

# **SAS Bulletin**

## Society for Archaeological Sciences

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#### Welcome Associate Editors

Taking over the reins of the SAS Bulletin has given me the chance to work with a wonderful editorial staff. However, it has also provided me with an opportunity to build on a strong foundation (thanks to Rob Tykot and other previous SAS Bulletin editors) by inviting new associate editors to continue to improve the quality of the Bulletin. To this end, allow me to please introduce (or reintroduce in some cases!) the staff of 10 associate editors for the SAS Bulletin:

*Charles C. Kolb, Associate Editor for Archaeological Ceramics*. Charlie is Senior Program Officer in the Division of Preservation and Access at the National Endowment for the Humanities, after a 20-year-long career as a faculty member at Pennsylvania State University and Bryn Mawr. He is coorganizer and chair (since 1985) of an annual symposium on ceramic ecology held at the meetings of the American Anthropological Association, edits a monograph series on ceramics, is an abstractor for technical journals, and serves as associate or regional editor for three technical publications, including the *SAS Bulletin*. Contact Charlie at ckolb@neh.gov.

*Nora Reber, Associate Editor for Archaeological Chemistry.* Nora is Assistant Professor of Anthropology at the University of North Carolina-Wilmington, specializing in Mississippian archaeology and absorbed pottery residue analysis. When a graduate student at Harvard, she developed a method to detect maize in absorbed pottery residues, and continues this work with residues from pottery derived from archaeological contexts in the St. Louis and surrounding areas. Contact Nora at rebere@uncwil.edu.

Jane Entwistle, Associate Editor for Archaeological Soil Science. Jane works in the School of Applied Sciences at



Northumbria University, where she lectures on soils, landscape degradation, and glacial and quaternary environments. Her research interests include soil science, geoarchaeology, and environmental change. Contact Jane at jane.entwistle@northumbria.ac.uk.

Roger C.P. Doonan, Associate Editor for Archaeometallurgy. Roger is Lecturer in Archaeology and Materials in the Department of Archaeology at the University of Sheffield. Contact Roger at r.doonan@sheffield.ac.uk.

Gordon F.M. Rakita, Associated Editor for Bioarchaeology. Gordon is Assistant Professor of Anthropology at the University of North Florida. His areas of expertise include bioarchaeology, mortuary and other ritual behavior, the prehistory of the Southwestern U.S. and Northern Mexico, emergent social complexity, evolutionary theory, human skeletal biology, archaeological method and theory, research design, and statistical data analysis. Contact Gordon at grakita@unf.edu.

Stacey Lengyel, Associate Editor for Book Reviews. Stacey is Co-director of the Archaeomagnetic Research Program at Statistical Research, Inc. in Tucson, Arizona. She is currently working to expand the use of archaeomagnetic dating in the eastern U.S., particularly in the Southeast and Midwest, and is also interested in improving the integration of dating theory with modern archaeological investigations. Contact Stacey at slengyel@sricrm.com.

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*Gregory Hodgins, Associate Editor for Dating.* Greg is a Research Scientist at the NSF - Arizona Accelerator Mass Spectrometry Laboratory in the Department of Physics and Atmospheric Sciences at the University of Arizona. His research interests include compound-specific isotope analysis, environmental isotope analysis, and archaeological applications. Contact Greg at ghodgins@physics.arizona.edu.

David D. Kuehn, Associate Editor for Geoarchaeology. Dave is a Geoarchaeologist/Principal Investigator for Geo-Marine, Inc., in El Paso, Texas. Since earning his Ph.D. from Texas A&M University, he has been pursuing his professional interests in archaeological stratigraphy, soils in archaeology, geomorphology, site formation processes, and paleoenvironmental reconstruction by conducting geoarchaeological research in the U.S. Great Plains and Southwest as well as East Africa. Contact Dave at dkuehn@geo-marine.com.

Colleen P. Stapleton, Associate Editor for Meeting Calendar. Colleen is Assistant Professor of Science at Mercer University. Her research interests center on archaeological applications of chemical analysis, including electron microprobe, SEM, oxygen isotopes, and LA-ICP-MS, to inorganic materials. Colleen's current research focuses on manufactured glass, especially from Bronze and Iron Age contexts in the Mesopotamia, the Near East, and Central Asia. Contact Colleen at stapleton\_c@mercer.edu.

Apostolos Sarris, Associate Editor for Remote Sensing and GIS. Apostolos is Director of the Laboratory of Geophysical-Satellite Remote Sensing and Archaeoenvironment at the Institute for Mediterranean Studies / Foundation for Research and Technology-Hellas (Greece), and Lecturer at the University of Crete, University of Thessaloniki, and the Technological Educational Institute of Crete. His research focuses on geophysical prospection, satellite remote sensing, and GIS applications. He has participated in more than 60 research projects, many of them in collaboration with international organizations from the United States, Cyprus, Italy, Iceland, China, Australia, and France. Contact Apostolos at asaris@ret.forthnet.gr.

I want to acknowledge my sincere gratitude to the associate editors for all their efforts; thank you! And *you*, the Reader, can show *your* appreciation by helping these editors fill their columns. Send them employment opportunities, conference announcements and calls for papers, book reviews, website inaugurations, etc. We *all* look forward to hearing from you...

#### E. Christian Wells, SAS Bulletin Editor

(I am Assistant Professor of Anthropology and Curator of Mesoamerican Collections at the University of South Florida. At USF, I direct a teaching and research laboratory dedicated to the physical and chemical analysis of soils and sediments for understanding human impacts on the formation processes of archaeological features and landscapes.)

#### **Employment Opportunities**

Texas A&M University (USA), Department of Anthropology invites applications for a tenured Associate or Full Professor position in archaeology with specialization in First American studies beginning Fall 2006. The successful candidate will become the Associate Director of the Center for the Study of the First Americans and assume the Endowed Professorship in First American Studies. Candidates should have a proven track record in First Americans research and specialties in lithic analysis. The successful candidate will be required to teach two courses per year. Candidates should submit a current curriculum vita, cover letter, evidence of teaching experience, three letters of support, reprints, and any additional materials the candidate deems relevant. Review of applications will begin October 15 and continue until position is filled. Send application materials to: Michael Waters, Chair, First Americans Search Committee, Department of Anthropology, Texas A&M University, 4352 TAMU, College Station, TX 77843-4352 USA.

The Departments of Anthropology and Biological Sciences in conjunction with the Roy J. Carver Center for Comparative Genomics at the University of Iowa (USA) invite applications for a tenure-track position at the Assistant Professor level. Successful candidates are expected to have an internationally visible research program that focuses on anthropological genetics and primate genomics. Some representative areas of research are: the developmental genetics of complex morphological traits; the genetic basis for unique character traits such as language; the comparative genomics of primates; and the use and analysis of molecular genetic markers in living populations to infer historic and prehistoric population demography. The Departments of Anthropology and Biological Sciences are committed to expanding their respective programs to reflect modern genomic approaches to primate and human evolution in association with the Roy J. Carver Center for Comparative Genomics. The Center is fully equipped for robotically driven high throughput DNA sequencing and functional genomics. More about the Departments and the Center for Comparative Genomics may be found at www.uiowa.edu/~anthro, www.biology.uiowa.edu, and www.biology.uiowa.edu/ccg. Candidates must have postdoctoral experience. Successful candidates will be expected to establish and maintain an extramurally-funded research program and participate in teaching at the undergraduate and graduate level. Applicants should send a curriculum vita, statement of research objectives, selected reprints, a description of teaching interests, and the names of three references to: Biological Anthropology Search Committee c/o Becky Birch Department of Biological Sciences 143 Biology Building The University of Iowa Iowa City, IA 52242 USA.

The University of Wisconsin-Madison (USA), Department of Anthropology invites applications for a position at the tenure track Assistant Professor level in Biological Anthropology. Appointment to begin August 2006. Priority will be given to candidates whose research and teaching interests complement and extend current faculty expertise. We are particularly interested in research that is field-based, preferably in the Old World, and that focuses on the ecology and evolutionary biology of hominids. However, we strongly encourage scholars with other research interests to apply as well. Candidates must have demonstrated excellence in research, teaching, and service. Application deadline: December 1, 2005. Please send application letter, including statement of research and teaching interests, CV, three letters of recommendation, and up to three publications to Search Committee in Biological Anthropology, Attn: Maggie Brandenburg, Department of Anthropology, University of Wisconsin-Madison, 1180 Observatory Drive, 5240 Social Science Building, Madison, WI 53706 USA.

Southern Illinois University-Carbondale (USA), **Department of Anthropology** invites applications for a tenuretrack position in biological anthropology with a specialty in Forensic Anthropology, Assistant Professor rank, beginning August 16, 2006, pending budgetary approval. All requirements for Ph.D. must be completed by date of application. Candidates must have an active research program in forensic analysis, osteology, and/or bioarchaeology; record of scholarly publications; teaching experience; and ability to contribute to a 4-field program which is participating in the development of a new interdisciplinary Forensic Science undergraduate major and graduate certificate. Duties include teaching at the undergraduate and graduate (M.A. and Ph.D.) levels, pursuing research and scholarly publications, participating in regular departmental activities, and developing courses and collaboration with other University Departments such as Chemistry and Biochemistry. Review of applicants will begin on November 1, 2005, and will continue until the position is filled. Send vita, letter detailing professional interests, research, and teaching experience, and names/addresses/e-mail addresses/phone/fax #'s of four references to: Robert S. Corruccini, Chair, Forensic Search Committee, Department of Anthropology, Mail Code 4502, Southern Illinois University Carbondale, 1000 Faner Dr., Carbondale, IL 62901 USA (email: rcorrucc@siu.edu; phone 618-453-5022).

The Department of Anthropology at the University of Victoria (Canada), invites applications for a tenure-track appointment at the rank of Assistant or Associate Professor in biological anthropology effective July 1, 2006. Candidates should have a strong commitment to teaching and research in a department whose members value cooperation between anthropological sub-disciplines. The successful candidate is expected to have broad teaching abilities in their sub-discipline and specialized research interests that indicate intellectual depth as well as breadth. Candidates should have a strong research record in osteology or contemporary biological variation and be able to teach in one or more of the following areas: osteology, paleopathology, paleonutrition, paleodemography, forensics, functional morphology or population genetics, epidemiology, growth and development. Candidates must also be willing to participate in the development of a new doctoral program in Anthropology at UVic. Applications must include complete

curriculum vitae, the name and addresses (including email, fax and telephone numbers) of three referees who the department may contact, copies of selected relevant publications and summaries of teaching evaluations. All qualified candidates are encouraged to apply: however, in accordance with Canadian immigration requirements, Canadian and permanent residents will be given priority. Applications should be sent to: Dr. Margot Wilson, Chair, Department of Anthropology, University of Victoria, P.O. Box 3050, Victoria, B.C. V8W 3P5 Canada, Telephone: (250) 721-7057, Email: anthone@uvic.ca, Main Office: Telephone: (250) 721-7046, Email: anthmain@uvic.ca before October 30, 2005.

#### Awards, Fellowships, and Training

**Fulbright Scholar Awards in Anthropology and Archaeology**. The Fulbright Scholar Program, Council for International Exchange of Scholars is pleased to announce the following awards in Anthropology and Archaeology and related fields, available in Southeastern Europe and the Caucasus. Georgia: Award # 6188; Cyprus: Award # 6251; Greece: Award # 6293; Turkey: Award # 6392; Turkey: Award # 6393; Turkey: Award # 6398. For additional information about the awards and the application process, please consult the Fulbright Program Web site at www.cies.org or contact Cynthia Crow, Senior Program Officer, Europe/Eurasia at 202.686.7872 or ccrow@cies.iie.org.

The Institute for the Environment, Brunel University, West London (UK) is offering a PhD studentship for "Reconstruction of past environments from palynological study of lacustrine sediment in the Kenya rift, focusing on the impact of the mega-Toba (Western Sumatra) eruption on human evolution 71,000 years ago." The overall aim of this project is to evaluate the global environmental consequences of a major volcanic eruption. The eruption was that of Toba volcano in northern Sumatra ~71 000 years ago. This eruption is widely regarded as the largest in the last two million years, and would have had significant effects upon the global climate. It took place at a critical time in human cultural evolution, and a prolonged period of global cooling triggered by the eruption may have caused widespread extinctions of the biota, and a severe reduction in the human population. The ensuing social and economic adaptations by human societies to this extreme event may have paved the way for subsequent migrations out of Africa into Europe and Asia and facilitated the transition from Middle to Later Stone Age culture and technology. A growing body of genetic evidence, notably from mitochondrial DNA, has revealed a human population bottleneck between ~100 and ~50 ka. During this interval the total world population was reduced to possibly 10,000-20,000 young males and females. Ambrose hypothesized that: "Six years of volcanic winter followed by 1000 years of the coldest, driest climate of the late Quaternary, may have caused low primary productivity and famine, and thus may have had a substantial impact on human populations." The East African Rift is an ideal natural

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laboratory where to search for any trace of the Youngest Toba Tephra, especially in the lake basins of the Kenya Rift where we have located many scores of archaeological occurrences (task of partner). The shallow lakes of the southern and central Kenya Rift are highly sensitive to even quite minor climatic fluctuations. The lake sediments, often diatomites, contain a detailed record of past volcanic eruptions in the form of interstratified ash bands. The ashes can be fingerprinted using geochemical methods and dated very precisely using argon/ argon dating techniques (task of our partners). The diatomites also contain pollen grains and other organic-walled microfossils (e.g., green algae, cyanobacteria) indicative of local (aquatic and terrestrial) and regional vegetation. The key aim of his studentship is to test the hypothesis of volcanic winter by high resolution sampling of diatomites in Kenya for pollen analysis. Combined studies of palynomorphs and diatoms (the latter is the role of our partners) are still relatively rare and offer a fruitful avenue for reconstructing local and regional environmental changes, including climate. This project uses this approach to provide primary palaeo-environmental data against which to compare the archaeological record and to seek evidence of any correlative ecological, demographic and cultural changes. Fieldwork funded by the Australian Research Council, a grant obtained by Prof. Martin Williams, University of Adelaide, a geomorphologist of international standard with African experience. The other partners in this project are Prof. Stan Ambrose, archaeologist from Illinois, Professor Alan Deino, a geochronologist in the Berkeley Geochronology Center, and Dr John Tibby works in the Adelaide University Diatom Laboratory. Starting date: between Sept and Dec 05. Fieldwork: six weeks in June 2006. Duration: 3 yrs. Preference given to a student who has a master in palynology. Supervisors for the palynology: Professor Suzanne Leroy and Professor John Dodson. The studentships will be available to home/EU students and will cover the cost of fees and living. Please visit our research pages (www.brunel.ac.uk/about/acad/ife/) to view the research areas we specialize in and contact the lead researcher in that area for more details. For more information, contact Shona Beesley at the Institute for the Environment, Brunel University Uxbridge, Middlesex UB8 3PH, UK; Tel: +44 (0)1895 266515; Fax: +44 (0)1895 269761.

The School of Archaeology and Palaeoecology, **Queens University-Belfast (UK)** encourages applications from suitably qualified candidates for the following PhD topic funded through the newly established Centre for Climate, the Environment and Chronology (14CHRONO): "Radiocarbon Reservoir Age Corrections for Freshwater and Marine Fish in Medieval British Isles." Supervisors: Dr. Paula Reimer (p.j.reimer@qub.ac.uk) and Prof. Gerry McCormac (f.mcormac@qub.ac.uk) in collaboration with Dr. James Barrett (University of York). Candidate qualifications: The student will have gained a 1st class honours or 2:1 undergraduate degree or equivalent in Archaeology, Biology, Chemistry, Geography, Geology, Palaeoecology or a related discipline and/or a relevant MSc degree. They should also have laboratory experience since they will be required to do sample preparations for the radiocarbon and stable isotope component of the project. The

student should be willing to travel to England to collect both archaeological and modern samples from museums, private collections, and fishing clubs or environmental agencies. Evidence of competency in oral and written English (e.g., TEFL qualification) is required if English is not the first language. It is envisaged that the three-year project will commence in October 2005, although there is potential for a start of January 2006. Further information on the projects may be found at: http://www.qub.ac.uk/arcpal/projects.htm. The School: The School of Archaeology and Palaeoecology conducts research of international importance. Queen's Archaeology and Palaeoecology achieved a Grade 5 (highest 5\*) for the quality of its research in 1996 and again in 2001, placing it in the top 10 departments in the UK. In November 2000, the Palaeoecology Centre was awarded the Queen's Anniversary Prize. Over the past thirty years the School's Palaeoecology Centre has developed an expertise in scientific dating methods, climate and environmental change and bioarchaeology. The Centre has been closely involved with the development of the tree-ring calibration curve used to calibrate all radiocarbon dates worldwide. Archaeological research ranges through early prehistory to the late medieval period across Europe, with a particular emphasis on Ireland and Great Britain. In 2002, the School established the Centre for Archaeological Fieldwork (CAF) which undertakes excavation work for Environment and Heritage Service (NI) and has provided employment for students and graduates. The 14CHRONO Centre: The School was recently awarded £6.2 million to set up the Centre for Climate, the Environment and Chronology (14CHRONO) funding new research on environmental and climate change and the establishment of an AMS radiocarbon laboratory, only the third such facility in the UK and the first in Ireland. The Centre brings together researchers with expertise in radiocarbon dating, stable isotope analysis, tephrochronology, dendrochronology, palaeoecology, and archaeology. Facilities are being built or upgraded and equipment is being installed to provide state-of-the-art technology to tackle problems of past and present climates and environments and the relation to societal change. Further details of the Centre may be found at: www.chrono.qub.ac.uk. Funding: Funding for the above project is available through a studentship, which will pay full fees and maintenance of circa £12,000 a year. Candidates should hold a 1st class or 2:1 Honours degree in the discipline specified or a related subject. Preference will be given to candidates with a Masters degree. Both EU and international (non EU) students are eligible to apply for the studentship. How to apply: Applicants should submit a completed Admission Form to the University. Additionally, prospective students should send a Curriculum Vitae and covering letter specifically addressing the candidate requirements to: Dr. N. J. Whitehouse, Palaeoecology Centre, 42 Fitzwilliam Street, Queen's University Belfast, Belfast BT9 6AX. Applicants should state clearly their availability regarding commencement of the project. Contacts: Applicants who require further information of the projects are encouraged to visit: http://www.qub.ac.uk/ arcpal/projects.htm and make direct contact with the potential supervisors. Further information on the School may be obtained from our web site at: http://www.qub.ac.uk/arcpal. Admission

forms may be downloaded at: http://www.qub.ac.uk/ado/ postgrad/applying.html. For other information please contact: Dr Paula Reimer, Palaeoecology Centre, 42 Fitzwilliam Street, Queen's University Belfast, Belfast BT9 6AX UK. Tel +44 (0)28 9097390; email: p.j.reimer@qub.ac.uk.

The Department of Archaeology and Natural History, Australian National University, seeks applicants for two new PhD projects in environmental change. If you have a first class honours (or equivalent) in geography, environmental science, archaeology or similar and you will be applying for an Australian Postgraduate Awards (APA, due 31st October 2005) or International Postgraduate Research Scholarships (IPRS, due 31st August 2005) in the next round then please read the project descriptions below. Alternatively, visit our website PalaeoWorks (http://palaeoworks.anu.edu.au/students.html) student page for details of these two new projects for prospective PhD students. Project 1. Biodiversity Change through Time in the Tropical Rainforest of Papua New Guinea. The potential for sudden collapse of ecosystems in response to multiple interacting pressures has been of increasing concern in ecological and conservation research (Scheffer et al. 2001, Nature 413:591). In the rainforests of Papua New Guinea, human populations numbers are growing rapidly and there is increasing pressure from a range of human resource exploitation from ancient forest clearance for agriculture to recent deforestation for commercial logging and mining. As part of the third largest expanse of rainforest on the globe these rainforests support a staggering array of plant and animal diversity. An equally staggering concentration of cultural and linguistic diversity can be found amongst human populations interacting and subsisting within these environments. One of the lessons learnt from the incorporation of ecological histories into models to understand and manage forest environments is that, with an adequate historical perspective, ecological catastrophes such as biodiversity loss can be predicted and averted (Swetnam et al. 1999, Ecological Applications 9:1189). This research project aims to chart long-term changes in biodiversity in the Crater Mountain Wildlife Management Area (CMWMA) of southern Papua New Guinea, a region typifying the cultural and natural variability across the island. The CMWMA was established in 1994 with support from the Wildlife Conservation Society (WCS) as a cooperative venture between The Research and Conservation Foundation of PNG, local landowners and government. Human resource exploitation and natural environmental change (including climate change and volcanic activity) have all played a part in shaping the rainforests of today; however, we still know little of the rate or scale of change that has occurred in the past. The successful candidate will use palaeoecological techniques in lake sites that span the period from the last glacial maximum to the present to explore: 1. the role of multiple interacting pressures, including climate change, volcanic eruptions and human activity on rainforest ecosystem change/stability through time, 2. the development of measures of biodiversity from palaeoecological data, 3. approaches to incorporating palaeoecological data into environmental management models and the implications for conservation and management in the Crater Mountain Wildlife Management Area

(CMWMA), Papua New Guinea. Project 2. Microscopic Indicators of Herbivore Extinctions and Invasions in Australasian-Pacific Prehistory. The aim of this project is to use the presence/abundance of microscopic dung fungi spores preserved in swamp sediments and archaeological sites as indicators of extinctions and invasions of herbivores in past landscapes. This will be approached through the development of a taxonomic understanding of dung fungi remains preserved in modern and ancient sediments. The technique has proved successful in North America and Madagascar to explore megafuanal extinctions and the introduction of domestic ungulates into these regions. The successful PhD candidate will develop this technique for application to archaeological and palaeoecological problems in the Australasian and Pacific region and be expected to participate in fieldwork in Papua New Guinea and neighboring Pacific islands. The outcomes of this project will contribute to one of the most significant questions remaining in Pacific prehistory, that of when the pig, the major animal domesticate of the region, was first introduced to the region (Bellwood and White, 2005, Science 309: 381). Resources and associations: You will join a vibrant palaeoecological and archaeological group at ANU where you will be based in the Department of Archaeology and Natural History, Research School of Pacific and Asian Studies. This is a well-resourced project conducted in conjunction with current departmental research activity in Papua New Guinea. The successful candidate will be expected to conduct fieldwork in the Papua New Guinea in 2006 and 2007. You will be enrolled in the Archaeology and Palaeoanthropology Graduate Program and be based in the Department of Archaeology and Natural History, RSPAS. Background of candidates: We are seeking highly motivated and enthusiastic students with a background in Quaternary science, geography, botany, or similar. Some field experience would be an advantage. A first class honours or research masters in a relevant field is required. Applications and closing dates for international (IPRS) and local (APA) scholarships: Interested applicants should submit an application for a graduate scholarship to ANU. The deadline for receipt of IPRS applications from international students is 31st August 2005; for APA/ANU/GSS scholarships for Australian and New Zealand students the deadline is 31st October 2005. The RSPAS also has funding available for tuition and full scholarships for outstanding students. The successful candidate will be expected to commence between 2nd Jan and 31st Mar 2006. Application forms for both international (IPRS) and local (APA) scholarships are available at http://www.anu.edu.au/ sas/forms/. For further information about this project contact: Dr Simon Haberle, Department of Archaeology and Natural History, Research School of Pacific and Asian Studies, ANU, Canberra 0200 Australia; Email: simon.haberle@anu.edu.au, tel: +61 2 6125 3373; Homepage: http://rspas.anu.edu.au/people/ personal/habes\_rmap.html.

**2006 R.E. Taylor Student Poster Competition**, call for applications: The Society for Archaeological Sciences (www.socarchsci.org) is offering a prize for the best student archaeometric poster presented at the 2006 Meeting of the Society for American Archaeology in San Juan, Puerto Rico.

The prize is a one-year membership in the SAS, including the quarterly *SAS Bulletin* and the monthly *Journal of Archaeological Science*. The student should be the first author and the presenter of the poster. Criteria for the award are significance of the archaeological problem, appropriateness of the archaeometric methods used, soundness of conclusions, quality of the poster display, and oral presentation of the poster. To apply, send a copy of the poster abstract (indicating the student author), a correspondence address, and the name and date of the session in which the poster will be presented. Submit by March 25, 2006 to: Aaron Shugar, Archaeometallurgy Laboratory, Lehigh University, 5 East Packer Ave., Bethlehem, PA 18015, USA, tel 610-758-4701, fax 610-758-3526, a.shugar@lehigh.edu.

#### **Conference News and Announcements**

Advances and Applications of Tephrochronology and Tephrostratigraphy: In Honor of Andrei M. Sarna-Wojcicki will be held in conjunction with the 2005 Annual Meeting of the Geological Society of America, Salt Lake City, Utah (USA), October 16-19. Tephra layers provide timestratigraphic markers that enable regional correlations for geologic mapping and studies of climate change, geologic hazards, and Neogene stratigraphy. This session will honor Andrei Sarna-Wojcicki, a pioneer in the field of tephrochronology. An extensive database on the stratigraphy, distribution, geochemical characteristics, and age of late Cenozoic tephra layers in the western U.S. is available for researchers working in continental and marine sequences in the region. This tephrochronologic database, developed by the efforts of many individuals over the past three to four decades, is central to studies of tectonic, volcanic, environmental, paleomagnetic, and archeological events and changes in the western U.S. A key figure in guiding and nurturing the development of this database has been Andrei M. Sarna-Wojcicki, Research Geologist, U.S. Geological Survey, Menlo Park, California. Dr. Sarna-Wojcicki's imminent retirement provides an excellent opportunity for researchers to come together and share their recent findings with him, review past accomplishments, and anticipate future improvements in instrumentation and methodology that will ensure the western U.S. tephrochronologic database continues to serve researchers in the region. Colleagues of Dr. Sarna-Wojcicki are invited to present results on a wide range of topics from discussion of the analytical methods that underpin the development of the tephrochronologic database to important findings that the database supports. Analytical techniques central to the development of the database include: chemical analyses of glass shards by both bulk- and micro-analytical techniques; isotopic dating, particularly the greatly improved precision of tephra dating by the 40Ar/39Ar laser-fusion method over the past 10-15 years; and correlation of magnetostratigraphy in sections and cores to the geomagnetic polarity time scale. Studies

dependent on tephrochronology are wide ranging and include: volcanic hazard studies; Quaternary paleoclimate studies of sections and cores; correlation and age calibration of marine and continental biostratigraphy; identification of major explosive volcanic eruptions ranging in age from Holocene to early Miocene; and estimation of long-term displacement rates on active faults. Finally, this theme session will provide an opportunity for developers and users of the database to meet with one another, often for the first time, and informally discuss past triumphs and future opportunities in the development, use and future improvements in the western U.S. tephrochronologic database. For more information: Janet L. Slate, Earth Surface Processes Team, U.S. Geological Survey, Box 25046, MS 980, Denver, CO 80225 USA, phone: 303-236-1284; fax: 303-236-0214; email: jslate@usgs.gov.

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

Materiales y Tecnologías, Escuela de Antropología. Facultad de Humanidades y Artes, Universidad Nacional de Rosario, Entre Ríos 758. CP 2000. Rosario (Santa Fe) – Argentina; TEL y FAX: 0341-4802675; Vía electrónica a la Organización del Congreso: congreso.arqueometria@gmail.com; www.fhumyar.unr.edu.ar/eventos/congresos.html.

The Developing International Geoarchaeology Conference (DIG 2005) is a forum for international communication on geoarchaeological topics, to facilitate discussion, stimulate research, and promote the teaching of geoarchaeology within the framework of an organized international group. Any and all practitioners, researchers and students interested in this interdisciplinary field are welcome. We are now issuing a formal call for papers for the conference, which will take place October 21-23, 2005. We have identified some session themes (see www.dig2005.com), but will gladly consider papers and posters on any aspect of geoarchaeology. Abstracts are due by August 15th 2005. The official conference hotel is the Hilton in Saint John, New Brunswick, Canada. Rooms are available at a discounted conference rate if booked before September 23rd 2005. Air Canada is also offering discounts on travel to Saint John. Please consult our website for more information on all accommodation and travel discounts. For more information, contact Pam Dickinson, Department of Geology, University of New Brunswick, 2 Bailey Drive, Fredericton, NB E3B 5A3, Canada; Tel: 1-506-453-4804; Fax: 1-506-453-5055; Email:Dickinson@DIG2005.com. Visit the Developing International Geoarchaeology Conference website at www.dig2005.com.

**Near-surface Geophysics** is the name of a special focus session to be held at the Fall Meeting of the American Geophysical Union (AGU) this year. The AGU meeting will take place 5-9 December 2005, in San Francisco, CA, USA. For general meeting information, see http://www.agu.org/ meetings/fm05/ Abstract submissions will open 26 July 2005. Electronic abstract submissions will close 6 September 2005. Contributions pertaining to all aspects of near-surface geophysics are welcome, including ground-penetrating radar, seismic, acoustic, magnetic, electrical, and electromagnetic methods. Surface as well as borehole studies are appropriate. Studies may involve data acquisition, processing, analysis, modeling, or interpretation. Case histories showing application of near-surface geophysical methods to other fields are welcome, including but not limited to stratigraphy, geologic hazard assessment, engineering, minerals exploration, archeology, and polar studies.

The **2005** Australasian Archaeometry Conference will be held at the Department of Archaeology and Natural History at the Australian National University in Canberra from December 12-15, 2005. For details, see: http://car.anu.edu.au/ Archaeometry/archaeometry\_conference.html. There is an online registration system that can be reached via the conference website or via this link: http://rspas.anu.edu.au/anh/ conference/. The final date for conference submissions is October 31, 2005.

Winter Conference on Plasma Spectrochemistry, Tucson, Arizona, January 8 - 14, 2006. The Winter Conference is sponsored biennially by the ICP Information Newsletter, Inc., a nonprofit, philanthropic research organization located in Hadley, Massachusetts, and organized by Dr. Ramon Barnes of the University Research Institute for Analytical Chemistry. Attendance has grown from 170 in 1980 to more than 600 with world-wide scientific participation representing 30 countries. Technical sessions comprise lectures and posters describing application, fundamental, and instrumentation developments with popular electrical plasma sources. The inductively coupled plasma (ICP), glow discharge sources, microwave induced plasma, direct current plasma, and laser-assisted plasma spectrochemistry are featured. New spectrometric instrumentation, novel sample introduction systems, plasma system automation, sample preparation approaches, elemental speciation, spectroscopic standards, quality assurance, new diagnostic characteristics, and theoretical treatments are highlighted. The Winter Conference attempts to bring together the major fig-ures in the field of plasma spectrochemistry in a comfortable and in-formal setting to pro-mote maximum information exchange and conversa-tions. We accomplish this by inviting keynote speakers, employing principals to organize and chair sessions and panel dis-cussions, and by offering technical short-courses taught by experts. Further-more, experienced and novice analytical chemists seeking to share and expand their experiences in plasma spectrochemistry participate actively. Invited speakers include distinguished international experts. Panel discussions, workshops, and symposia will be arranged and chaired by many of the leaders in the field. For more information, contact Dr. Ramon Barnes, Conference Chairman, Telephone (413) 256-8942, Fax (413) 256-3746, Email wc2006@chem.umass.edu, Website http:// www-unix.oit.umass.edu/~wc2006.

The Second International Conference on Environmental, Cultural, Economic and Social Sustainability will be held in Hanoi and Ha Long Bay, Vietnam, 9-12 January, 2006. This conference aims to develop a holistic view of sustainability, in which environmental, cultural and economic issues are inseparably interlinked. It will work in a multidisciplinary way, across diverse fields and taking varied perspectives in order to address the fundamentals of sustainability. As well as an impressive line up of international main speakers, the conference will also include numerous paper, workshop and colloquium presentations by practitioners, teachers and researchers. We would particularly like to invite you to respond to the conference call for papers. Papers submitted for the conference proceedings will be fully peerrefereed and published in print and electronic formats in the new International Journal of Environmental, Cultural, Economic and Social Sustainability. If you are unable to attend the conference in person, virtual registrations are also available which allow you to submit a paper for refereeing and possible publication in this fully refereed academic journal, as well as access to the electronic version of the conference proceedings. Proposals are usually reviewed within four weeks of submission. Full details of the conference, including an online call for papers

form, are to be found at the conference website, http:// www.SustainabilityConference.com.

Archaeological Chemistry: Analytical Techniques and Archaeological Interpretation is the title of a symposium being organized by members of the Archaeometry Lab at MURR. The symposium will be held at the American Chemical Society meeting in Atlanta, Georgia March 26-30, 2006. In the past, most of these archaeological chemistry symposia have resulted in a very high quality symposium volume. We plan to produce the same. We hope that many of our colleagues in Archaeological Chemistry will choose to participate by describing their most up to date research in the symposium. We are currently applying to different funding sources to assist students and faculty with covering a portion of their travel costs. If you are interested in participating and would like to be added to our mailing list, please send your contact information (email address and potential research topic) to: Michael D. Glascock (glascockm@missouri.edu), Robert J. Speakman (speakmanr@missouri.edu), or Rachel S. Popelka (rsp89f@mizzou.edu); http://www.missouri.edu/~glascock/ archlab.htm.

**Computer Applications and Quantitative Methods in** Archaeology (CAA; www.caaconference.org) is an international organization whose goal is to expand fruitful communication between archaeologists, computer scientists, and mathematicians for the benefit of the discipline of archaeology. The 2006 annual conference will be held in Fargo, North Dakota (USA), April 18-23. The exploration of new frontiers is a hallmark of the human experience; it is what has pushed humans to spread throughout the world. It is, then, a human theme, the exploration of frontiers and resultant discoveries that change our understanding of the world. For the exploration of new frontiers in knowledge, we need new methods for discovery, and today those methods are preeminently digital. Thus our conference theme: "Digital Discovery: Exploring New Frontiers in Human Heritage." The theme for 'CAA2006 Fargo' would reflect both the general aims of the conference and the uniqueness of its place. The United States will be celebrating the bicentennial of the journey of exploration undertaken by Merewether Lewis and William Clark from 1804 through 1806. Lewis and Clark led the "Corps of Discovery" up the Missouri River, through the Dakotas, westward to the Pacific Ocean, and back again. They explored the frontier that came to the fledging American nation with the Louisiana Purchase from France. The territory was, of course, already occupied by numerous tribes of Native American Indians, whose ancestors had explored those same lands many millennia earlier. Who Should Attend CAA2006? We take note of the fact that the CAA attracts not just archaeologists, but also scholars in computer science, mathematics, architecture, museum sciences, graphic arts, geography, and physical anthropology. This appeal bespeaks a broadening umbrella that covers all concerns with computer applications for human heritage. Through this conference, we seek to attract and engage new researchers in the application of computer technology for research and education in human heritage; to

attract people who as yet have had little exposure to the power and utility of current and developing technology. The variety and power of computer and quantitative methods for archaeology has not been fully appreciated by many professionals in developing countries, or even by many of our US colleagues, who largely lag behind Europeans in these areas. A major goal of CAA2006 is to begin to change that differential. A post-conference tour will be arranged to central North Dakota to see the Missouri River, Native American sites from the Plains Village Period, historic forts, and museums. Given the size of the state, that tour will be a two-day bus trip. The trip will provide a good view of the end of the prehistoric era and the beginning of the historic period in the Northern Great Plains. We may also provide a one-day trip option going east, into the state of Minnesota, for a visit to the headwaters of the Mississippi River. For questions or comments related to the CAA2006 conference, please send e-mail to: info@www.caa2006.org. For questions about renting a vendor booth at the CAA2006 Technology Expo, or sponsoring a please send e-mail conference event, to: sponsors@www.caa2006.org.

**Integrating African Archaeology**, honoring Peter Lewis Shinnie, is the theme of the biennial conference of the Society for Africanist Archaeologists. The conference will be held in Calgary, Alberta, Canada, with a pre-conference day on Thursday June 22nd and the conference proper from Friday June 23rd to Monday June 26th, 2006. Let "integration" be broadly construed to include the interrelationships: of archaeological data and sequences from different parts of Africa and between regions of Africa and other parts of the world, including the African Diaspora; of African archaeology and related disciplines: historical linguistics, metallurgy, climatology, paleontology, material culture studies and many others; of producers of African archaeology and its consumers, actual and potential, especially Africans; of expatriate Africanists and their institutions and their African colleagues and their institutions; and of African archaeology and other archaeologies in terms of theory, methodology and methods. This listing is in no way intended to limit the range of topics discussed at the conference but rather to encourage delegates to reflect on the wider significances of their research and practice, and to build connections with colleagues whose "distance" may be more apparent than real. For example the following topics/sessions could bring together materials and colleagues in productive ways: Behavior and cognition in the African Early Stone Age; Diffusion and the invention of tradition African by Africans in Africa and those of the diasporas during the Slave Trade period; Multi-disciplinary approaches to ancient migrations and disease: the contribution of genetic, archaeological, and medical sciences; The archaeology of landscape and performance in Africa. We encourage you to present papers and symposia on other topics and themes, some of which will emerge from delegates' proposals and abstracts and which will be incorporated as such into the program. "Conservation (at all scales) and public archaeology" is one that we have identified as of special current interest. For more information, visit the website at http:// homepages.ucalgary.ca/~safaconf/SAFA/index.htm.

The World Congress of Soil Science will be coming to Philadelphia, Pennsylvania July 9-15 2006. This meeting represents an outstanding opportunity to showcase soils-related work on the world stage. The following historical and history related symposia planned follow: "History of Soil Science in Countries." Developing Eric C. Brevik (ecbrevik@valdosta.edu), Dan Yaalon (yaalon@vms.huji.ac.il), and Anthony Young (anthony.young@land-resources.com) convening; "The History of Soil Sciences: Past Accomplishments to Future Perspectives," Kirk Scheckel (scheckel.kirk@epa.gov) and Benno Warkentin (benno.warkentin@oregonstate.edu) convening; "The Godfather of Terra Preta and Father of Terra Preta Nova: A Symposium in Honor of Wim Sombroek," A.M.G.A. WinklerPrins (antoinet@msu.edu) and W. I. Woods (wwoods@siue.edu) convening. If interested, contact one of the session convenors for information. Abstract submission deadline is September 15, 2005. Additional information on the World Congress of Soil Science can be found at http:// www.colostate.edu/programs/IUSS/18wcss/index.html.

#### SASnet

James Burton, University of Wisconsin-Madison

SASnet, an electronic network for the Society for Archaeological Sciences, has been established to facilitate discussion about the applications of methods from the physical sciences to archaeological problems and provide rapid communication among archaeometrists and archaeologists. It's intended to provide a resource for archaeologists who need access to technical expertise and a forum for physical scientists to discuss the development of archaeological applications of their methods.



#### To Subscribe

Visit the subscription page, https://lists.core.com/mailman/ listinfo/sasnet, and fill in your e-mail address. You will be sent a subscription confirmation to the e-mail address you enter and from which you may post to SASnet (only subscribers may post to SASnet).

#### To Post Messages

Once you have subscribed, to send a message to the list, address it to: SASnet@lists.core.com. This is a moderated list. The moderator reserves the right to make decisions regarding the posting of messages. Questions or concerns regarding this list should be directed to the list manager, James Burton jhburton@wisc.edu. Society for Archaeological Sciences Minutes for General Meeting Marriott Hotel, Salt Lake City March 31, 2005 70<sup>th</sup> Annual Meeting of the Society for American Archaeology Recorded by Destiny L. Crider, Arizona State University

#### Attendance

Gregory Hodgins, Charles C. Kolb, Stacey Lengyel, Kory Cooper, Robert H. Tykot, Destiny Crider, E. Christian Wells, Rob Sternberg, Aaron Shugar, Blanca Maldonado, John Weymouth, Arleyn W. Simon, A.J. Vonarx, Michael D. Glascock, Michael Gottesman, Rachel Popelka, Chris Widga, Mitch Allen (Left Coast Press), Erik Hanson (AltaMira Press), and Teresa Krauss (Springer archaeology editor)

#### Call To Order

President Greg Hodgins, 5:08 PM. This will be the last meeting chaired by Greg as this meeting will appoint new executive officers. SAS minutes from the 69<sup>th</sup> Annual Meeting of the Society for American Archaeology in Montreal reviewed and accepted.

#### Reports from Officers

<u>President's Reports</u>, Greg Hodgins: Refer to Print Version, Errata – Jim Burton *Archaeometry* Editor, not *Journal of Archaeological Science*.

<u>President-Elect</u> Aaron Shugar: Initiated Bylaws review, identified nominees for open SAS board positions, conducted an email ballot for officer elections.

<u>General Secretary</u>, Rob Sternberg: refer to Print version for statistics. Looking into the legal ramifications of becoming incorporated, issue to be addressed in new business. Note on the 2005 to date enrollment numbers, this is consistent with last year and we expect to pick up additional enrollment throughout the year. Student enrollment is up, probably due to the Arizona meeting and the change in credit card pricing. Will send a reminder email for non-payment and work to gain return of members that have not participated recently.

<u>SAS Bulletin</u>, Rob Tykot: This is Robs 8th and final year as Editor of *SAS Bulletin*. He has been serving as Co-editor with E. Christian Wells for the last year. Christian will take on all duties as Bulletin editor. No substantial formatting changes and the transition is going smoothly. We will want to continue having a month or two lag time in posting the online pdf version after paper print. This will not deter from membership receiving the first copy. Christian Wells is seeking new and regular contributors for the Bulletin, especially a new book review editor. April 20th is the deadline for the next bulletin, send all job announcements, meetings, and contributions via email.

Journal News – No Report

#### ISA - No Report

SASweb and SASnet, Jim Burton and Destiny Crider: Jim Burton sent written report. SASweb has officially moved from Jim Burton to Destiny Crider and Arleyn Simon at the Archaeological Research Institute at Arizona State University. Destiny and Arleyn have restructured and redesigned the web site. Please keep new content coming to the website, as this is how you keep membership using the service. SASnet (listserv) continues operations through Jim Burton but has moved the service to CoreComm, the same provider for the web service. We should continue to seek a new home for both services that is more cost effective and provides better archival and analysis services. We will stay with CoreComm for at least a few months to assure stability in access to web and listserve components.

#### Old Business

<u>Report on Zaragoza Meeting</u> – not addressed in interest of time.

<u>Retirement of Board Members</u>. See web contact list for accurate changes in Board.

<u>R.E. Taylor awards</u> presented last SAA meeting: 2 at SAA, 2 at Archaeometry, 2 at Arizona (1 shared).

<u>Review of Archaeological Sciences in the Americas</u> September 26-28, 2004. Successful joint venture with SAS. Student poster competition successful. New membership.

Bylaws Amendments Update, Aaron Shugar: Secretary position no longer in the Bylaws. Reference to "Mail" refers to traditional and electronic forms. Will post two versions of bylaws, old and suggested revisions, to the web site for membership review. Will be posted for 60 days, followed by electronic or mail vote. We need to bring what we do into agreement with the bylaws.

#### New Business

Election Results, Rob Sternberg: Done via email vote. Elections: 44 ballots cast. 42 for Rehren, 43 for Burke, 41 for Vonarx. Wells: are membership development, intersociety relations to be elected or appointed?

Appointment of Officers for 2005-2007, President – Aaron Shugar, Past-president – Greg Hodgins, President Elect – Thilo Rhen, VP Intersociety Relations – Adrian Burke, VP Membership – A. J. Vonarx, SAS Bulletin Editor – E. Christian Wells, Publications Coordinator – Rob Tykot, SAS Web – Destiny Crider and Arleyn Simon.

<u>Comments regarding agenda as SAS President</u>, Aaron Shugar: Interested in increasing the number of students to SAS as well as a student voice in *SAS Bulletin* and webpage. Would like to see the webpage used to provide more reports and exposure to student research.

Book & Symposium Proceedings Publisher Search, Rob Tykot: brief history of SAS publications (primarily Plenum/Springer). Plenum/Kluwer series (http://www.socarchsci.org/ advances.htm). Springer has now absorbed these. Rob has invited three publisher representatives to speak with the SAS board about publishing possibilities.

Mitch Allen – Left Coast Press, Inc. SAS needs to consider whether seeking long-term lasting relationship with a single press or different presses for different projects. Advances Series is the least enticing for the publisher as it is costly to produce for a small audience. Smaller press may be able to produce more cheaply than a large press. Many publishers more interested in general text publications because of wider audience appeal. The advantage of Left Coast Press, Mitch has unilateral decision-making ability. This press seems most interested in the general text but might consider combo deal if general text and specialty items done together.

Eric Hanson – Alta Mira Press. Eric Hanson, now archaeology editor of AltaMira, replacing Mitch Allen. Hanson echoed Allen's his comments: Publishers are of course interested in sales. Low-volume sales, such as edited volumes, might be balanced against larger sellers, like texts. The more narrow the audience, the higher the pricing. Alta Mira has the advantage of more presence and access to resources than Left Coast Press, but less flexibility in decision-making.

Theresa Krauss – Springer Press. Interested in a Handbook of Archaeological Sciences. Wants to clarify objectives of the association for printing. She is open to the potential for continued relationship with SAS, but like Alta Mira must review book prospectus through higher chain of command and might take some months to determine outcome.

Discussion centered around the dilemma that the primary SAS objective was to publish edited volumes of conference symposia, and that publishers want to avoid these as they are not very profitable. The presented publishing deals tie the SAS into long-term agreements to produce and publish more profitable books such as general college texts. These are not an immediate priority for the Society. Greg wondered whether we might want different publishers for different purposes and would like to see proceedings and edited volumes go forward as needed. Tykot also chatted with David Brown, publishers of Oxbow. Blackwell does not want to do edited volumes. University of Utah Press would be interested in edited volumes.

<u>Motion from Greg</u> – To change our publishing strategy so as to approach publishers individually, based on the project. Seconded, and passed.

<u>By-laws.</u> Move for a special vote on by-laws changes, to be posted. Seconded, and passed.

<u>Poster Award.</u> Move to change student poster award to cash award of \$100. Seconded. Discussion – is \$100 enough? Only 5 entries this year, would a cash prize increase interest? Stacey - recognition is the main thing. Motion passed.

Motion to name the student poster award as the R.E. Taylor award at SAA, and the SAS Award at other venues. Seconded, passed.

<u>Bulletin name change.</u> Christian might ask members about this through the *Bulletin*. We might need to keep the same main title to retain institutional subscribers; a subtitle could be added. Christian will continue to consider subtitle name Possibilities include 'Archaeological Scientist' and 'Scientific Archaeology.'

Lobbying. Charles Kolb and Greg Hodgins will look into lobbying possibilities. Our by-laws say we should do that. Need to identify SAS goals in lobbying efforts, generally to increase research funds for archaeological sciences. Will seek to identify most useful Congressional Committees for review.

<u>Michael Glascock</u>. Organizing ACS Symposium on archaeological chemistry for the next annual meeting in Atlanta, March 2006.

Budget. Reviewed and approved.

<u>Next General Meeting</u>. Alternatives were to hold the next General Meeting of the SAS in the context of the SAAs, or the next International Symposium on Archaeometry. Motion put forward to hold the next general meeting at the Archaeometry Symposium in Quebec City. This motion was passed.

Adjourned: 6:25pm.



The 2005 Annual Meeting of the Society for American Archaeology took place at the Salt Palace Convention Center in Salt Lake City, Utah (USA), March 23-29. The SAS Business Meeting was held across the street in the Marriott, the convention hotel.

#### Making a Case for Agent-Based Modeling

Luke S. Premo, John T. Murphy, Jonathan B. Scholnick, Brandon M. Gabler, and Joseph E. Beaver University of Arizona

Archaeologists' knowledge of the past must rely on inference, often from scant material remains. Those of us who are not ethnoarchaeologists are denied the opportunity to directly observe our subjects: we can never watch Plio-Pleistocene hominins interact around a bovid carcass, or Hohokam farmers deal with the complexities of an irrigation system during a dry year. However, computer technology offers a way to view the dynamics of past cultural formation processes in digital conceptual models. Our student-run research group at the University of Arizona has found one relatively new class of models, called Agent-Based Models (ABMs), to be especially useful in this endeavor. Here we discuss the use of ABMs as "cultural laboratories" capable of executing controlled, repeatable experiments and systematically exploring multiple parameters of hypothetical cultural processes. We also provide brief synopses of ongoing projects to introduce research that is currently making use of this promising new methodology.

#### Agent-Based Models as Cultural Laboratories

A computer model does not simulate reality, but instead represents and encodes our concepts of it. Thus, it is a tool used to explore our ideas about the past, rather than the past itself. Once encoded, a computer model can do what our limited imaginations do not permit: follow the implications of our ideas to find where they lead and, often, where they are inconsistent. ABMs, like any other models (narrative, formal, or digital), are simplifications. No model captures every nuance of reality, so every model is a caricature. This limitation can also be an advantage. The simplest models are often the most useful, either because they highlight the central variables, or because they show us clearly where our conceptualizations of the problem are inadequate.

Although agent-based modeling was originally developed by computer scientists interested in artificial life, the technique has since been applied to research questions in physics, evolutionary biology, and economics, to name a few. ABMs use software objects called agents that have limited means to perceive some virtual environment and limited repertoires by which they interact with it and with other agents. Whereas the rules an agent follows may be quite simple, the aggregate outcome of their interactions may be difficult to predict. In some ABMs, a single agent interacts with an environment; here, the impacts of varying environmental and/or behavioral parameters are often of greatest interest (Brantingham 2003). In other ABMs, populations of agents interact to form "artificial societies" (Epstein and Axtell 1996) that exhibit emergent properties (e.g., distribution of wealth, variable archaeological assemblages) that are strikingly similar to those in real societies. This kind of modeling breaks free from top-down, deterministic equation-based approaches. The dynamics observed are generated from the bottom-up, in that emergent properties arise

from the individual agents' actions, just as the global properties of a society or complex system emerge from the actions of single persons or components.

Anthropologists can employ ABMs to experiment with the cultural processes that result from various combinations of behavioral rules and selective pressures in the same way that a chemist might experiment with a reaction between various concentrations. For example, in silico we can endow an agent with a strategy adapted to one area and observe its success in another: an agent that uses a !Kung foraging strategy can be placed in the Arctic or in a tropical rain forest in a way that a real !Kung forager cannot. Moreover, the most important elements of the model are reduced to simplified essentials, and the state space defined by the entire suite of pertinent ecological, social, and behavioral variables can be explored strategically or exhaustively. Repeatability is a central tenet of scientific experimentation, and provided the input data and algorithms are preserved, every agent-based modeling experiment is completely replicable. Publication of code renders experiments completely transparent as well.

ABMs can encompass large temporal and spatial scales, and yet make many details available for analysis. Consider the utility of a data set that documents the daily movements, interactions, and resulting material correlates of 100,000 people over 1,000 years. Using ABMs allows one to act as an "artificial ethnoarchaeologist" who not only has control over the initial conditions of the model but also has perfect knowledge of every agent's health, memory, individual reproductive fitness, etc. throughout the duration of the experiment. Given this ability to collect accurate data from millions of agents over extended periods of simulated time, ABMs yield richer data sets than archaeologists are normally privy to, and these, in turn, lead to and permit questions that could not otherwise be addressed.

Simulations cannot tell us exactly what happened in the past. But by allowing us to play out multiple alternatives, they provide a way to identify plausible scenarios, as well as to see when our assumptions and expectations lead to implausible or patently false outcomes. They also permit the exploration of multiple hypothetical (what if) scenarios. Such approaches are crucial to the exploration of dynamics in complex and emergent systems, including coupled human and environmental systems.

#### Some Examples of Current Agent-Based Modeling Projects

Luke Premo developed an ABM, called the Simulated Hominin Altruism Research Environment (SHARE), using the Swarm libraries (Minar et al. 1996). The goal of the project is to study the evolution and archaeological implications of Plio-Pleistocene hominin food sharing from the bottom-up. Population data collected from artificial societies of hominin foragers demonstrate that transitional levels of food resource patchiness can facilitate the evolution of altruistic food sharing due to the fitness benefits it bestows upon members of subsistence-related trait groups (Premo 2005). Spatial data collected from artificial assemblages demonstrate that clusters of dense artifact accumulations, akin to those found in Olduvai and Koobi Fora, do not necessarily require central place foraging; they can form when routed foraging strategies are employed in patchy environments.

John T. Murphy is working with the International Institute for Sustainability at Arizona State University on a model, underwritten by the McDonnell Foundation, of Hohokam irrigated agriculture. Hohokam canals could exceed 20 km in length, but whether the system required a central authority or could have been constructed, maintained, and managed by independent but cooperating groups is unknown. The model includes parameters such as water flow and agricultural production; the simulation assembles data (genuine and hypothetical) on plant productivity, cropping schedules, labor costs, among others. The simulation can be run via the Internet, and forms a "collaboratory" in which Hohokam scholars can work together to construct alternative possible scenarios about Hohokam agriculture and social organization.

Jonathan Scholnick is building an ABM to investigate how different cultural transmission mechanisms affect an artifact style's popularity through time. While archaeologists frequently employ battleship-shaped, unimodal popularity curves to seriate assemblages, the mechanisms that contribute to these patterns have not been systematically investigated. Previous simulations have shown that drift and innovation can generate unimodal histograms (Neiman 1995), but the effect of different learning behaviors on the sizes and shapes of popularity curves has not been studied. Model results will be compared with empirical archaeological data to evaluate the effect that cultural changes such as village formation might have had on patterns of ceramic production in the American Southwest.



Screen shot of SHARE in the middle of a simulation run. Left: altruistic foragers are blue, selfish foragers are red, plants are green, and animal carcasses are white. Each of these agents has its own set of internal variables and behaviors. Upper Right: streaming log of agent communication and agent interactions. Right: line graph of selfish and altruistic forager populations through simulated time. Lower Right: line graph of betweengroup and within-group selection through simulated time.

Brandon M. Gabler is developing an ABM that will examine emergent aggregation of farming societies on the Pajarito Plateau, New Mexico. This project aims to develop artificial societies on the plateau and follow them through settlement changes due to social and environmental patterns through the Coalition and Classic Periods. The shifts in settlement from low to high elevation are thought to be related largely to environmental conditions, but increased rainfall fails to explain why people remained at high elevations. The promise of an agent-based approach lies in its abilities to generate testable archaeological expectations for different hypotheses about aggregation on the plateau and to facilitate a cross-cultural comparison to determine the robustness of the model's results.

Joseph Beaver is modeling food sharing relationships between households in small-scale farming societies. While traditional approaches to understanding the level of social equality/inequality in such societies treat resource scarcity or abundance as cause or condition, his study examines emergent variability in circumstances of resource-balance at the level of the entire society, but with varying levels and types of interhousehold imbalance. Social network analysis techniques are applied to patterns of food sharing relationships to examine the potential ability of households to claim prestige or exercise influence.

#### Agent-Based Modeling and Archaeological Science

Though the majority of the discipline views the first wave of agent-based applications with an appropriate mix of enthusiasm, curiosity, and skepticism, a distinguished minority has been extolling their potential for some time (see articles in Kohler and Gumerman 2000; Lansing 2003). We believe that agent-based modeling is well-suited to the larger enterprise known as archaeological science. ABMs often involve the application of techniques and theory from the biological, physical, and computer sciences to archaeological problems. In addition, they introduce another fundamental component of scientific hypothesis testing-controlled, replicable experiments-to archaeological research. Thus, a wellconstructed ABM acts as a cultural laboratory. It provides a setting in which one can perform experiments that are often impossible to observe in the field. We hope that this brief discussion of the experimental power of ABMs will encourage others to look more closely at this emerging technique-past the eye-catching (but often superfluous) visual displays, around the exotic lines of code, over the stacks of retrievable data, and into the nuts and bolts of the methodology-before (re)considering its rightful place in the discipline.

You may visit the Agent-Based Modeling Group at the University of Arizona webpage (www.u.arizona.edu/~jtmurphy/ ABM/ABM.htm) for links to additional resources and lectures.

Acknowledgements. We thank AJ Vonarx and Christian Wells for informing us of this opportunity to address the Society for Archaeological Sciences. Steve Kuhn and Amy Margaris provided helpful comments on an earlier draft of this essay. We also thank the many students and professors who have been a part of the UA Agent-Based Modeling Group over the last three years for sharing their time and expertise with us. Please address correspondence to Luke Premo (lpremo@email.arizona.edu).

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#### **Book Reviews**

Stacey N. Lengyel, Associate Editor

**Pompeian Households: An Analysis of the Material Culture.** Penelope M. Allison, The Cotsen Institute of Archaeology, University of California: Los Angeles, 2004. xvii + 255 pp., 115 figures, 74 tables, one appendix, index. Price \$40.00 (paper). ISBN 0-917956-96-6.

Reviewed by Peter S. Wells, Department of Anthropology, University of Minnesota, 395 HHH Center, 301 19<sup>th</sup> Avenue South, Minneapolis, MN 55455 USA.

This book is a study of houses in the city of Pompeii, of rooms in those houses, of the objects recovered in the rooms, and of what those data can tell us about how people used their domestic space. Pompeii is familiar to all archaeologists and indeed to a large portion of the general public, but Allison demonstrates that most of what we think we know is wrong – or at least not entirely right – and that we still have a great deal to learn about this important archaeological site. The author's approach to her study of Pompeian households was to consult a variety of records from the past two centuries of excavation at the site, as well as to study houses and rooms and, when available, portable objects from them. The principal purpose of her project is to examine what the objects found in these rooms can tell us about the functions of specific spaces in the houses. Another, related, purpose is to compare textual sources about room functions in the Roman world with the archaeological evidence at Pompeii.

At the outset, the author presents an excellent abbreviated discussion of the development of thinking about Pompeii. Art historians, Classical archaeologists, architectural historians, ancient historians, and anthropological archaeologists have approached and understood Pompeii differently. Over the more than 200 years of excavation work at the site, goals and methods have varied greatly, as have systems of recording data, making Allison's task of assembling a database from a sample of 30 selected houses challenging. She chose 30 "atrium" houses (houses with open courtyards surrounded by rooms) for her study. A problem with past interpretations has been the tendency for investigators to assume the use to which a room was put on the basis of structural features and wall decorations. Allison tests this idea and, not surprisingly, finds that the reality was considerably more complex.

Of special interest to anthropological archaeologists is the author's discussion of the nature of Pompeii as an archaeological site. Common knowledge holds that the city of Pompeii was sealed by the eruption of Mount Vesuvius in AD 79, such that large numbers of objects were left exactly where they had been when people last used them. This notion gave rise to the "Pompeii Premise," a topic regularly discussed in introductory archaeology courses - the assumption, applied incorrectly to most archaeological settlement sites, that the archaeologist finds objects where they were left by the inhabitants, as if the site had been suddenly abandoned, and everything remained in situ. As Allison points out, a series of earthquakes from AD 62 on not only damaged houses at Pompeii, but they also caused people to make repairs, rearrange interiors, and otherwise transform their living spaces. Far from being fully intact when archaeologists began exploring the site in the 18th century, Pompeii shows considerable evidence of disturbance. Archaeologists have often encountered holes broken through house walls, apparently made to recover valuables left behind at the time of the volcanic eruption in AD 79, either by returning owners of the houses or by looters.

For her analysis, Allison constructed a database of 863 individual rooms within the 30 houses that formed her sample

and of roughly 6,300 artifact entries (individual artifacts or groups of associated items). She discusses in detail the character of different rooms and of objects that can be associated with them. In analyzing functions of objects, she examines categories of activity such as food preparation and storage, consumption, sleeping, personal hygiene, leisure, religious ritual, and domestic manufacturing. She considers connections between material culture and different categories of persons as defined by age and gender and by whether individuals were enslaved or free, residents or visitors.

Her conclusion, summarized briefly, is that the patterning of portable objects in rooms suggests that the functions of rooms were much more variable than most text-based studies have proposed. The purposes for which rooms were used often changed over time, multiple activities could be carried out in one room, and sometimes unexpected functions could be identified in a room.

This is a very interesting and important book. It is valuable for all archaeologists because it explains in good detail how complex the site of Pompeii is and because it demonstrates the kinds of information that we can derive from detailed analysis of rooms and their contents. For anyone concerned with Roman urban society, it presents a wealth of information about houses, rooms, and material culture of the latter half of the first century AD. The author explains her purposes, methods, and interpretations clearly and succinctly. She is explicit about the sample she selected, about problems with the data, and about the amount of work that remains to be done on the questions she poses and on others concerning Pompeii. The discussion is wide-ranging throughout, touching on anthropological archaeology, Classical archaeology, art history, and ancient history. The bibliography is excellent and leads the interested reader into a variety of different subjects. The book is copiously illustrated with black-and-white photographs, most of which are of good quality. The appendix includes plans of all 30 atrium houses that the author selected for her study. Tables are used to very good effect for summarizing large amounts of data pertaining to associations between objects and rooms. The text is very well written and free of jargon. This book is a welcome addition to the scholarly literature about Pompeii, and it has much to teach any archaeologist or historian concerned with understanding past domestic material culture and behavior.

**Earth Sciences and Archaeology.** Paul Goldberg, Vance T. Holliday, and C. Reid Ferring (editors), Kluwer Academic/ Plenum Publishers: New York, 2001. xxi+513 pp. Price: \$126 (cloth). ISBN: 0-306-46279-6

Reviewed by Rob Sternberg, Department of Earth and Environment, Franklin & Marshall College, Lancaster, PA 17604-3003 USA.

As discussed in the preface to this book, the title conveniently avoids the terms geoarchaeology and

archaeological geology, archaeometry and archaeological science. The distinctions among these terms are more important to some, less important to others (I'm in the latter category). Perhaps it is sufficient to suggest that the two disciplines of earth sciences and archaeology are involved, mutually informing one another. Techniques from each are utilized, problems in both can be addressed. The preface also quickly suggests that there is an infrastructure in this interdisciplinary area consisting of books, journals, conferences, societies and special interest groups, and academic programs. The editors go on to indicate the specific purpose of this contribution to the literature: a didactic book for archaeologists and earth scientists, looking at up-to-date methodologies, addressing concrete problems with the ability to extract practical information. By and large, the book has succeeded in meeting those goals.

The book is divided into six sections: background (2 chapters); geomorphological studies (4 chapters); soils, sediments, and microstratigraphy (4 chapters); specific techniques (3 chapters); geochemical methods (3 chapters); and a prehistorical perspective (1 chapter). The areas in which the editors primarily work (geomorphology and soils) are most strongly organized; the others might have been more effectively recombined into the more traditional areas of archaeometry/ geoarchaeology: chronology, paleoenvironment, geophysics, artifact analysis.

#### Background

"Quaternary Geoscience in Archaeology" (Holliday) is an excellent first chapter, providing the temporal and climatic framework for the rest of the book. The interplay of the earth systems of the atmosphere and oceans in determining climate is perhaps why the book title suggests the broader scope of earth sciences as opposed to just the solid earth focus implied by geology. I sometimes find the topic of site formation processes a bit elusive, but "A Review of Site Formation Processes and Their Relevance to Geoarchaeology" (Stein) put this topic into a comprehensible and fascinating historical and theoretical perspective. Stein describes the dependence of the entire subdiscipline of geoarchaeology (as used in the narrow sense) on the collaboration needed between archaeologists and geoscientists in understanding site formation processes. The practical examples included are in the didactic spirit of the book, although the reasons for choosing the specific examples used were unclear.

#### Geomorphological Studies

"Evaluating Causality of Landscape Change: Examples from Alluviation" (Frederick) starts off with a clear explanation of why the geomorphic emphasis has been more important in North America and some parts of Europe where the region is a more important unit than the individual site, especially when significant architectural remains are lacking. I liked Frederick's use of the term "opportunistic dating," one I sometimes used in archaeomagnetism–one has to sometimes work with what is available. The causal factors for alluviation again suggest involvement of broader earth systems. Ferring contrasts his article, "Geoarchaeology in Alluvial Landscapes," with the previous one by its emphasis on the alluvial sediments; the editors could have better honed the titles of these two chapters to emphasize their complementarity. I appreciated the section on site discovery methods, which put my interest in geophysical prospection into a wider geoarchaeological context. This paper covered a lot of territory, but was weaker in the didactic approach preferred by the editors. The first of these two alluvial papers had no figures, a bit of a surprise, while the two figures in the second paper were difficult to understand. Wells' paper, "A Geomorphological Approach to Reconstructing Archaeological Settlement Patterns Based on Artifact Distribution," starts with a useful reminder to this geoscientist that archaeological landscapes are molded by cultural as well as geologic forces. The paper emphasizes case studies. "Archaeoseismology" (Noller) is a welcome addition to the literature in this area, which tends to be oriented too much towards the popular media or short articles focusing on specific earthquakes. Timing of earthquakes as revealed in the archaeological record, their archaeological effects, and forecasting are all considered.

#### Soils, Sediments, and Microstratigraphy

"Use and Analysis of Soils by Archaeologists and Geoscientists: A North American Perspective" (Mandel and Bettis) progresses nicely through a series of topics, from distinguishing soil from sediment, to soils and archaeological surveys, to soils and site evaluations, and finally to soils and site excavations. I like their concluding statement, that soils are "historical archives." Figures would be better if they all showed a scale. In "Microfacies Analysis Assisting Archaeological Stratigraphy" (Courty), the discussion on how many samples to collect is useful, but it would also be helpful to consider how samples are taken from the ground and prepared. Several of the diagrams are rather complex and difficult to follow. In "The Soil Micromorphologist as Team Player: A Multianalytical Approach to the Study of European Microstratigraphy," Macphail and Cruise "illustrate ways in which the soil micromorphologist may more effectively work within a multidisciplinary approach to microstatigraphic studies." This is a useful reminder on how any good archaeometric project must integrate the archaeometric technique with an archaeological problem that needs solving. "Buried Artifacts in Sandy Soils: Techniques for Evaluating Pedoturbation Versus Sedimentation" (Leigh) reviews the different ways sandy soils can be disturbed by pedoturbation. Although some of the terms almost border on the comical (e.g., impacturbation), such can be the nature of technical terminology. The data in the longer tables at the end of his chapter might have been more revealing as graphs.

#### Specific Techniques

The title of this section is too general. "The Role of Petrography in the Study of Archaeological Ceramics"

(Stoltman) focuses on petrography rather than chemical characterization of ceramics. After a review of methods, he addresses four types of issues that petrographic data can address: classification, function, production, and exchange. The production section summarizes the postulates used in different types of provenance (sorry, I have to use that form over the author's preference for provenience) problems: the provenience, local-products-match, and spatial patterning postulates. And he concludes by reminding us that the purpose of ceramic studies should be to address a problem such as ceramic exchange. The "micro" emphasis of "Microartifacts" (Sherwood) might have had this chapter better placed in the previous section. This chapter reminds us again of the significance of scale, and the importance of information content at different scales, here at the small end of the spectrum. The question of scale was clearly represented in Fig. 12.1; the section on data representation would have benefited from some graphical representations of data; Fig. 12.3 seems to show little at all. "Current Practices in Geophysics" (Kvamme) is an excellent overview of the field methods of magnetics, resistivity, conductivity, and ground-penetrating radar. Unfortunately the page headings for this chapter, Aracheogeophysics [sic], made me wonder if it had something to do with spiders. Units for resistivity were incorrectly given as ohm/meter instead of ohmmeters). Table 13.1, comparing and contrasting the various geophysical methods, provides a useful overview to consider when selecting a particular method to use. The glossary was helpful, but this was a feature used only in this chapter.

#### Geochemical Methods

"Beyond <sup>14</sup>C Dating" (Rink) starts off with five questions to be asked in developing a site chronology: what material can be dated; what are the usefulness of these materials for the time range expected; what is the dated event; what would be the events bridging the dated material to the target dates; what would be the precision of the chosen methods? Tables 14.1, 14.2, and 14.3 provide helpful information relevant to these questions. The dating methods dealt with, beyond <sup>14</sup>C, are argonargon, uranium-series, fission-track, ESR, and luminescence dating.

"Stable Carbon and Oxygen Isotopes in Soils" (Nordt) returns to the topic of soils. Fig. 15.2 is a nice summary of how  $C_3$  and  $C_4$  plants generate various d<sup>13</sup>C values in soil organic matter, although the novice will have to wait another 11 pages for the definition of PDB. Several case studies support the book's goal of providing practical examples. "Sourcing Lithic Artifacts by Instrumental Analysis" (Herz) gives a quick overview of the alphabet soup of techniques – NAA, XRD, SEM, OES, AAS, ICP, CL, PIXE, ESR, NMR – and provides citations for one seeking more details in order to better savor the soup. And Herz warns us not to skip hand specimen and petrographic examination before heading straight for the hightech stuff. Various materials spanning the rock cycle are then discussed: obsidian, basalt, granite, serpentine, marble, sandstone, chert, carbonates, and amber (ok, that one's not a rock). Table 16.2 is a useful summary of which methods are

most promising for which lithic types (and even contains my own favorite, magnetics). He reminds us that possible goals include learning about: the time of fabrication; trading patterns; changing aesthetic tastes; technology; forgery detection; and assembly of broken artifacts. I like Herz' representation of the various choices as entire "systems" of analysis, not just techniques or methods.

#### Prehistorical Perspective

The sole article in the final section of the book is "A Personal View of Earth Sciences' Contributions to Archaeology" (Bar-Yosef). He discusses three areas in which close cooperation between earth scientists and archaeologists has been important: the environments of sites; site formation processes; and chronology. In echoing those topics that were interwoven into the fabric of this book, in speaking to the need to critically evaluate new methodologies, and in giving us a final, stern, and appropriate reminder of the need to integrate analytical methods with archaeological problems, Bar-Yosef has indeed earned the mantle of the "old teacher."

Overall, the production of the book is of generally good quality, although some photographs and figures could have been crisper, and some photographs would have benefited from color. The preface gets off to a bad start with a misspelling in the second sentence, and a few of the articles (e.g., Ferring, Wells, Nordt) have more typographical errors than one would hope for in a volume of this quality.

My perspective on this book is as an archaeomagnetist and geophysicist, but also as an instructor for an undergraduate course on archaeometry. The peculiar nature of my course is that students need not have much background in either earth sciences or archaeology, so the level of this book would be challenging for most of my students. Were my course taught more as an upper level course in geology, this book would be a better fit as a text. And for those teaching graduate level course, the fit could be even better. Some geoarchaeological topics are not well represented in this book, but of course could be covered in supplementary readings. Nonetheless, it's a book that should be in all of our institutions' libraries, and on many of our bookshelves as well. And, a less expensive paperback edition would make it more attractive to a wider audience.

**Soils in Archaeological Research**. Vance T. Holliday, Oxford University Press: Oxford, UK, 2004. xv + 448 pp., 111 figures and tables, three appendices, index. Price: \$115 (cloth). ISBN: 0-195-14965-3.

Reviewed by E. Christian Wells, Department of Anthropology, University of South Florida, Tampa, Florida, 33620 USA

Soil is often considered to be the product of numerous intersecting natural processes, including erosion of geological

materials, topography, climate, living organisms, and time. But as Vance T. Holliday argues in Soils in Archaeological Research, human behavior must be added to this list, and soil must be understood and studied as a product of social and cultural forces as much as natural ones. This idea is not exactly new, however; soil surveyors and pedologists have long recognized that physical, biological, and chemical properties of soil may be altered significantly as a direct result of human activity (hence the concept of "anthrosol"). Yet, as Holliday points out, only recently has pedological research become integrated as a core component of geoarchaeology (compared to stratigraphy, sedimentology, and geomorphology). In his latest contribution to archaeological soils research-adding to a long list of key contributions he has made to this realm of study over the last quarter century—Holliday convincingly demonstrates that, as the physical embodiment of human/ environment relationships, the soilscape is an important analytical domain because it reveals the consequences of the complex and multi-layered dialectic between human behavior and soil bodies over long periods.

While archaeology historically has been largely concerned with the study of human behavior manifest at the level of the site (a vaguely defined area of human settlement or activity), only very recently has the analytical unit shifted to the scale of landscapes and entire regions. Holliday takes advantage of this observation to highlight the ways in which geoarchaeologists draw theoretical and methodological insight from other social and natural sciences to study the use, management, and meaning of landscapes. For studying landscapes as social and natural phenomena, Holliday argues that geology, pedology, and other earth sciences must play a central role. These varied strands have combined to form new, transdisciplinary approaches to landscape research, which focus on the physical evidence for human/environment relations over very long time spans, on the order of hundreds or thousands of years.

The book is organized into 11 chapters and three appendixes. The first three chapters cover basic terms and concepts relevant to pedoarchaeology, including detailed discussions of soil genesis and soil geomorphology. Chapters 4-7 introduce the reader to basic data collection techniques (soil surveys and soil stratigraphy) and interpretive approaches (especially concerning pedogenesis and the concept of time) to understanding soil formation processes. The remainder of the book, Chapters 8-11, deals with special topics that often are of particular interest to archaeologists: paleoenvironmental reconstructions, landscape evolution, site formation processes, and human impacts on soilscapes. The book concludes with three valuable appendices that provide information on suggested modifications to USDA field nomenclature, approaches to total and extractable soil phosphorus, and (co-authored with Julie Stein and William Gartner) a comparison of various common laboratory methods for sediment and soil analysis.

Perhaps the greatest value of this book (in my opinion) is Chapter 11, "Human Impacts on Soils," which should be required reading for all archaeology students. In this chapter, Holliday sets out to provide a comprehensive review and critical discussion of the ways in which human behavior impacts soils and what we can learn about those processes, such as the shape and spread of settlement, stratigraphic relationships and site formation processes, and intrasite activity areas, as well as more traditional studies of agriculture and natural resource management. After an impressive synthesis of the literature, Holliday focuses on the analysis and interpretation of a range of physical and chemical attributes associated with soil phosphorus, anthrosols, and agriculture.

Soil phosphorus (P), for example, is a sensitive indicator of human activity, as its deposition is associated with a variety of human activities including food preparation and consumption, refuse disposal, and fertilizing. The basic idea is that the surfaces of certain soil particles, particularly clays, hold ions carrying a negative charge (anions) that act like magnets to attract positive ions (cations). Cations, including those from aluminum and calcium, bond with P to form relatively stable chemical compounds, which become attached to soil particles in a process known as cation exchange. Since these compounds are rapidly fixed to the mineral surfaces of soil particles, they tend to remain stable and immobile for very long periods. Archaeologists have studied the proportional relationships of P and many other elements for reconstructing land use practices (Wells 2004).

As Holliday points out, the study of human impacts on soils is one of the oldest applications of soil studies in archaeology. However, Holliday misses the chance to acknowledge Charles Darwin as possibly one of the first "geoarchaeologists" concerned with soil-forming factors and the deposition of cultural materials (Feller et al. 2003). In Darwin's last—and largely neglected—book, *The Formation* of Vegetable Mould Through the Action of Worms, With Observations on Their Habits, Darwin ponders the question of how archaeological remains become buried over time. In answering this question, he measured the effects of earthworms on an ancient Roman villa near his home. He concluded that "archaeologists ought to be grateful to worms" because they "protect and preserve for an indefinitely long period every object... dropped on the surface of the land, by burying it beneath their castings" (Darwin 1881:146). This was a significant, if often ignored, contribution at the time, which would have added to Holiday's chapter on human impacts—if only to contextualize the range of soil studies in archaeology.

With a comprehensive and timely bibliography, this book is certainly core reading for geoarchaeologists, but is also essential for all archaeologists and pedologists—as a classroom textbook or field guide. Indeed, the significance of Holliday's book is the way in which it manifests transdisciplinary research that exposes the linkages between social and natural sciences.

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- Feller, Christian, George G. Brown, Eric Blanchart, Pierre Deleporte, and Sergey S. Chernyanskii, 2003. Charles Darwin, Earthworms and the Natural Sciences: Various Lessons from Past to Future. *Agriculture, Ecosystems and Environment* 99:29-49.
- Wells, E. Christian. 2004. A Brief History of Archaeological Soil Chemistry. *Newsletter of the International Union of Soil Science and the Soil Science Society of America* 11:2-4.

#### **Books Available for Review**

Please contact the book review editor, Stacey Lengyel (slengyel@sricrm.com), if you are interested in reviewing any of the following books:

- Bell, Ellen E., Marcello A. Canuto, and Robert J. Sharer (editors). 2003. *Understanding Early Classic Copan*. University of Pennsylvania Museum Press, Philadelphia.
- Fagan, Brian. 2005. Chaco Canyon: Archaeologists Explore the Lives of an Ancient Society. Oxford University Press, Oxford, UK.
- Lucas, Gavin. 2005. *The Archaeology of Time*. Routledge, New York.
- Monaghan, G. William and William A. Lovis. 2005. *Modeling Archaeological Site Burial in Southern Michigan: A Geoarchaeological Synthesis*. Michigan State University Press, East Lansing.
- Richards, Janet. 2005. Society and Death in Ancient Egypt: Mortuary Landscapes of the Middle Kingdom. Cambridge University Press, Cambridge, UK.
- Yoffee, Norman. 2005. *Myths of the Arhcaic State: Evolution of the Earliest Cities, States, and Civilizations*. Cambridge University Press, Cambridge, UK.

#### **CALL FOR CONTRIBUTIONS**

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

Upcoming Conferences

Colleen P. Stapleton, Associate Editor

#### 2005

- Aug. 28-31, 5th International Bone Diagenesis Meeting, University of Cape Town, South Africa. Contact: Julia Lee Thorp, jlt@science.uct.ac.za, Convenor & Chair of the Organising Committee. General information: www.cmc.uct.ac.za/ conferences/2005/bonediag/info.html.
- Aug. 31-Sep. 3, 3rd International Conference on the Application of Raman Spectroscopy in Art and Archaeology, University Pierre et Marie Curie, Paris. General information: http://www.ladir.cnrs.fr/ArtRaman2005/. Contact: Conference Secretariat, LADIR UMR 7075 CNRS Université Pierre et Marie Curie, Paris 6, 2 rue Henri Dunant, 94320 Thiais, France. Phone: (33 or 0) 1 49 78 11 14, fax : (33 or 0) 1 49 78 11 18, email: ArtRaman2005@iscsa.cnrs.fr.
- Sep. 12-16, 14th ICOM-CC, The Hague, The Netherlands. Contact: Congress ICOM-CC 2005, Floortje Kok, Keizersgracht 497, PO Box 76709, 1070 KA Amsterdam, The Netherlands, tel: +31 20 305 45 20, fax: +31 20 305 45 00, email : icom-cc2005@icn.nl. General information: www.icom-cc2005.org/intro/harikete/.
- Sep. 12-16, 22nd International Meeting on Organic Geochemistry, Seville, Spain. "New Trends in Organic Geochemistry," including studies from archaeology, biochemistry, and DNA. General information: www.imog05.org.
- Sep. 12-16, 15th International Conferences on Secondary Ion Mass Spectrometry, University of Manchester, UK. Includes one day symposium on Archaeometry, Cosmochemistry and Geology. General information: http:/ /www.meeting.co.uk/confercare/simsxv/info.htm.
- Sep. 19-23, 14th Meeting of the Association of the European Geological Sciences, Turin, Italy. Website, http://www.maegs14.com.
- Sep. 19-20, Glass Science in Art and Conservation, Universidade Nova de Lisboa, Portugal. Contact: Mrs. Ana Maria Alonso Martins, Departamento de Conservação e Restauro, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa Monte de Caparica, 2829-516 Caparic, Portugal, Ph/FAX: 351 212948322, amam@fct.unl.pt. General information: http:// www.apvidro.org/Glass\_2005.html.
- Sep. 26-29, Archaeometallurgy Session, Materials Science & Technology 2005 (MS&T '05), Pittsburgh, PA, USA. The third in a series of multidisciplinary annual conferences held by and for professionals in the metals and materials community. Sponsored by TMS, the Association for Iron & Steel Technology, ASM International, the American Ceramics Society, and the American Welding Society. Session organizers: Mike Notis, Heather Lechtman, Pam Vandiver, Martha Goodway. Contact: TMS Meetings Services, 184 Thorn Hill Road, Warrendale, PA, 15086; tel: (724) 776-9000, ext. 243; fax: (724) 776-3770; e-mail: mtgserv@tms.org. General info: www.matscitech.org.
- Sep. 28-29, Metallurgy in Southeast Europe from Ancient Times till the End of 19th Century, Sozopol, Bulgaria. Union of

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Bulgarian Metallurgists, 108 Rakovsky Street, 1000 Sofia, phone/fax:(+3592) 986 2964, e-mail: bum@ttm.bg. General information: www.bum.ttm.bg/3thIntSymposium\_en.htm.

- Sep. 29-Oct. 1, 3rd Forbes Symposium on Scientific Research in the Field of Asian Art, Freer Gallery of Art, Washington, DC, USA. Email: dcsr@asia.si.edu; fax: 202-633-9474. General information: www.asia.si.edu/visitor/ dcsrSymposium.htm.
- Oct. 16-19, Advances and Applications of Tephrochronology and Tephrostratigraphy: In Honor of Andrei M. Sarna-Wojcicki, held in conjunction with the 2005 Annual Meeting of the Geological Society of America, Salt Lake City, Utah (USA). For more information: Janet L. Slate, Earth Surface Processes Team, U.S. Geological Survey, Box 25046, MS 980, Denver, CO 80225 USA, phone: 303-236-1284; fax: 303-236-0214; email: jslate@usgs.gov.
- Oct. 20-21, Primer Congreso Argentino de Arqueometria: "Metodologías Científicas Aplicadas al Estudio de los Bienes Culturales," Rosario, Argentina. For more information: Primer Congreso Argentino de Arqueometría, Laboratorio de Materiales y Tecnologías, Escuela de Antropología. Facultad de Humanidades y Artes, Universidad Nacional de Rosario, Entre Ríos 758. CP 2000. Rosario (Santa Fe) – Argentina; TEL y FAX: 0341-4802675; Vía electrónica a la Organización del Congreso: c o n g r e s o . a r q u e o m e t r i a @ g m a i l . c o m ; www.fhumyar.unr.edu.ar/eventos/congresos.html.
- Oct. 21-23, Developing International Geoarchaeology, University of New Brunswick, Saint John, NB, Canada. Contact: Pam Dickinson, Dept. of Geology, University of New Brunswick, PO Box 4400, Fredericton, New Brunswick, E3B 5A3, Canada. Phone: 001 (506) 453-4804, fax: 001 (506) 453-5055, email: diskinson@dig2005.com. General information: http:// www.dig2005.com/.
- Oct. 25-29, European Meeting on Ancient Ceramics (EMAC' 05), Lyon, France. First circular. Contact: EMAC' 05,Laboratoire de ceramologie, UMR5138, Maison de l'Orient et de la Mediterannee, 7 rue Raulin, 69365 LYON cedex 7, FRANCE; tel: 33 (0)4 72 71 58 71, fax: 33 (0)4 78 69 82 31, email: emac05@mom.fr.
- Nov. 16-29, Artifacts: The Inside Story, American Schools of Oriental Research Annual Meeting, Philadelphia, Pennsylvania, USA. Please check the ASOR website for membership and participation requirements, http:// www.asor.org.
- Dec. 5-9, Near-surface Geophysics is the name of a special focus session to be held at the Fall Meeting of the American Geophysical Union (AGU) this year in San Francisco, CA, USA. For general meeting information, see http://www.agu.org/meetings/fm05/ Electronic abstract submissions will close 6 September 2005.
- Dec. 12-15, Australasian Archaeometry Conference, Australian National University, Canberra. Sponsored by the Department of Archaeology and Natural History and the Centre for Archaeological Research. Abstract deadline: Oct. 31, 2005. General information: http://car.anu.edu.au/ Archaeometry/archaeometry\_conference.html.

#### 2006

- Jan. 8-14, Winter Conference on Plasma Spectrochemistry, Tucson, Arizona. For more information, contact Dr. Ramon Barnes, Conference Chairman, Telephone (413) 256-8942, Fax (413) 256-3746, Email wc2006@chem.umass.edu, Website http://www-unix.oit.umass.edu/~wc2006.
- Jan. 9-12, The Second International Conference on Environmental, Cultural, Economic and Social Sustainability will be held in Hanoi and Ha Long Bay, Vietnam. Full details of the conference, including an online call for papers form, are to be found at the conference website, http:// www.SustainabilityConference.com.
- Jan. 11-15, SHA Annual Conference, Sacramento, CA, USA. General information: http://www.sha.org/About/ Conferences/mt2006.htm.
- 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 renting a vendor booth at the CAA2006 Technology Expo, or 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 and abstract submission: http://www.saa.org/meetings/ index.html.
- May 10-15, International Symposium on Archaeometry, Quebec City, Canada. No details yet available.
- June, ASMOSIA, Aix en Provence, France. Contact: Prof. Philippe Jockey, Maison Méditerranéenne des Sciences de l'Homme.
- June 23-26, Integrating African Archaeology, honoring Peter Lewis Shinnie, is the theme of the biennial conference of the Society for Africanist Archaeologists. The conference will be held in Calgary, Alberta, Canada. For more information, visit the website at http:// homepages.ucalgary.ca/~safaconf/SAFA/index.htm.
- July 9-15, 18th World Congress of Soil Science, Philadelphia, PA, USA. Symposium on "Soil Micromorphology, Archaeometry, and Archaeology". Contact: Robin Thwaites (R.Thwaites@qut.edu.au) or Brian Slater (slater.39@osu.edu). General information: http:// www.colostate.edu/programs/IUSS/18wcss/index.html.

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