified. Preliminary analysis has identified similarities between Merida and orange micaceous ceramics found in colonial North America. Mary M. Furlong (University of West Florida), “Coarse Earthenware Figurines from Presidio Isla de Santa Rosa,” Abstract: A significant collection of coarse earthenware figurines and fragments depicting both human and animal forms has been recovered from excavations at Presidio Isla de Santa Rosa (1722-1752), the second town site occupied by the Spanish in Pensacola. Although similar figurines have been found at other contemporaneous maritime and terrestrial sites in Florida, only one has been found at the earlier and later Pensacola presidios (Santa Maria de Galve, 1698-1722 and San Miguel, 1756-1763). Their scarcity in these contexts and the much larger numbers at Santa Rosa has implications for understanding their role in the ideology of Hispanic frontier settlers.

Stacey C. Jordan (Jones & Stokes), “The Face of Mercantilism at the South African Cape of Good Hope: Ceramics and the Hesitant Empire,” Abstract: In 1652, the

Dutch East India Company (VOC) established a refreshment station for its ships on Table Bay at the South African Cape of Good Hope. It grew, against the Company's intentions, into a settlement whose ceramic remains—dominated by Asian porcelains with smaller numbers of coarse earthenware and European and Asian stonewares — are part of the material expression of the VOC's movement of goods and people around the globe. The stoneware and coarse earthenware collections from sites at the Company's headquarters of the Castle make apparent the ambiguous location of this outpost station, both spatially along the mercantile Company's trade routes and culturally as the locus of identity negotiation. The ceramic assemblages reflect both the complexities of the VOC's mercantilist enterprise as well as the intricacies of everyday life at the increasingly creolized and self-sufficient Cape.

Stephan T. Lenik, Stephan T. (Syracuse University, "Archaeological Evidence of Moravian Pottery and Trading Networks in the Danish Virgin Islands," Abstract: Moravian missionaries began their Evangelical efforts among enslaved Africans in the Danish Virgin Islands in the 1730s. Sherds collected during archaeological excavations at the Estate Lower Bethlehem sugar plantation on St. Croix, and a coastline settlement at Cinnamon Bay, St. John, include a type which appears to represent a Moravian pottery tradition, which is known to have been produced in Moravian settlements in Europe, Pennsylvania, and North Carolina. This archaeological evidence suggests that Moravian missionaries, although more interested in traveling to the Danish Caribbean colonies in order to Evangelize enslaved African laborers, also may have brought with them the pottery they produced, thus establishing trade connections between Moravian communities in Europe, North America, and the Caribbean.

Candace K. Lewis (New Mexico Department of Cultural Affairs) and C. Dean Wilson, "Spanish Influence and Pueblo Response: Colonial Period Changes in Puebloan Pottery Traditions," Abstract: In 1610, the establishment of the Spanish capital in Santa Fe positioned Spaniards between two well-developed Pueblo pottery traditions. Since the 14th century, Pueblo groups to the south had produced glaze paint pottery, while northern groups produced matte paint pottery. The location of Santa Fe, coupled with the high cost of Majolica and porcelain importation, led Spaniards to utilize existing Pueblo pottery traditions to fulfill their ceramic needs. 17th century Spanish influences on glaze and matte paint pottery traditions can be seen in pottery assemblages from the Palace of the Governors in Santa Fe. Assemblages from this central Spanish colonial site suggest that Pueblo potters responded differently to Spanish demand for pottery. Pueblo strategies and Spanish consumption patterns established during the 17th century were greatly influenced by the Pueblo Revolt and subsequent reconquest, as patterns established prior to 1680 exhibit marked differences from those of the 18th century.

Harold C. Mytum (University of York, UK), "Power Dressers: Ceramics and Furniture in the Welsh Home", Abstract: Archaeologists have become aware of the importance of the size and arrangement of internal space as defined by rooms. Less attention has been given to the role of furniture,

however, though in historical contexts some features of the arrangements may be known. Using the example of Welsh domestic furniture, particularly dressers and their ceramic assemblages, it is possible to examine how class and gender relations were articulated and reinforced. Ethnographic data, museum collections, and archaeological excavation evidence for the 19th and 20th centuries from west Wales can be combined to demonstrate the social power of furniture and, in the Welsh context, the particularly potent significance of the dresser and its contents. William A. White (University of Idaho) and Greg Anderson, "Hope in North Idaho: A Behavioral Interpretation of Ceramic and Glass Assemblages from a 19th Century Boomtown," Abstract: In 1997 installation of sewer lines under Main Street in Hope, Idaho by the Ellisport Bay Sewer District prompted a cultural resource survey revealing a number of areas within the project boundaries with potential to contain culturally significant materials beneath the ground surface. Hope, Idaho was host to a number of economic ventures associated with mining and logging industries during the late 19th century. Young Euro-American workers and Chinese immigrants actively participated in these ventures. Ever modernizing transportation and distribution networks delivered a wide range of commodities from around the world to satisfy consumer demand in this remote community. Artifacts unearthed during the 1997 excavations yield insights into the consumer behaviors and aspirations of these individuals who despite their temporary tenure at this town left their mark on North Idaho history and the histories of western North American boomtowns. Dean Wilson (Museum of New Mexico), "Significance of Powhoge Polychrome from Spanish Sites," Abstract: Powhoge Polychrome was the dominant decorated pottery type produced by Tewa Pueblo potters in the Tewa Basin north of Santa Fe during the late eighteenth and early nineteenth century. This pottery type has been mainly defined by whole vessels collected from pueblos during the turn of the nineteenth and twentieth century. Almost all curated vessels attributed to Powhoge Polychrome represent large jars and deep dough bowls. Analysis of sherds recovered from late Colonial Hispanic sites in the Tewa Basin indicate the most common decorated type was Powhoge Polychrome, mainly consisting of small bowls and soup plates. These differences in form indicate both biases of early pottery collectors as well as the very different influences of Hispanic settlers and Anglo collectors on Tewa Pueblo pottery technology and forms.

For Hearth and Altar: Artistry and Action in African Ceramics is the title of a symposium held February 4, 2006 at the Art Institute of Chicago (AIC). The session focused on materials in the Institute's exhibition "For Hearth and Altar: African Ceramics from the Keith Achepohl Collection." Six art historians presented research on ceramic traditions in Africa; the morning session, "Exceptional Artistry in African Ceramics," was chaired by Barbara Frank (SUNY-Stony Brook and the National Museum of African Art), and the afternoon session, "Ritual and Sacred Vessels of Meaning and Memory," was chaired by Marla C. Berns (UCLA Fowler Museum of Cultural History). A concluding roundtable was moderated by the exhibition's curator, Kathleen Bickford Berzock (AIC's

Department of African and Amerindian Art), and recapped the themes illuminated by the day's presentations. Prior to the symposium, Barbara Frank presented a lecture on 2 February entitled "Patterns and Paradigms: Artistry and Identity in African Ceramics." The exhibition, "For Hearth and Altar: African Ceramics from the Keith Achepohl Collection," is scheduled from 3 December 2005 through 20 February 2006. Collected by printmaker and academic Keith Achepohl over the past 25 years, this corpus focuses on the aesthetic accomplishment of each work. The collection ranges in date from the 3rd to the mid-20th century, spans the African continent, and displays the full range and artistry of African ceramics. The exhibition and its accompanying catalogue showcase a group of 125 African ceramics from the Keith Achepohl collection (approximately half of the works on view are promised gifts to the Art Institute of Chicago). An exhibition blurb reads: "Across the continent of Africa unique and often surprising ceramic vessels have been created for domestic and ritual uses. Potters still practice centuries-old techniques, making wares by hand and firing them in the open to produce vessels of amazing durability. The most striking examples embody an immediacy of form and a deceptive simplicity that can only be achieved through a deeply ingrained understanding of material, process, and embellishment." A 204-page catalogue with 23 b/w and 164 color illustrations accompanies the exhibition: *For Hearth and Altar: African Ceramics from the Keith Achepohl Collection* by Kathleen Bickford Berzock (New Haven: Yale University Press, 2005, ISBN: 0300111495, cloth, \$45.00). The publisher's blurb states: "Practicing centuries-old techniques that have been passed through generations, African potters craft their wares by hand from terra cotta clay, firing them in the open to create vessels of amazing durability. These pieces embody an immediacy of form and a deceptive simplicity that reflect their makers' deep understanding of material, process, and embellishment..."

Book Reviews

Stacey N. Lengyel, Associate Editor

Proceedings of the 33rd International Symposium on Archaeometry. Edited by H. Kars and E. Burke, Institute for Geo- and Bio- archaeology (Faculty of Earth and Life Sciences), Vrije Universiteit, Amsterdam, 2005. xiv+568 pp., author index. Price: €55.00. ISBN: 90-77456-03-1.

Reviewed by Pranab K. Chattopadhyay, Centre for Archaeological Studies & Training, Eastern India, Kolkata-700016, India

As the name indicates, this volume presents the proceedings of the International Archaeometry Symposium that

was held in Amsterdam during 22-26 April 2002. As in past years, the contributions cover a wide variety of the archaeometric techniques that are commonly applied to archaeological research and present innovative new applications as well. The volume incorporates 125 papers by 383 scholars from all fields of archaeometry. It is organized into seven sections based on the symposium's general sessions: field archaeology (9 papers); technology and provenance of stone plasters and pigments (18); technology and provenance of ceramics and ceramic pigments (37); technology and provenance of metals (28); dating (7); biomaterials (19); and conservation science (8). It is not possible to discuss each paper in detail here; instead, I present a summary of each section and highlight those papers that contributed significantly to this volume.

The nine papers included in the field archaeology section focus on such topics as geophysical survey (Barba et al.; Krivanek; Linford; Neubaur et al.; Pavlish et al.; Valenta et al.) and land use studies (Haslam et al.). Sampietro Vattuone et al., in particular, present a significant study on the identification of micromorphological soil features of the Tafi Valley in Northwest Argentina. These researchers studied both agricultural and residential soil profiles and were able to identify formative settlements on the ancient soil surface. Unfortunately, the authors could not determine the composition of floors used in that culture. Their findings will need to be evaluated further before they can be applied to prehistoric settlement studies. The ethnoarchaeological contribution by López Varela *et al.* adds a nice integrative study to this section. They combine ethnoarchaeological studies of comal production and use in modern Mexican households with chemical residue analysis and mineralogical studies of temper to identify ritualistic activity in the archaeological record. They found that they were able to isolate protein residues from comals that were related to the ritualistic killing of chickens during festivities.

Nineteen papers focus on different aspects of the technology and provenience of stone, plasters and pigments. Three studies seek to identify and characterize important obsidian sources (Buxeda i Garrigós et al.; Cernicchiaro et al.; Tykot, Setzer & Glascock) and a fourth (Tykot, Ammerman, et al.) uses obsidian artifact analyses to reconstruct mechanisms of exploitation and exchange. Three papers report on the results of Prompt-Gamma-Activation Analysis of grey flint samples (Kasztovszky et al.), the chemical and mineralogical characterization of Argentinian collar beads (Dominguez Bella et al.), and petrographical analyses on bronze casting moulds (Péterdi et al.). A number of papers focus on identification and characterization of inorganic pigments (Cepriá et al.; Colombini et al.), pigments and plasters from wall paintings (Tsantini et al.), admixtures of ancient mortars from Central Mexico (Martinez et al.), and raw material characteristics of different Anatolian plasters (Caner et al.). Provenance studies of marble artifacts and building materials (Pinter et al.; Zöldföldi et al.), and a radioisotope X-ray fluorescence analysis of frescoes from historic buildings (Czechák et al.) are also presented. All of the papers in this section are excellent; however, the study by Cernicchiaro et al. stands out. This

innovative study shows that Mössbauer spectroscopy is a viable alternative for sourcing raw materials. It also demonstrates that the magnetic properties of obsidian can be used to source the raw materials and characterize the thermal history of stone tools.

Thirty-seven papers deal with the technology and provenance of ceramics, ceramic pigments, and glass. These include studies on Neolithic (Bonzon; Dumpe; Mommsen et al.; Szakmany et al.), Chalcolithic (Burghelia et al.; Dias et al.) and late Bronze age (Maggeti) pottery. A number of papers present the results of XRF analyses (Albert et al.; Bandini et al.; Gigli et al.), raw material sourcing (Chartrand et al.; Hein et al.; Waerenborgh et al.), and slip identification (Gualtieri et al.). Others focus on use-wear analysis of recycled sherds (López Varela et al.), 3D modeling of ceramic morphology (Simon et al.), and identification of post-depositional alterations of ceramics (Haslam et al.). Still others focus on the technology and provenance of Egyptian (Columbini et al.), Iberian (Petit-Dominquez et al.) and Roman (Buxeda i Garrigós et al.; Gall et al.; Vigil de la Villa et al.) amphorae, as well as Chinese pottery, RU wares and porcelain (Feng et al.). Among the papers on glass, one investigates the technology of frit making in Iznik (Okyar et al.). Another uses energy dispersive X-ray fluorescence analysis to determine the elemental composition of glass artifacts (Karwowski et al.). One interesting paper by Obranovic et al. examines the behavior of chlorine during glass melting as a means of distinguishing between different batches of glass.

Twenty-eight papers focus on the technology and provenance of metals. A wide range of studies is included in this section, such as the use of tin isotopes (Clayton et al.) and 186Os/187Os ratios (Junk et al.) for the provenance of metals. Other papers explore non-destructive analytical techniques such as PIXE (Denker; Guerra) and time-of-flight neutron diffraction (Siano et al.). Metallographic studies are presented for Cu beads (Ryndina et al.) and plated coins (Beck et al.). New ideas on ingot torque (Junk), brass smelting (Zhou), and quantifying flaws by optical stereology (Sheehan) are offered. Over the last three decades, many studies have focused on the reconstruction of iron smelting; this seminar included papers on the reconstruction of Chalcopyrite smelting. Finally, researchers from at least the time of Theophilus have known about wire production via draw plates, and one study included in this volume explores the production of precious metal wire using draw plates during the Viking Age in Northern Europe (Armbuster).

Seven papers focused on different chronometric techniques. Several luminescence studies were included in this section, such as the use of IRSL to date mud bricks from Catalhoyuk (Akoglu et al.), the use of OSL to date soil erosion and cultural activities in the Phlious Basin (Fuchs et al.), and the use of TL to date an example of Byzantine architecture in Sicily (Galli et al.). Busiello et al. present new AMS dates from sites in the Salerno region, and Plicht et al. use AMS to date structural carbonate in cremated bone. Kovecheva et al. present new archaeomagnetic results from sites in Bulgaria and Switzerland.

Finally, the relatively new technique of quartz hydration dating presented by Dersch et al. is significant because it provides a valuable complement to existing dating techniques.

Nineteen papers were included in the biomaterials group. Two papers present organic residue analysis from pottery vessels that provided dietary information (Mukherjee et al.; Oudemans et al.), and a third employs stable carbon isotope analysis to assess paleodiet in South Africa (Corr et al.). Other studies establish the physical properties of human bones (Actinsh et al.) and examine human mobility through alkaline earth ratios (Burton et al.) and strontium-isotope analysis (Knudson et al.) of human tooth enamel. An analysis of gold threads in silk textile (Lantratova et al.) is interesting, but the original place of manufacture is not discussed. Finally, ancient Egyptians used different mummification salts for dehydration of tissues. It was known that ancient Egyptian used borax in metallurgy and medicine, and in an important contribution to this volume Weser et al. demonstrate that borate served as an effective inorganic mummification reagent as well. The studies of the present author and his colleagues (Ghosh and Chattopadhyay 1981) established a similar use of borax in copper smelting in Eastern India, where trace amounts of boron were detected in metal and in copper slag from different Chalcolithic and early historic sites.

Finally, eight papers deal with different aspects of conservation science. Two papers discuss bone preservation and conservation (Jans et al.; Panagiaris et al.), and a third (Wilson et al.) uses geochemical modeling to understand diagenetic pathways in archaeology. Additionally, the conservation of a three hundred years old factory site (Herbach et al.), weathering of archaeological glass (McLoghlin et al.), and archaeological heritage (Kars) are presented nicely.

This volume, like the proceedings of the previous symposia, incorporates the status of archaeometry worldwide. Currently, there are few textbooks in the archaeological sciences, and this volume helps to fill that void. Both archaeometrists and archaeologists will find this volume useful. The latter will benefit in particular from learning about the wide range of applications of science that can be brought to bear on their questions. Readers also will benefit from the extensive presentation of information pertaining to past history.

Normally, conference proceedings are so varied that it becomes rather difficult for editors to present the results in a single, well-edited volume. The editors of the present ISA volume have done their duties in a very systematic manner and were able to create a coherent volume in a short time. The editors must be praised for developing and organizing this volume in the form of an archaeometry textbook. The volume could have been improved, however, with the inclusion of a synthetic introduction to the book, and introductions to each section would have been helpful as well. Finally, on a personal note, I would have liked to see more studies that employed Mössbauer spectroscopy included in this work as well as studies that applied fission track dating.

References

Ghosh, A. K. and P. K. Chattopadhyay. 1981. Identification of new trace element in ancient copper object: fresh light on copper technology. *Science and Culture* 47 (7): 262-263.

The Ceren Site: An Ancient Village Buried by Volcanic Ash in Central America. By Payson Sheets. Jeffrey Quilter, series editor. Wadsworth Publishing, 2005. 168 pp., images, endnotes, bibliography, index. \$25.95 (paperback). ISBN: 0-495-00606-8.

Lisa Hanes, Department of Humanities and American Studies, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620 USA

Payson Sheets opens his newly revised monograph, entitled *The Ceren Site: An Ancient Village Buried by Volcanic Ash in Central America*, by stating his intent “to present a different culture to undergraduate students in a readable and informative manner” (p. 1). It is this reviewer’s assessment that indeed, he has met his stated goal. The average undergraduate student can easily understand the more technical jargon, which includes definitions, yet the more knowledgeable academic will feel intellectually comfortable due to the inclusion of sophisticated terminology and professional approach of the content. In this second edition, Sheets has added research updates and new material to this case study of Ceren.

Ceren has been hailed as the “Pompeii of the New World,” and Sheets portrays himself as almost an academic Indiana Jones, blazing new archeological trails and discovering hidden treasures never before uncovered by modern scientists. Sheets first examined Ceren in 1976 after a bulldozer operator uncovered the corner of a building, and the site continues to provide the archeological community with an amazing glimpse into the past, enabling scientists to view domestic activities of Maya civilization. Since the volcanic activity that buried the site occurred without warning, residents had no time to take their belongings with them, leaving objects lying *in situ* for archeologists to unearth centuries later. The site is well preserved and shows little of the decomposition normally found in tropical Central American locations. Examination of households in Mesoamerica previously had been limited to the elite, and Ceren provides an unparalleled opportunity to examine the daily habits of the commoners. The focus of these discoveries is that of an academic examination of the artifacts, yet the reader is able to ascertain a sense of the daily lives of the inhabitants through the author’s descriptive phraseology.

This book presents detailed reports of the excavations carried out at Ceren by a multidisciplinary team of archaeologists, ethnographers, volcanologists, geophysicists, botanists, biologists, and others. Sheets makes a point to credit all involved with this project, clearly establishing his belief in the benefit of a cooperative effort for such a major undertaking.

Chapter One is an introduction that sets the tone for the balance of the text, presenting the findings in both an informational and interesting manner, a pleasant surprise from the dry and stilted tone one might expect from such a detailed recounting of an archeological excavation. The book discusses not only the physical environment and resources, but also household structures, artifact analysis, and theoretical debates. The text has many positive aspects, with only a few minor weaknesses. For example, some illustrations and drawings are detailed, informative, and effectively support the text, while others leave the reader slightly puzzled as to the relevance of these specific images, and this reviewer considers it a minor dissatisfaction in the overall enjoyment of the book. Offsetting this slight shortcoming, are the realistic accounts of red tape, funding issues, the complexity involved with transporting machinery, and the intricacy of coordinating the efforts of diverse fields of study.

Chapter Two is relatively short, and discusses the theoretical framework of household archeology. The comparison and contrast of the Ceren site to other Maya sites helps clarify the significance of the Ceren findings, and reasserts the anthropological importance of Ceren. Chapter Three explores the value of, and difficulties involved with, interdisciplinary studies. The necessity for cooperative effort between geophysics, biology, anthropology, and volcanology may seem obvious, yet the author guides us through the delicate process of establishing a cooperative atmosphere. Many discoveries would not have been possible without this collaboration, and Sheets carefully credits each area of research with the value of its contribution.

Chapters Four and Five examine two domestic buildings, identifying the similarities between them, as well as significant differences, and establishing a contrast with other Maya domestic findings of the same period in nearby locations. In these two chapters in particular, the photographs and illustrations are invaluable to the reader, and help gain perspective and appreciation for the enormity of the excavation task. Sheets breaks down the surrounding domestic structures by assumed usage, and offers realistic suppositions as to meaning and domestic importance. Drawings and photographs of pottery, maize fields, and kitchen items remind the reader that this is an examination of daily life, abandoned with no notice, and offers a rare glimpse into a moment suspended in time. The text alternates between detailed presentations of archeological methods, and the presumed use and meaning of artifacts. This fusion of method and theory provides the reader (or hopeful archeologist) with a practical look at the reality of archeology.

Chapter Six discusses other structures at Ceren, including a public building, a bodega, and a sauna. These unusual buildings provide an impressive glimpse into other aspects of life in Ceren. The detailed descriptions of the excavation, the meticulous journaling of events and artifacts, and the care and concern he portrays for accurate and ethical archeology all lend themselves to create a realistic, comprehensible picture of the daily life of these families.

Chapter Seven reveals the religious aspects of additional buildings, and Sheets focuses on the spiritual aspects of daily life. The painted white walls and the architectural details not found on other buildings serve to demonstrate a crucial difference between these buildings and the surrounding structures. Sheets includes a great deal of technical detail as to the construction of the buildings and their contents and usage, creating a sense of authenticity. He examines the theories regarding religious or spiritual activities experienced by the occupants of Ceren as supported by the archeological evidence. Sheets verbally “walks” the reader through the rooms of Structure 12 on a journey with the shaman, literally bringing the reader inside the shaman’s environs. Computer recreations, and the drawings inserted at various sections of the chapter, all reinforce the importance of these buildings. The detail and care invested in these illustrations sets them apart as more than simply supporting illustrations, and the reader should examine them closely to glean additional understanding.

Chapter Eight, Summary, and Conclusions: The Site in Perspective is a concise recounting of Sheet’s efforts to inform and enlighten undergraduate students. Broken down into subheadings, each section reaffirms Sheet’s objectives, beliefs, and hopes in regards to Ceren. The recap of Geology-Volcanology section reinforces the background information necessary to appreciate the significance of this find, and stresses the rarity of the integrity of the artifacts. The Geophysical Exploration and Biology subheadings could have, or perhaps should have, been expanded slightly to reiterate the value of the contributions by both fields, and we must remember that without geophysics, much of Ceren would have remained undiscovered.

The subheadings of Village Orientation, The Households of Ceren, and Ethnicity all guide the reader to the conclusion that the Ceren site is not only a major archeological find, but also a rare opportunity to create a multidisciplinary cooperative effort. Anthropological advances of this type are rare, which Sheets reminds the reader of without climbing onto a sociopolitical soapbox.

The Epilogue provides a “practical guide” for pursuing international research. Sheets lays out the frustrations and concerns in undertaking such a global project, and he exposes the issues of funding, travel and transportation of instruments and machinery, and technological complications for the reader. His honesty and realistic portrayal of both the challenges and the blessings of such an undertaking are commendable.

Payson Sheets has obviously devoted extensive time and effort into his research, and it is clearly a labor of love. Many readers may find Sheets’ writing style to be entertainingly informative, and the book to be well researched and well written. This text would make an excellent classroom resource for courses that examine the Central American Maya civilizations during the Classic period, the socioeconomic aspects of domestic life of the common Mesoamerican, or the practical applications of archeological theory and methods in general.

The findings of Payson Sheets at Ceren represent groundbreaking contributions to the field of archeology and anthropology of Central America and of the Maya culture in the Classic period.

Upcoming Conferences

Colleen P. Stapleton, Associate Editor

2006

- Feb. 1-3, IV Congresso Nazionale di Archeometria-Scienza e Beni Culturali, Pisa, Italy. Abstracts due: Nov. 14, 2005. Contact: aiar2006@humnet.unipi.it. General information: <http://aiar.mater.unimib.it>.
- March 26-30, Archaeological Chemistry: Analytical Techniques and Archaeological Interpretation, American Chemical Society, Atlanta, GA, USA. Contact: Mike Glascock: glascockm@missouri.edu.
- March 28-30, Association for Environmental Archaeology, University of Exeter, UK. Sessions on organic analysis, landscape reconstruction, palaeopathology, and ritual deposits. For proposing other sessions, contact: A.K.Outram@ex.ac.uk. General information: <http://www.ex.ac.uk/archaeology/AEA2006.html>.
- April 18-23, Computer Applications and Quantitative Methods in Archaeology (www.caaconference.org) 2006 annual conference will be held in Fargo, North Dakota (USA). For questions or comments send e-mail to: info@www.caa2006.org. For questions about sponsoring a conference event, please send e-mail to: sponsors@www.caa2006.org.
- April 26-30, SAA 71st Annual Meeting, San Juan, Puerto Rico. Abstract deadline: Sep. 7, 2005. General information: <http://www.saa.org/meetings/index.html>.
- May 10-15, International Symposium on Archaeometry, Quebec City, Canada. Details: <http://www.isa2006.ulaval.ca/>.
- June, ASMOSIA, Aix en Provence, France. Contact: Prof. Philippe Jockey, Maison Méditerranéenne des Sciences de l’Homme. E-mail: asmosia8@msh.univ-aix.fr.

4th INTERNATIONAL LIMNOGEOLOGY CONGRESS
Barcelona - CosmoCaixa
July 11-14th 2007

Limnogeology:
tales of
an evolving Earth

www.ilic2007.com

4th INTERNATIONAL LIMNOGEOLOGY CONGRESS
ILIC2007 BARCELONA

UNIVERSITAT DE BARCELONA
ICS - Joan Miró CBC

Obra Social
Fundación 'la Caixa'

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

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

Newsletter of the Society for Archaeological Sciences

SAS Bulletin Staff

Editor: **E. Christian Wells**, Department of Anthropology, University of South Florida, 4202 E. Fowler Ave., SOC 107, Tampa, FL 33620-8100, USA; tel 813-974-2337; fax 813-974-2668; email cwells@cas.usf.edu

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

Associate Editors, Archaeometallurgy: **Nora Reber**, Anthropology Program, University of North Carolina, 601 S. College Road, Wilmington, NC 28403, USA; tel 910-962-7734; email rebere@uncwil.edu

Associate Editor, Archaeological Soil Science: **Jane Entwistle**, Geography, School of Applied Sciences, Northumbria University, Sandyford Road, Newcastle upon Tyne NE1 8ST, UK; tel 44(0)191-227-3017; fax 44(0)191-227-4715; email jane.entwistle@northumbria.ac.uk

Associate Editor, Archaeometallurgy: **Roger C.P. Doonan**, Department of Archaeology, University of Sheffield, Northgate House, West Street, Sheffield, S1 4ET, UK; tel 44(0)11-4222-2939; fax 44(0)11-4272-563; email r.doonan@sheffield.ac.uk

Associate Editor, Bioarchaeology: **Gordon F.M. Rakita**, Department of Sociology, Anthropology, & Criminal Justice, University of North Florida, Building 2, Room 1100, 4567 St. Johns Bluff Rd., South Jacksonville, FL 32224-2659, USA; tel 904-620-1658; fax 904-620-2540; email grakita@unf.edu

Associate Editor, Book Reviews: **Stacey N. Lengyel**, Statistical Research, Inc., 6099 E. Speedway Blvd, Tucson, AZ 85712, USA; tel 520-721-4309; fax 520-298-7044; email slengyel@srirm.com

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

Associate Editor, Geoarchaeology: **David D. Kuehn**, Geo-Marine, Inc., 3945 Doniphan Park Circle, Suite C, El Paso, Texas 79922, USA; tel 915-585-0168; fax 915-585-2153; email dkuehn@geo-marine.com

Associate Editor, Meeting Calendar: **Colleen P. Stapleton**, Department of Liberal Studies, Mercer University, 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, Foundation of Research & Technology Hellas, Melissinou & Nikiforou Foka 130, P.O. Box 119, Rethymnon 74100, Crete, Greece; tel (30)-831-25146; fax (30)-831-25810; e-mail asaris@ret.forthnet.gr

SAS Administration

General Secretary: **Robert Sternberg**, Department of Earth and Environment, Franklin & Marshall College, Lancaster, PA 17604-3003, USA; tel 717-291-4134; fax 717-291-4186; email rob.sternberg@fandm.edu

SAS Executive Officers, 2005-2007

President: **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

Vice President/President-elect: **Thilo Rehren**, Institute of Archaeology, University College London, 31-34 Gordon Square, London, WC1H 0PY, UK; tel 44(0)20-7679-4757; fax 44(0)20-7383-2572; email th.rehren@ucl.ac.uk

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

Internet and the World Wide Web: **Destiny Crider** and **Arleyn W. Simon**, Archaeological Research Institute, Arizona State University, Tempe, AZ 85287-2402, USA; tel 602-965-9231; fax 602-965-7671; email destiny.crider@asu.edu, arleyn.simon@asu.edu

SASnet: **James Burton**, Department of Anthropology, University of Wisconsin, Madison, WI 53706-1393, USA; tel 608-262-4505; fax 608-265-4216; email jhburton@facstaff.wisc.edu

Vice President for Intersociety Relations: **Adrian Burke**, Département d'Anthropologie, Université de Montréal, C.P.6128, succursale Centre-ville, Montréal QC H3C 3J7, Canada; tel 514-343-6909; email adrian.burke@umontreal.ca

Vice President for Membership Development: **AJ Vonarx**, Department of Anthropology, University of Arizona, Tucson, AZ 85721-0030; tel 520-881-3407; fax 520-621-2088; email ajvonarx@email.arizona.edu

Publications Coordinator: **Robert H. Tykot**, Department of Anthropology, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620-8100, USA; tel 813-974-7279; fax 813-974-2668; email rtykot@cas.usf.edu

SAS Editor for Archaeometry: **James Burton**, Department of Anthropology, University of Wisconsin, Madison, WI 53706-1393, USA; tel 608-262-4505; fax 608-265-4216; email jhburton@facstaff.wisc.edu

Editor, Archaeometry: **Mark Pollard**, 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 mark.pollard@rlaha.ox.ac.uk

Editor, Journal of Archaeological Science: **TBA**

SAS Representative on the International Symposium on Archaeometry committee: **Sarah Wisseman**, Ancient Technologies and Materials Program, University of Illinois at Urbana-Champaign, 116 Observatory, MC 190, 901 S. Mathews, Urbana, IL 61801, USA; tel 217-333-6629; fax 217-244-3490; email wisarc@uiuc.edu

Published quarterly by the Society for Archaeological Sciences

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