SAS Bulletin

Society for Archaeological Sciences

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From the Editor

With this double issue, we should have finally resolved both our printing and distribution problems and the *Bulletin* should get back to a more regular schedule. In fact you should receive the next issue in about six weeks. Please keep submitting your news and information to us!

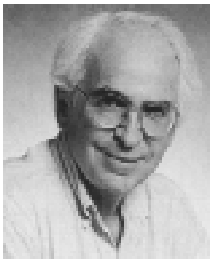
For 2000, we note that SAS membership rates stay unchanged from last year, while we continue to offer the *Journal of Archaeological Science* to our members at a savings of over $600. A discount subscription rate for *Scientific American Discovering Archaeology* is also available (contact Johanna Hunziker, managing editor, at jhunz@elp.rr.com), and we should be able to offer a very special rate on *Archaeometry* in the coming year as editor Michael Tite intends to transform it into a commercially produced quarterly.

As we enter the new millennium, archaeological science appears to be thriving in many ways. At my own institution, three introductory courses in archaeological science were taught this year, to a wide variety of undergraduate and graduate students: "Chemistry in Archaeology" was offered by Dr. Jay Palmer in the chemistry department, as a lecture course using Joseph Lambert's book *Traces of the Past* as the primary text; Prof. Wendell Williams taught "Archaeometry" out of the chemistry department on our honors campus; and I offered "Archaeological Science" as a 3-hour lecture plus 3-hour lab course to a mix of anthropology majors and archaeology graduate students. At the same time, there are many challenges still ahead to bring the significance of archaeometry to archaeological and anthropological interpretation to the broader professional community and the general public. Arleyn Simon reports that an SAS proposal to the Wenner-Gren Foundation for Anthropological Research, to support New World scholars attending the Archaeometry Symposium, was declined. The reviewer's comments begins "Archaeometry, almost by definition, does not deal with the anthropological significance of archaeological research, but rather with state of the art instrumentation and techniques in the service of archaeology." This should remind all of us that as focused as we may be on the proximate technological and methodological aspects of our research, we need to keep emphasizing the ultimate goal of our endeavors, the reconstruction and interpretation of past human behaviors.

SAA 1999 Awards

Among the awards given at the Society for American Archaeology annual meeting in Chicago last April were the Fryxell Award for Interdisciplinary Research in the physical sciences, awarded to Henry P. Schwarcz, and the Excellence in Lithic Studies Award, awarded to Barbara E. Luedtke. The Fryxell Award citation reads:

"This year's Fryxell Award for Interdisciplinary Research in the physical sciences goes to Henry P. Schwarcz. Schwarcz earned his Ph.D. in geology from the California Institute of Technology and has taught geology at mcmaster University in Ontario for most of his career. his first publications related to archaeology involved uranium series dating of travertine deposits in caves, but he became intrigued by the many fascinating issues and problems archaeologists deal with and began to devote much of his research effort to archaeological geology. He has published more than 100 articles on archaeological topics, involving sites in all parts of the world. Many deal with dating, especially in the crucial and difficult age range between radiocarbon dating and potassium argon dating, using the uranium series as well as electron spin resonance. he also has investigated a wide range of other topics of significance to archaeology, including paleoclimates, stable isotope geochemistry of human and animal bone, and isotopic analysis of food residues on ceramics. he has served as chair of the Archaeological Geology Division of the Geological Society of America and on the editorial boards of *Journal of Archaeological Science, Journal of Human Evolution*, and *Geoarchaeology*. He also is notable for his inspiration and support to junior researchers; 10 of his former graduate students are working as geoarchaeologists. For his extraordinary commitment to strengthening the intersection between archaeology and geology, the Society for American Archaeology is honored to present the 1999 Fryxell Award for Interdisciplinary Research in the physical sciences to Henry P. Schwarcz."



(continued on page 2)

SAA Awards (continued from page 1)

The Lithic Studies Award citation reads:

The SAA is pleased to honor Barbara E. Luedtke as the 1999 recipient of the Excellence in Lithic Studies Award. Beginning with her graudate work at the University of Michigan in the 1970s, she has been an innovator and leading contributor to lithic studies in various regions of the Americas, including the Plains, the Great Lakes, Peru, and particularly New England. She has published extensively on several interrelated themes: chert and flint quarries, trace-element analysis, the organization

of lithic procurement, and techniques of stone-tool production. A major synthetic work building on these themes, *An Archaeologist's Guide to Chert and Flint*, was published in 1992 and has become the most widely used reference work of its kind. Luedtke's detailed explorations of the nature and origins of chert materials, their chemical, visible, and mechanical properties, and the procedures for formal analysis of chert sources, including petrographic and elemental analyses, are models for the field. She has regularly involved students in field schools and survey projects, imparting her knowledge. She sits on the editorial board of the journal *Lithic Technology*, is actively involved in public archaeology in the northeast, and has started a new project with Junius Bird's lithic collectiosn from Fell's Cave and Palli Aike in Peru. For Luedtke's pioneering efforts in lithic sourcing and insightful contributions to our udnerstanding of prehistoric stone industries, SAA is pleased to confer this award.

Position in Paleoethnobotany

University of Alabama at Birmingham, seeks, pending approval, full-time, tenure track archaeologist specializing in archaeobotany to take up appointment during the 2000-2001 academic year. Geocultural area and period of specialization open though an interest in developing a forensic botany program a plus. The candidate will be expected to develop and teach courses in his/her area of specialization. Ability to teach introductory cultural anthropology a must. Ph.D. in hand at time of appointment. Recruiting will be done at the SAA, American Academy of Forensic Science and Society for Ethnobiology meetings. Send letter, resume, two offprints or writing samples and three letters of recommendation by 1 April 2000 to Brian Hesse, Department of Anthropology, 338 Ullman, University of Alabama at Birmingham, Birmingham, AL 35294-3350. Preliminary inquiry may be made to bhesse@uab.edu. Women and minorities are especially encouraged to apply.

NERC PhD Studentships at Oxford

Applications are invited for NERC funded PhD Studentships from October 2000 at the Research Laboratory for Archaeology and the History of Art, University of Oxford. The general topics available are:

1. Study of ancient diet using isotopic molecular information;
2. Glass and related vitreous materials technology and provenance;
3. Luminescence dating of ceramics and sediments;
4. Radiocarbon dating

Candidates should have, or expect to obtain, a first or upper second class degree, normally in either a physical or biological science or in archaeological science, depending on the area of interest. Letters of application indicating the preferred project area and accompanied by a CV and names and addresses of two referees should be sent to Professor Michael Tite, Research Laboratory for Archaeology & the History of Art, 6 Keble Road, Oxford OX1 3QJ. Further information is available from web page www.rlaha.ox.ac.uk/nercs00a.html or Professor Tite (01865 283033 or <michael.tite@rlaha.ox.ac.uk>). Applications should be received by Friday 31 March 2000. The University is an Equal Opportunities Employer.

Fellowship in Archaeometallurgy

A three-year assistant position with the aim to obtain the PhD degree is available at the Institute of Mineralogy and Petrography, University of Fribourg, Switzerland.

Applicants should have a good mineralogical-petrographical background. The PhD work will focus on the study of the remains of an early blast furnace and finery (12th AD) excavated at Dorstel / Langenbruck BL/CH (chemistry and mineralogy of the metallurgical wastes and associated materials, technology of production, link with the ore, calculation of output, comparison with furnaces of similar age in Germany and Sweden).

The salary will be around 25'000 CHF/year. Starting date: May 1, 2000. Applications (curriculum vitae, copy of education documents, brief statements of research-experience and the names of two referees) should be sent as soon as possible to: Dr. Vincent Serneels, Institute of Mineralogy and Petrography, University of Fribourg, PΘrolles, CH 1700 Fribourg, Switzerland. tel +41 (0) 26 300 89 31; fax +41 (0) 26 300 97 65; email: vincent.serneels@unifr.ch; www.unifr.ch/mineral

Geoarchaeology

Michael R. Waters, Associate Editor

The column in this issue highlights meetings and graduate student funding opportunities.

Meetings

At the 65th annual meeting of the Society for American Archaeology that will be held April 5-9, 2000 in Philadelphia, the Geoarchaeology Interest Group has organized a symposium entitled "Rockshelter Sediment Records and Environmental Change in the Mediterranean." This symposium is co-organized by Jamie Woodward and Paul Goldberg. The speakers and topics are as follows:

–Sediments and Stratigraphy in Rockshelters and Caves from Spain to the Near East: Principles and Pragmatics, Bill Farrand.

–The Record of Abrupt Climate Change in Cemented Rockshelter Sediments in the Mediterranean Region, Marie-Agnes Courty, Josep Vallverdu, Angelo Angelucci, and Igor Arteaga.

–Chronometric Dating of Archaeological Features in Rockshelters and Caves, Henry Schwartz and Jack Rink.

–Macroscopic Plant Remains in Mediterranean Caves and Rockshelters: Avenues of Interpretation, Julie Hansen.

–Late Pleistocene and Holocene Climate Change Derived from Magnetic Susceptibility Measurements of Cave and Rockshelter Sediment Samples, Brooks Ellwood and Francis Harrold.

–The Formation and History of Stratified Deposits as Indicated on Flint Surfaces, Randolph Donahue and Daniela Burroni.

–El Miron Cave: A Late Quaternary Stratigraphic Sequence in the Cantabrian Cordillera, Cantabria Spain, Manuel Gonzales Morales, Lawrence Guy Straus, Marie-Agnes Courty, and Bill Farrand.

–Rockshelter Sediment Sources and Environmental Change: Linking the On-site and the Off-site Records, Jamie Woodward.

–Microstratigraphy and Microanalysis at Gorham's and Vanguard Caves, Gibraltar, Paul Goldberg and Richard Macphail.

–Stratigraphy and Sedimentology of the Akrotiri Aetokremnos Rockshelter, Southern Cyprus, Rolfe Mandel.

–Trend and Transition in the Stratigraphic Record of Konispol Cave, Albania: Merging Environmental and Archaeological Data Sets, Joseph Schuldenrein, Brooks Ellwood, Karl Petruso, Francis Harrold, and Julie Hanson.

–Discussant, Ofer Bar-Yosef.

The Geoarchaeology Interest Group is also sponsoring a one-day field trip at the SAA meeting. The trip will occur on Wednesday, April 5th. The field trip is organized by Doug Kellogg and will address "Current Issues in Mid-Atlantic Geoarchaeology." This all-day field trip will examine a number of archaeological and geological localities. Pre-registration is required for this trip and reservations must be made by February 25, 2000. Cost is $50/person and includes lunch and transportation. For more information about the trip, contact Doug Kellogg at: dkellogg@johnmilnerassociates.com.

Funding Opportunities for Graduate Students

Claude C. Albritton Memorial Fund. This fund (sponsored by the Archaeological Geology Division of the Geological Society of America) provides a $2,000 award in support of thesis or dissertation research in the field of geoarchaeology. To be eligible to receive this award you must be a graduate student working on an M.A./M.S. or Ph.D. in the geosciences or archaeology, be interested in applying earth science methods to archaeology, and have a desire to pursue a career in teaching and research. For more information contact Reid Ferring, Institute for Applied Sciences, P.O. Box 13078, University of North Texas, Denton, TX 76203 (e-mail: ferring@unt.edu). Deadline for receipt of proposals is May 1, 2000.

Jonathan O. Davis Scholarship Fund. This scholarship provides support to a graduate student for field research on the Quaternary geology of the Great Basin or surrounding areas. Awards of $2,000 are given annually. For more information contact: Executive Director, Quaternary Sciences Center, Desert Research Institute, P.O. Box 60220, Reno, NV 89506.

Travel Grant. The Archaeological Geology Division of the Geological Society of America provides a $650 travel grant for a student to attend and present a paper in the Division's technical session at the annual meeting of the GSA in Reno, Nevada to be held November 13-16, 2000. This award is competitive and is awarded based on the evaluation of an abstract and a 2000 word summary paper prepared by the student. Deadline for submissions is May 1, 2000. Applications are to be sent to Tina Niemi, Chair, GSA Archaeological Geology Division Awards Committee, Dept. of Geosciences, Science and Technology Building, Room 420, 5100 Rockhill Rd, Univ. of Missouri, Kansas City, MO 64110-2499 (e-mail niemit@umkc.edu).

Geological Society of America Graduate Student Research Grants. Funding provided directly by the Geological Society of America to support graduate student research on geological topics. Applications can be obtained from: Leah J. Carter, Research Grants Administrator, Geological Society of America, P.O. Box 9140, Boulder, CO 80301-9140 (e-mail lcarter@geoscoiety.org). Deadline for applications is February 1, 2000.

Geochron Laboratories (Krueger Enterprises, Inc.). Geochron Laboratories is offering a number of research grants for graduate students. The awards are free analytical services. Awards are offered in the following categories: (1) K-Ar dating; (2) C-14 dating, and (3) stable isotope analyses. The awards are offered to encourage the application of isotopic methods to solve original and significant problems in archaeology and Quaternary geology. Deadline for applications is May 1, 2000. For guidelines and more information contact: Geochron Laboratories, 711 Concord Ave., Cambridge, MA 02138.

Funding of *Radiocarbon* Journal

Radiocarbon dating has a long history at the University of Arizona. One measure of that is our publication of the reference journal for radiocarbon, the journal of the same name. We believe this journal is very important to the radiocarbon community and we request your support.

As part of the new management of *Radiocarbon*, we are undertaking a campaign to solidify the journal's financial base. *Radiocarbon* is in a small financial crisis. The journal has run a deficit of $12-25K for some years, and the current total deficit is about $36K. The journal has a total operating cost of about $135K. The journal is operated from a designated university account, which is supposed to about break even.

We therefore would like to approach the wider C14 community for support. This is important for several reasons. First, it offsets the immediate red ink problem. Second, it shows our university administration that the C14 community truly supports the journal. This is vital for obtaining mathing funds from the university. We have already obtained commitments of about $15K from some of our best "Friends of Radiocarbon". We also have a commitment of some support from our Research Office. Thus, we would like to ask YOU, the radiocarbon community to consider either institutional or personal support of our journal, which is a focus for radiocarbon laboratories and users. This could take several forms:

1. institutional lifetime subscription for $2,500

This allows multiple copies to one institutional address and listing as a contributing supporter of *Radiocarbon*.

2. personal subscriptions - only $65 per year or a lifetime for $700 A subscription to a journal which is important to your work is tax-deductible in the USA and some other countries.

3. direct personal contributions to the University for the journal. For US residents, you might save 1/3 or more of the contribution in federal and state income taxes! Contributions to the journal, which is part of the University of Arizona, are tax-deductible in the USA to the extent permitted by law. The University of Arizona is a non-profit institution, under sec. 501(c)3 of the Internal Revenue code.

In the longer term, we can offset some of these funds eventually by raising subscriptions to compensate for these losses, but this takes time. We have an immediate crisis due to the departure of former managing editor, David Sewell. We have promoted associate editor, Kim Elliot, who is a very capable successor, to this position. The fund accountants' view is that we cannot replace the second exisiting (& vacant) position "due to the deficit" in this account. Hence, we are looking for support from institutions and individuals, who are interested in the long-term survival of this important journal.

Also in the longer term, we are seriously considering alternative publication methods such as electronic publication, which might supplement the hard-copy journal. We hope to be able to discuss these ideas at the next Radiocarbon Conference.

Thanks very much for your consideration.

A.J. Timothy Jull, Editor, *Radiocarbon*, NSF Arizona AMS Facility, Physics Building, University of Arizona, Tucson, AZ 85721. tel (520) 621-6816; fax (520) 621-9619; http://www.physics.arizona.edu/ams/index.html

Australasian Archaeometry 2001

Feb 5-9, 2001, University of Auckland, New Zealand.

The Australasian Archaeometry conference meets every four years. This year for the first time the conference will be held outside Australia. In 1997 this conference was attended by several hundred scholars with involvement in the fields of Archaeology, Anthropology, Geography, Conservation, Museology, Material Science and Applied Nuclear Science (e.g. dating, materials analysis etc).

Some topics covered at past conferences included advances in dating (14C, TL, OSL, OHD), bone chemistry, technological and provenance studies, prospection, environmental impact and geoarchaeology.

The conference is organized by a Local Organizing Committee which extends invitations to a broad range of researchers working in the Australasian region and beyond. The main host for 2001 will be the Centre for Archaeological Research at the University of Auckland in collaboration with a number of other New Zealand research centers and academic institutions.

The theme session for this Symposium will be Issues and Developments in Australasian Chronology: New Directions for the New Millennium.

If you wish to receive further announcements and information concerning the symposium, please contact us by email, regular mail, fax, or fill out the online registration form at our web site. The first call for papers will be issued in May 2000.

Australasian Archaeometry 2001, Dept. of Anthropology, University of Auckland, Private Bag 92019, Auckland, New Zealand; tel 64-9-373-7599 x8572; fax 64-9-373-7441; email P.Sheppard@auckland.ac.nz. Online registration: http://car.ant.auckland.ac.nz/archconf/arch_feedback.html

New Discoveries from Materials Science in the Archaeology of the Near East

A session to be held at the Annual Meeting of the American Schools of Oriental Research, Nashville, TN, November 15-18, 2000

This session welcomes submissions in which materials science techniques are used to assist in the interpretation of the archaeological record. Papers should focus on the archaeological problem, the technique(s) selected to investigate the problem, the data acquired, and how the results are used within the archaeological context. Studies on both organic and inorganic remains will be considered, especially those that deal with issues of environmental change, ancient technology, trade patterns, demography and subsistence.

Deadline for abstracts: April 1, 2000

Please check the ASOR website for membership and participation requirements before submitting abstract: http://asor.org/AM/2000call.htm Abstracts and questions should be addressed to: Section Chair, Elizabeth Friedman (University of Chicago), 1369 E. Hyde Park Blvd., Apt. 1001, Chicago, IL 60615; tel 773-324-4813; email esf1@midway.uchicago.edu

SAA Archaeometry & CRM Symposium

We are starting to put together a poster symposium, tentatively titled "Cultural Resource Management and Archaeometry: Entering the Mainstream," for the 2001 SAA Conference in New Orleans. The goal of this symposium is to demonstrate that archaeometric techniques have a significant place in contract archaeology and provide a cost-effective means of doing research-oriented archaeology in a CRM framework. We are placing no limitation on the techniques employed - showcasing a diversity of techniques is foremost - but we would prefer that posters reflect cases where archaeometry provides a significant contribution to the CRM project, perhaps on an ongoing basis.

If you are interested in participating in this symposium, we would like to receive a brief description of the CRM project, archaeometric technique(s) employed, number of samples analyzed and at what laboratory, whether you will attend the 2000 SAA Conference so we can meet, and a contact address. If you have any questions, etc., or if you anticipate conducting a suitable project in the next year, please email us at the addresses below or send mail to:

Jim Cogswell (CogswellJ@missouri.edu)
Michael D. Glascock (GlascockM@missouri.edu)
Hector Neff (NeffH@missouri.edu)
Jeff Speakman (SpeakmanJ@missouri.edu)
Research Reactor Center
Reactor Park
Columbia, MO 65211

5th International Ancient DNA Conference

Ancient DNA 5 will be held in Manchester, England on 12-14 July 2000. Further information is available from Terry Brown. email: adna5@bi.umist.ac.uk

Research Awards for Graduate Students Laboratory for Archaeological Chemistry University of Wisconsin-Madison

The Laboratory for Archaeological Chemistry at the University of Wisconsin-Madison is initiating an annual program of research award grants to graduate students in archaeology programs around the world. The lab staff strongly believes that major discoveries in archaeology in future years will come from laboratory investigations. In that light, the training of graduate students in analytical methods and their application is essential. This award is intended to further those goals. The awards are offered to support and encourage the application of chemical analyses in solving archaeological problems.

The Laboratory for Archaeological Chemistry has been involved in the study of questions of archaeological interest for many years. The primary focus of research in the laboratory is on the characterization of prehistoric bone, soils, and pottery. A variety of other materials including stone, dyes, organic residues, metals and glass are also investigated in the laboratory. Instrumentation in the lab includes a (1) Inductively Coupled Plasma – Atomic Emission Spectrometer for the rapid elemental characterization of a variety of materials with a resolution in parts per million, and (2) Finnigan Element Inductively Coupled Plasma High-Resolution Mass Spectrometer for isotopic and elemental characterization of many materials, often at the parts per billion level. This instrument incorporates laser ablation as a sample introduction technique appropriate for many solids and for small or fragile samples. In addition the lab has access to a variety of other instrumentation and equipment on campus that is often used in our research.

Application: Applications for the award should contain (1) a three-page letter from the applicant containing the specifics of the research and the analyses involved, (2) a curriculum vitae of the applicant,(3) a tentative table of contents for the dissertation, and (4) a letter of recommendation from the major advisor. The letter of application should contain detailed information on the research project, the kinds of analyses involved, the number of samples and analyses required, availability of samples with letter(s) of permission if appropriate, and a discussion of the importance of the analysis to the proposed research. This letter should also provide a timetable for research and completion of project. Discussions with the lab staff are recommended prior to application to ensure that the project meets award criteria and employs services available in the Laboratory for Archaeological Chemistry. There is no form for applications.

Criteria for Award: The award will be made by the staff of the Laboratory for Archaeological Chemistry and major criteria for selection will be the significance of the research question, feasibility of the project, and impact on the student and the field.

Deadline: 1 January for awards beginning in 1 September of the same year.

Award: One award will be made each year consisting of analytical services involving elemental or isotopic measurements available with Laboratory for Archaeological Chemistry instrumentation. The lab encourages students to participate in analyses, where possible, in order to learn and understand the methods employed.

Announcement: The award will be announced on 15 March each year. Awards should be appropriately acknowledged in any dissemination of results of the analyses and copies of resulting publications should be provided to the Laboratory for our files

Contact: Questions and Applications should be addressed to T. Douglas Price or James H. Burton, Laboratory for Archaeological Chemistry, University of Wisconsin-Madison, 1180 Observatory Drive, Madison WI 53706 USA. Phone: 608-262-2575 (tdp), 608-262-0367 (jhb), 608-265-4216 (fax). Email: tdprice@facstaff.wisc.edu or jhburton@facstaff.wisc.edu. For further information on the Laboratory for Archaeological Chemistry, please see our web site at www.wisc.edu/larch/aclab/larch.

Metallurgy Datasheets

Historical Metallurgy Society Archaeological datasheets are available from the address below. They are free of charge to HMS members (but please send us an A4 stamped addressed envelope) and cost one pound for the set for non-HMS members.

Details of HMS membership are available on our website: http://www.hist-met.org/ or from Justine Bayley, English Heritage Centre for Archaeology, Fort Cumberland, Fort Cumberland Road, Eastney, Portsmouth PO4 9LD, UK

Datasheets available now:

No 1 Crucibles and moulds
No 2 Precious metal refining
No 3 Iron working processes
No 4 Geophysical techniques applied to early metalworking sites
No 5 Bloomery iron smelting slags and other residues
No 8 Currency Bars and other forms of trade iron
No 10 Hammerscale
No 11 Metallographic examination
No 12 Chemical analysis of metalwork and metalworking debris
No 14 X-radiography and archaeometallurgy

Datasheets in preparation:

No 6 Bloom refining and iron smithing, slags and other residues
No 7 Blooms, billets, forging blanks and waste
No 9 Sampling strategies for metalworking residues and post-excavation work
No 13 Metallurgical databases

Conference Reports: Archaeological Sciences 1999 (Bristol, U.K.) and European Association of Archaeologists (Bournemouth, U.K.)

Michael Richards, Associate Editor

This September we were fortunate in the U.K. to have two conferences that were wholly in one case, and partly in the other, concerned with archaeological science. There were an overwhelming number of papers presented at the two conferences (over 50 in total) and so here I can only provide a summary of a selection of papers from the two conferences.

The first was a one day session entitled "Ancient Biomolecules: Archaeology in a test tube" and was held as part of the European Association of Archaeologists 5th Annual Meeting at Bournemouth University, U.K. on the 14th to 19th September, 1999. The conference itself was impressive and well-attended with a wide range of themes and time periods represented. It also offered the more scientifically minded of us a chance to learn how we too could be "Feeling the colour of monuments" (G. MacGregor) and "Excavating silence" (J. Hansson), as well as attend a whole session on "The archaeology of drinking: the socio-political context of the alcoholic drink and its use."

The session on 'Ancient Biomolecules' was organised by Oliver Craig (University of Newcastle) and Keri Brown (University of Manchester Institute of Science and Technology (UMIST)). There were a number of themes to the day, centred around advances in our characterisation and detection of ancient biomolecules, as well as considering the limitations of our methods.

Ancient DNA (aDNA) analysis was strongly represented, and it was the focus of nine of the fourteen papers. Terry Brown (UMIST) and Ian Barnes (Oxford) both gave their impressions of the current state of ancient DNA research. Terry Brown provided the more optimistic overview, focussing on the practicalities of undertaking aDNA analyses in Britain today. Ian Barnes summarised some of the disappointments of aDNA analyses, particularly the lack of interaction between the practitioners of aDNA analyses, and the consumers, archaeologists. He helpfully provided some guidelines for the future, calling for more basic research on the limitations of the method. As an example he discussed his groups attempts to find DNA from ulcer bacteria in modern human samples, and the difficulties encountered, which did not bode well for other researchers looking for pathogens in archaeological material.

There were a number of papers on the identification and characterisation of other ancient biomolecules. The three main research groups in the U.K. which are working on this aspect of archaeological science were represented here. Carl Heron (University of Bradford) gave a summary of the important work his group had accomplished characterising the resins and lipids found in potsherds, focussing here on his, Ben Stern's (Bradford) and Janine Bourriau's (Oxford) research in the Bronze Age Eastern Mediterranean. This research, as well as contributing to the methodology of analysing pottery residues, has been strongly archaeologically focussed and driven. Richard Evershed (University of Bristol) provided an overview of the groundbreaking work that his group had accomplished over the past number of years. He summarised their innovative method of measuring the $\delta^{13}C$ values of specific compounds extracted from potsherds from archaeological sites from all over the world, with particular reference here to identifying milk residues in pots. The third group was the Newcastle group, led by Matthew Collins, and based at the Fossil Fuels and Environmental Geochemistry Postgraduate Institute, University of Newcastle, U.K. New, innovative, research into identifying protein residues in potsherds was presented at this conference in a paper by Oliver Craig, Matthew Collins and Jacqui Mulville (English Heritage/Oxford) entitled "Dairying in the Western Isles: a Biomolecular Approach". Their method involves removing proteins from potsherds using cooled HF acid, which dissolves the potsherd and releases the proteins into solution. The released proteins then bind to the sides of custom-made test tubes which have high protein affinity. After removal of the HF acid solution, the resultant proteins are then probed with appropriate antibodies for milk or meat, made to various species. This elegant method is not only simple but relatively cheap, which is great news for archaeologists. They presented positive results from an Iron Age site in Scotland for which there is good archaeological evidence that dairying was being practised. Hopefully they will continue this work to apply it to

pottery from all over Europe, and I look forward to seeing this work progress.

The second conference was the British archaeological science conference entitled "Archaeological Sciences '99" which was held at the Chemistry Department of the University of Bristol from the 20th to 22nd of September, 1999. This conference is held every two years, alternating years with the larger international Archaeometry conference, and in some ways it is similar in content and theme, although obviously smaller in scale. However, the emphasis in the British meeting is on new research, with many of the presentations and posters being presented by graduate students.

The conference started with an evening lecture by Professor Derek Briggs (Bristol) entitles 'Beyond the bare bones: the fossilization phenomenon' which, although outside the time range dealt with by most archaeological scientists, was nonetheless interesting, and especially relevant for those of us dealing with the preservation of bone in the very earliest stages of this process.

Over the next two days thirty four papers were presented, loosely grouped into six themes. Unfortunately I cannot go into much depth about them all here, but I will give examples of some of the papers in each of the themes.

The first theme was "Landscape and Site Reconstruction" and some of the papers would not necessarily be recognised as archaeological science by North American researchers. It is particular to Britain that the fields of palaeoenvironmental reconstruction using, for example analyses of pollen, molluscs and beetles from sites is called archaeological science here. In this section then we had papers on the palaeoenvironment of Slovenia (Andric, Oxford) and on identifying floodplain grasslands using molluscs (Davies, Bath Spa). Additionally, we had two papers on the applications of computer modelling (Robson-Brown and Chalmers, Bristol), and GIS to archaeology (Chapman, Hull). Similarly, papers from the sixth and last session "Agriculture and economy" were concerned mainly with the plant remains recovered from archaeological sites, again, not strictly what would be considered archaeological science in North America. Here, we had papers on the remarkably well preserved plant remains from Brazil (de Oliveira Freitas, Escola Superior de Agricultura, Brazil), summaries of the presence of Emmer wheat in the Roman and Saxon periods in the U.K. (Pelling, Oxford), and a summary of the plant remains associated with plant husbandry in prehistoric southern England (Campbell, English Heritage).

The second theme was "Palaeodiet", and we had three excellent papers presented. Tamsin O'Connell and Robert Hedges (Oxford) discussed the results of feeding experiments undertaken on chickens, and the resultant isotopic analyses. Sam Roberts (Newcastle) talked about his efforts to chemically identify cooked bone in the archaeological record. Finally, Stephanie Dudd (Bristol) presented a summary of their groups important work identifying milk in potsherds using the $\delta^{13}C$ values of extracted lipids.

The third, rather general theme was "Post depositional processes." The Newcastle group was again well represented here, with a paper on kinetic models for bone collagen degradation presented by Colin Smith, and a summary of a large scale European Union funded project on bone diagenesis entitled "The degradation of bone as an indicator in the deterioration of the European archaeological property" presented by Christina Nielsen-Marsh. Matthew Collins presented a plea for a new look at amino acid racemization for dating, in the intriguingly titled "Amino acid racemization: Lazurus or Elvis?" Collins paper presented new data on advances in the pretreatment of samples that allowed successful AAR dating (compared to radiocarbon dating) of ostrich eggshells.

The fourth theme, "Markers of health and status in past populations" was a disparate group of papers. Malcolm Lillie (Hull) presented new data on the analysis of teeth, and new stable isotope data from Mesolithic and Neolithic humans from the Ukraine. Along the same lines I presented my stable isotope data from humans and fauna from the Neolithic site of Catalhöyük, Turkey. The paper that really stood out was by Angela Guernay (Newcastle), and was entitled "The Coimbra connection-Exploitation of cell wall lipids for the diagnosis of ancient mycobacterial disease." In this work, Guernay convincingly presented a new method of identifying diseases such as tuberculosis in archaeological bone material by the presence of cell wall lipids specific to the disease. This new method, in my opinion, is the way forward for the identification of these diseases in past populations, and supersedes other analytical methods, such as DNA analyses.

The fifth theme was a topic that would be much more familiar to regular attendees of the Archaeometry conference, "Early technology and materials." Surprisingly a number of the papers here were concerned with links between the organic residues on potsherds and material analysis of the pottery. Richard Evershed talked about his groups efforts taking a 'holistic' approach in a paper entitled "Organic residues and ceramic analysis: An holistic study of the late Saxon/Early Medieval pottery of West Cotton, Northamptonshire." More traditional metal analyses were provided in papers by Spoto (Catania, Italy) "Chemical and structural properties of ancient metallic artifacts" and Ponting (Nottingham), "The scientific study of Roman and Early Islamic metalwork from Israel."

All in all, this was a very enjoyable conference, with a variety of themes and papers. Hopefully, the British Archaeological Sciences conference will continue to grow, and perhaps in future years will involve more researchers from outside Europe.

In summary, a wide range of papers were presented at these two conferences, and relatively large attendances at both (about 40 at the session at the EAA, and about 70-80 at Bristol), which reflects the healthy state of archaeological science in the U.K. and Europe at the present. Hopefully, these conferences are positive signs that archaeological science will continue to expand in the coming years.

New Book on Obsidian

Bibliographie zum Obsidian - Artefakt und Provenienz. By Hans-Otto Pollmann, Bochum, 1999. Veröffentlichungen aus dem Deutschen Bergbau-Museum 78. DM 48.50.

Remote Sensing & GIS

Apostolos Sarris, Associate Editor

This multi-part contribution includes a laboratory report, information about some university and other programs, symposia announcements and reviews.

Laboratory of Geophysical - Satellite Remote Sensing & Archaeo-Environment, Institute for Mediterranean Studies (I.M.S.) , Foundation for Research & Technology, Hellas (F.O.R.T.H.)

The Laboratory of Geophysical - Satellite Remote Sensing & Archaeo-Environment constitutes part of the Institute of Mediterranean Studies (I.M.S. -F.O.R.T.H.) at Rethymnon, Crete. The research activities of the Laboratory include projects in geophysical prospection, environmental & archaeo-environmental studies, satellite remote sensing & geo-graphical information systems with emphasis in the research, assessment, protection and management of archaeological sites and their environmental context. The Laboratory of Geophysical – Satellite Remote Sensing & Archaeo-environment offers a wide range of specialized services at the leading edge of technology.

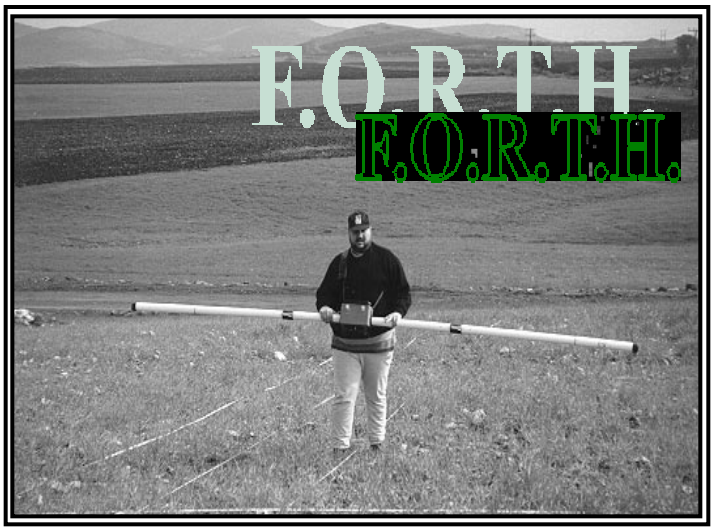
Research Activities

The Laboratory conducts small and large-scale geophysical surveys for mapping the subsurface relics of archaeological sites. Both, geophysical prospection and satellite remote sensing contribute in the mapping of the subsurface archaeological monuments, the management and conservation of the archaeological sites and the better exploitation of the environmental and cultural resources.

Ground prospecting and satellite remote sensing/G.I.S. are used for the preservation, monitoring and management of the environmental resources. The Lab is also involved in research of the environmental consequences of technical construction works, environmental pollution and geological mapping/hydrogeology. Geographic Information Systems together with image processing techniques (modelling, classification, etc.) are employed for the assessment and management of the natural and cultural resources. The Laboratory is also conducting research on the biological remains and lithic finds from archaeological excavations, aiming to the reconstruction of the ancient environment.

Technical Support

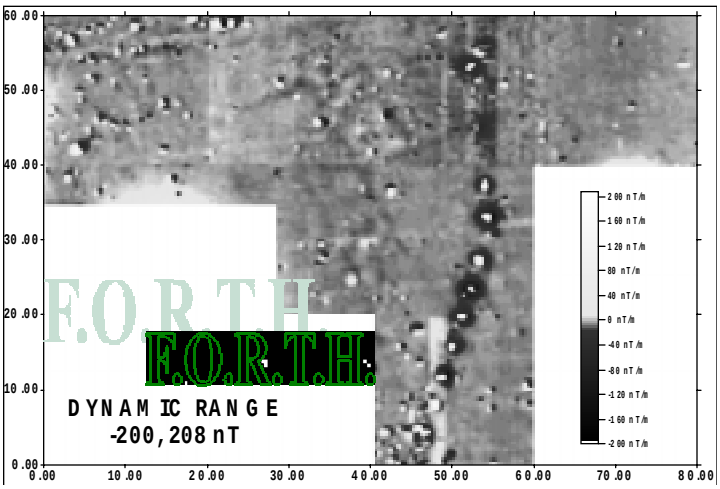
The Laboratory uses the most modern and precise equipment for fieldwork and sophisticated computer facilities and software for processing and mapping of the geophysical and remote sensing data. Geophysical investigations include the use of Geoscan



fluxgate gradiometer FM36 and resistivity meter RM15, Geonics EM31-MK2 ground conductivity meter, Smartmag SM-4G Caesium gradiometer, Lacoste & Romberg Model-D land gravity meter, EKKO 1000 ground penetrating radar, Sting/ Advanced resistivity tomography equipment, Bardington MS2D and MS2F magnetic susceptibility sensors, a.o. Two Ashteck stop & go GPS Z-12 base stations with rover antennas and sub-cm accuracy are used for topography mapping. The Lab is also equipped with the necessary instruments for macro and micro analysis of archaeo-environmental remains, including Leica MS5/6 microscopes, drawing boards and phototubes. An ethnobotanical collection initiated by Research Associate Dr. A. Sarpaki is also available for comparative studies. Processing is carried out in workstations and PCs using various software such as Geosoft/Oasis, TNT, ERMapper, Surfer, Geoplot, Erdas, Noesys, Arcview, a.o. A collection of aerial photographs, topographic and geological maps and satellite images supports the satellite remote sensing campaigns. Digitization boards, scanners, color plotters and printers guarantee the high quality presentation of the results and maps.

Geophysical Prospection Research

The Laboratory carries out geophysical prospection surveys in archaeological sites with aim to guide the excavation procedures and provide additional information to archaeological research. The Laboratory includes the following services that fall within its research interests: (1) near-surface prospection of the archaeological sites & mapping of the subsurface archaeological relics; (2) estimation of depth to the archaeological relics and verification of the occupation layers. Magnetic properties of the archaeological soils and materials; (3) terrain reconstruction and modelling of the subsurface layers through the use of GPR, electrical tomography and seismic techniques; (4) topography mapping and creation of digital elevation models; (5) digitization and scanning of topographic maps, geological maps, architectural drawings, images, etc.; (6) planning and management for the development of archaeological sites. Assessment of the effects of construction works in archaeological areas; (7) environmental consequences on archaeological sites. Conservation areas. Cultural and natural national parks; (8) surface surveys in conjunction to other remote sensing techniques (geophysical, aerial,



satellite) can be combined through a Geographic Information System for a better geographic registration of the archaeological finds and a productive management of archaeological information.

Satellite Remote Sensing

Satellite remote sensing techniques and advanced image processing methodologies are employed in projects dealing with the preservation, monitoring and management of the environmental resources (natural and cultural). Researchers of the Lab are involved in a number of related projects which include, among others, the following: digital elevation models (DEM), orthoimages, 3-D terrain reconstructions, thematic mapping (2-D & 3-D); geographic registration and modelling; satellite imagery and aerial photography analysis, enhancement, mosaicking & classification; image processing and Geographic Information Systems (G.I.S.); emphasis on the archaeological site assessment and management; predictive modelling & settlement pattern analysis; viewshed analysis; management of natural and cultural resources; land use, landcover, linear features, geological mapping; urban planning, forestry, agriculture, environment; thematic maps; electronic archaeological maps; protection (risk) areas; national parks and preservation sections.

Technical Construction - Environmental Research

The Laboratory of Geophysical - Satellite Remote Sensing & Archaeo-environment) with the collaboration of the Laboratory of Applied Geophysics of the Technical University of Crete contributes to geophysical prospection and satellite remote sensing campaigns with target the conservation, protection and enhancement of the environment. In relation to this subject, the Lab is providing services dealing with the environmental consequences of technical construction works, assessment of disaster consequences in the environment, geographic land classification (land use, crops, forest lands, aquatic lands, buit-up areas, etc.), mapping and monitoring of conservation areas (national parks, forests, archaeological areas, etc.) through the use of sub-cm Global Positioning Systems (G.P.S.), a.o.

Archaeo-Environmental Research

The Laboratory undertakes the analysis of biological remains from archaeological excavations, aiming to the reconstruction of the ancient environment and landscapes. Through the detailed identification and recording of plant and animal remains, the Lab contributes to the better understanding of the environmental and economic variables which have affected human activity and behaviour in the past. The analysis of bio-archaeological remains sheds light to basic aspects of ancient economy (i.e. available natural resources and their management, nutrition, plant and animal technology, farming, husbundry, hunting and fishing and so forth). Furthermore, the investigation and study of ancient ecosystems leads to a better understanding of environmental management .

Among the services provided by the Lab, the following fall within the main body of archaeo-environmental research:

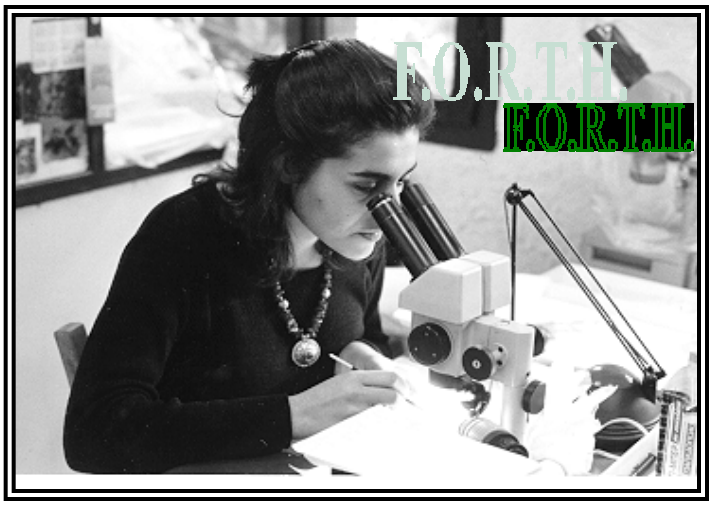
Identification and analysis of archaeobotanical remains, osteological material (mammal and fish bones) & lithic material (reduction sequence, statistical processing & usewear analysis)

Consulting services for a best sampling and field processing (water-flotation, sorting) of the bio-archaeological material. Training of the members of the excavation project for the above procedures.

Photography and drawing of bio-archaeological remains & lithic tools.

Preparation and disposal of fish and animal skeletons to Institutes, museums and researchers.

Archaeo-environmental research is carried out through a number of laboratory instruments including stereo-microscopes, petrographic microscope, high precision weigh ing scale, microscope drawing and photographic equipment, statistical



packages for data analysis , etc. It is also equipped with an airing cupboard, for the preparaton of bone reference collections and a flotation machine for the field processing of soil samples.

Research Associate Dr. Anaya Sarpaki has currently analyzed archaeobotanical data from the Minoan site of Chamalevri (Rethymno), the Quartier NU at Malia (Herakleion), the Cave of Cyclops at Yioura, Mycenean Thebes, Akrotiri (Thera) and elsewhere. Under a grant by the British School of Archaeology at Athens she collaborated with Dr Delwen Samuel (Institute of Archaeology at UCL) studying ways of approaching the bread data from Akrotiri, Thera and with Dr Glynis Jones and Dr Mike Charles (Sheffield University) on the statistical approach of archaeobotanical data from the same site.

Research Associate Dr. Evagelia Karimali has recently completed the planning stage for the construction of a WEB site

entitled "Neolithic and Early Bronze Age in Greece", for the account of the Foundation of Hellenic World and she is working on her Instap sponsored study on "Obsidian Production and Use in Thessaly: A Regional Approach". The goal of the project aims at the comparative study of obsidian debitage and tools in Thessaly and the Cyclades from a technological and distribution perspective. Dr. E. Karimali is analyzing the lithic material from Cornell Halai & East Lokris Project and recently she completed a research work on the usewear analysis of lithic material with the collaboration of Derek Roe & John Mitchell (Oxford University), funded by a grant by the British School of Archaeology in Athens.

Research Associate Mrs. Dimitra Mylona has examined zooarchaeological material from Syvritos (Rethymno), Krioneri (Serres), Berbati (Argolid), Itanos (E. Crete), Eleftherna (C. Crete), a.o . and she is working on her dissertation at the University Sheffield.

Both Dr. A. Sarpaki and Mrs. D. Mylona participated in the study of bio-archaeological remains at the excavation of Polis (Chrysochous) Cyprus (Princeton University) and have contributed to the permanent exhibition of the Natural History Museum, University of Crete organizing a diorama on «The Minoan Environment and People».

Projects

Geophysical prospection projects have been carried out in Itanos (E. Crete), Chamalevri, Eleftherna and Matala (C. Crete), Theologos (Rhodos), Strymi and Orestiada (Thrace), Isthmia (Corinth), Dimini and Aerino (Magnesia), Ithaki, Alonnisos, Kantou-Kouphovounos (Cyprus), a.o. Satellite remote sensing campaigns have been carried out in Amorgos and Itanos.

The current research activities of the Laboratory include the processing of data collected from geophysical surveys at the islands of Ithaki and Alonnisos, the continuation of the geophysical survey and GPS mapping of the wider archaeological region of Itanos (E. Crete) and the construction of a GIS/electronic archaeological map of Lasithi district. The General Secretariat of Research & Technology of Greece has also funded a co-operation research project with China on the Integration of High Resolution Geophysical Prospection Surveys and Satellite Remote Sensing in the Study of Archaeological Sites. The latter project is carried out together with the Institute of Archaeology of the Chinese Academy of Social Sciences.

Collaborations

The Institute of Mediterranean Studies has organized a number of international symposia, art exhibitions, archaeological campaigns, film productions & other cultural events in collaboration with Institutes from all over the world. Within this context, the Laboratory of Geophysical-Satellite Remote Sensing and Archaeo-environment has carried out research projects in Greece and Cyprus, offering its services to the Hellenic Ministry of Culture, Universities (Technical University of Crete, U. of Crete, U. of Athens, U. of Ioannina, Ohio State University, U. of Chicago, Cornell University, Washington University, U. of Nebraska-Linkoln, a.o.), museums and research institutions (Natural History Museum - University of Crete, Foundation of Hellenic World, Ecole Francaise D'Athenes, Swedish Archaeological School of Athens, Instituto Per Gli Studi Micenei De Egeo-Anatolici, Institute of Archaeology-Chinese Academy of Social Sciences, a.o.) and private organizations such as highway construction companies and the Organization for the Development of Eastern Crete. The researchers of the Laboratory are also offering training to undergraduate & graduate students through hand-on experience in the field & lab and lecture series.

Publications & Other academic activities

An informal publication, Archaeo-telepiskopika Nea is a newsletter providing information regarding the current activities of the Lab. The latest issue of the newsletter (No. 2, 1999) is devoted to Satellite Remote Sensing & Geographical Information Systems in Archaeological Research.

During the last 2 years, the researchers of the Lab have participated in the supervisory committee of more than 12 BA & MA dissertations applicants at the University of Crete, the Technical University of Crete, The Aristotelian University of Thessaloniki, the Greek Airforce Academy, a.o. Some of the research topics that have been already completed with the contribution of the researchers and the facilities of the Lab include the following: "Analysis & processing of seismic refraction and reflection data from the archaeological site of Itanos (Crete)" (M. Manakou), "Study and evaluation of geometric corrections in satellite imagery" (A. Tripolitsiotis), "Digitization and mapping techniques in the archaeological site of Itanos" (V. Kevgas), "Satellite image processing with emphasis in the characteristics assessment of airports" (G. Doxastakis & A. Krikellis), "Development of a GIS incorporating geophysical and satellite data for the construction of an electronic archaeological map of Amorgos" (A. Gkiourou), "Magnetic properties of minerals and soils from archaeological sites of Greece" (E. Aedona).

Communication

For additional information regarding the Laboratory of Geophysical - Satellite Remote Sensing & Archaeo-environment, please contact Dr. Apostolos Sarris: Institute for Mediterranean Studies, Foundation for Research & Technology, Hellas (F.O.R.T.H.), Melissinou & Nikiforou Foka 130, P.O. Box 119, Rethymno 74100, Crete, Greece, Tel. ++30-831-56627, 25146, Fax. ++30-831-25810, e-mail: asaris@ret.forthnet.gr

A New Graduate Programme at the University of Crete

A New Graduate Programme at the University of Crete started in October 1998. The title of the programme is "Advanced Methods and Information Systems in Archaeology: Research and Management of the Material Remains of Aegean Cultures". The graduate programme, which is the result of co-operation between the Department of History & Archaeology and the Department of Computer Science of the University of Crete aims at educating archaeologists and computer engineeers, as well as other professionals from Liberal Arts, in using the modern scientific approaches and techniques of archaeological science with emphasis to the appplication of information systems in archaeology and museums.

The programme will lead to an MS and PhD degree on the subject of "Systems of Cultural Information and Management of Cultural Resources", which will be awarded by the above

departments, depending on the specialization of the students.

Courses are taught in Greek or English by professors of the University of Crete together with a number of professionals that have been invited from research and educational institutes of Greece and abroad (FORTH, University of Aegean, University of Thessaloniki, University of Athens, Technical University of Crete, National Research Center "Demokritus", Ministry of Culture, Institute of Archaeology-University College of London, a.o.). The Institute for Mediterranean Studies and the Institute of Information Science of the Foundation for Research and Technology provide the technical support of the programme and participate in the teaching of specialized cources, related to Geophysical Prospection, Satellite Remote Sensing, G.I.S., Information Systems, Terminology Systems, etc.

Announcement of other Symposia

CAA 2000: Computing Archaeology for Understanding the Past, a joint conference of Computer Applications and Quantitative Methods in Archaeology (28th annual conference) and the Union Internationale des Sciences Préhistoriques et Protohistoriques, Commission IV, will take place at Ljubljana, Slovenia from 18-21 April 2000. The conference is organized by the Centre for Scientific Research of the Slovene Academy of Sciences and Arts and is sponsored by the Ministry of Science and Technology of the Republic of Slovenia and Scientific Research Centre of the Slovenian Academy of Sciences and Arts. Scientific information is provided by Dr. Zoran Stancic, Scientific Research Centre of the Slovenian Academy of Sciences and Arts, Gosposka ulica 13, SI-1000 Ljubljana, Slovenia, Phone: +386 61 125 7795, Fax: +386 61 125 52 53, E-mail: caa2000@zrc-sazu.si, Web: www.zrc-sazu.si/caa/. Information regarding registration and accommodation can be provided by Ms. Alenka Kregar, Cankarjev dom, Cultural and Congress Centre, Presernova cesta 10, SI -1000 Ljubljana, phone: +386 61 1767 133, Fax: +386 61 217 431, E-mail: alenka.kregar@cd-cc.si, Web: www.cd-cc.si

New Laboratory of Chemical Analysis in Chania (Crete)

A new Laboratory of Chemical Analysis has been established at the 25th Eforia of Prehistoric and Classical Antiquities of Chania, Crete. The Laboratory is expected to contribute to the conservation of archaeological materials and monuments. The offered services include chemical analysis of soils, conservation of coins, stone materials, ceramics, and glass artifacts, plastering analysis, etc. For more information contact Dr. Noni Maravelaki-Kalaitzaki, 25th Eforia of Prehistoric and Classical Antiquities of Chania, Crete, tel. ++30-821-44418.

Archaeological Remote Sensing Consortium

The Archaeological Remote Sensing Consortium (ARSC) is an outgrowth of the Remote Sensing Applications in Archaeology conference co-sponsored by St. Cloud State University, the Oriental Institute and NASA in 1997. The goal of ARSC is to provide information and assistance to researchers dealing with the practical and theoretical applications of remote sensing techniques in archaeology. ARSC acts as a clearinghouse of information, as well as a forum in which individuals can find assistance and research partners with complimentary interests and expertise. ARSC maintains a WWW site (http://eleftheria.stcloudstate.edu/arsc/) with technical, educational and other resources, together with an archived discussion list for members and a bi-annual electronic newsletter.

To Join the Archaeological Remote Sensing Constortium you need to contact Prof. Richard M. Rothaus (President), Archaeological Computing Laboratory, Department of History, St. Cloud State University, St. Cloud, MN 56301, U.S.A. Membership dues are $20 (US) annually. Institutional membership is available at an annual rate of $500 (US).

Report on Conferences

International Conference on Remote Sensing in Archeology from Spacecraft, Aircraft, on Land, and in the Deep Sea (Boston University, 1998).

The International Conference on Remote Sensing in Archeology from Spacecraft, Aircraft, on Land, and in the Deep Sea was held from 16-19 April 1998 at Boston University. Co-organizers of the conference were Farouk El-Baz and James Wiseman from Boston University and Earnest Paylor from NASA Headquarters. The aim of the conference was to present the application of the most current remote sensing devices in archaeological investigations and to address their potential for the future. Although the majority of the presenters was affiliated with institutions in U.S.A., a wide spectrum of applications from all over the world was presented.

Presentations on spaceborne and airborne radar imaging systems (SIR-C/X-SAR) indicated the recent developments and potentiality of the techniques. David V. Arnold (Brigham Young University) presented the archaeological applications of the Brigham Young University SAR (YSAR) in Israel. Douglas C. Comer (National Park Service) discussed the interpretation improvement of SIR-C/X-SAR radar imagery by coregistration with higher resolution satellite and aerial photographs. Benjiamin F. Richason III and Carrie Hritz (St. Cloud State University) described their use of SAR techniques for studying the archaeological sites of Nipur area of Iraq's Lower Mesopotamian Plain. The effectiveness of SIR-A & SIR-C in detecting sand-buried rivers and channels in the desert environment of Egypt and in mapping ancient geomorphological characteristics in arid regions was demonstrated by Farouk El-Baz (Boston University) and Derrold W. Holcomb (Erdas) respectively. Similar success of the SIR-C/X-SAR and the airborne L-band SAR was reported by Guo Huadong (Chinese Academy of Sciences) in detecting burried or collapsed portions of the Great Wall in N. China. The high resolution, multi-channel imaging capabilities of AIRSAR combined with the topographic mapping data of TOPSAR, as they were applied in Ankor, Cambodia, were reported by Anthony Freedman and Scott Hensley (Jet Propulsion Laboratory) and Elizabeth Moore (University of London). A more general review of the recent advances in high resolution multispectral airborne remote sensing and their application in archaeology was provided by Colin A. Shell (University of Cambridge).

The integration of remote sensing techniques with geographical information systems (GIS) was discussed by Thomas L. Sever (NASA/GlobalHydrologic and Climatic Center), taking an example from his research in the Peten region of Northern Guatemala. Data from spaceborne imaging techniques such as Landsat, SPOT, SIR, and JERS have integrated through GIS for the study of the ancient Southern Arabian trade routes, by Ronald Blom and Robert Crippen (Jet Propulsion Laboratory), George Hedges (Hedges and Caldwell) and Juris Zarins (Southwest Missouri State University).

A number of papers concentrated on the use of ground based prospection techniques. The recent developments in ground penetrating radar were addressed by Lawrence B. Conyers (University of Denver), Dean Goodman (University of Miami, Japan Division), Yasushi Nishimura (Nara National Cultural Properties Research Institute, Nara-shi, Japan), Bradley S. Matson (Western Oregon University) and Sheldon S. Sandler (Northeastern University). Examples were drawn from El Salvador, Guatemala, Peru, U.S.A. England, Jordan, Cambodia and Japan. Emphasis was given to the processing of the radar signals (inverse filtering, time slice and horizontal slice techniques), the construction of high-resolution 3-D maps of archaeological sites, modelling and interpretation of data.

Vincent Gaffney (University of Birmingham) reported on the role of geophysical prospection in investigating roman urban centers of Britain (Viroconium Cornoviorum - Birmingham's Wroxeter Hinterland Project) and in Italy (Forum Novum - Rome's Tiber Valley Project). Comparing the geoarchaeological research in the lower Amazon, Brazil, with similar projects in equatorial latidutes, Anna C. Roosevelt (Field Museum & University of Illinois) dealt with the potential of archaeo-geophysical remote sensing in Lower Equatorial Forests. Similarly, Payson D. Sheets (University of Colorado) focused on the problems encountered by the application of geophysical prospection techniques in mapping the archaeological relics of volcanically active areas of Central American Tropics. Kenneth L. Kvamme (Boston University) presented his experiences from a geophysical prospection field school at the Roman Site of Empuries, Spain, and Apostolos Sarris (Institute for Mediterranean Studies/FORTH) discussed the implications involved in ground based prospection techniques (applied in the investigation of archaeological sites in Greece) with respect to the original expectations, available instrumentation, survey design and interpretation of results.

Moving to the deep sea, Anna Marguerite Mc Cann (Boston University) described the latest technological advances in underwater remote sensing, including JASON, a remotely Operated Vehicle (ROV), and MEDEA, an unmanned camera sled, that were used in documenting Roman trade routes (and shipwrecks) between Carthage and Rome.

John H. Stubbs (World Monuments Fund and Columbia University) addressed the issue of preservation and conservation of cultural resources and the role of remote sensing.

Except of the leading-edge technology and applications topics that were presented, the symposium offered a chance to capture a more holistic picture of the ongoing research in the field of remote sensing throughout the world. Taking in account the importance of the issues that were addressed and the rapid developments of the technology, it is hoped that such kind of symposia could be organized in a much more frequent basis. The proceedings of the symposium are expected to be published soon.

Computer Applications in Archaeology. International Conference (Dublin, 1999).

In the CAA99 conference at Dublin, presentations broke down in seven main categories: Database Applications, GIS Applications, Internet Applications, Management and Organisation, Statistics and Quantitative Methods, Surveying and Mapping Applications & Virtual Reality, Presentation and Education.

Database developments for digital archives management, archaeological information documentation and retrieval, excavation recording and artifact classification were presented in the session on Database Applications. Presentations included the following papers: An Intranet Based Approach to Information Management within the York Archaeological Trust (Mike Rains), Isolating a Scarab Workshop using a Database (Nir Lalkin), PETRA 3.0 and the Crusader Border: New Features of the PETRA Archaeological DBMS (Franco Niccolucci & Marco Crescioli), Archaeological Database of Serbia Prehistory: First Steps (Nenad N. Tasic & Viktor Farcic), The use of computers in a single commerical consultancy context (Margaret Gowen), The Application of Databases in a Site-Specific Scenario (Anthony Whaley), Pressing the Right Buttons: Demonstration of the NI Sites & Monuments Record Database (Anne Given and Helen Murphy), Digital Archaeological Resources at the University of Bergen: An Efficient Tool in Research and Heritage Management? (Sonja Innselset and Asbjorn Engevik).

In the session for GIS Applications presentations emphasized the use of GIS for the protection and management of archaeological resources and addressed issues related to the landscape, surveying, site catchment and settlement pattern analysis: The Death and Life of Site Catchment Analysis: Landscape and Burial patterns in the Irish Middle Bronze Age (Sarah Cross); The Wadi Faynan Project in Jordan (Francesco Menotti); GIS as an Authoring Technique for Interactive VR (Steve Smith); Describing the Geographical Background of the Archaeological Sites Presented as Point Features: An Analysis of the Effect of Different Spatial Resolutions and Software on Interpretation (Ulla Rajala); GIS and its Application on Archaeological Field Surveys (Mª Concepcion Blasco, Javier Baena and Mercedes Planas); Protection of the Archaeological Patrimony and G.I.S. (Maria Pia Guermandi); Geografical Information System (code name VBGIS) (Carlos Reynoso and Damian Castro); Analysing Changes in the Settlement Pattern Around Silchester from 100 BC to AD 200 (Devon Tully); An Assessment of the Vulnerability of Karst Limestone Regions to Imposed Anthropogenic Stress with Particular Reference to the Burren in Co. Clare (Lianda d'Auria); DAU: Data Archaeologica Universalis (B.C. Ridderhof & W.F.M. Beex).

The following papers were presented in the session on Internet Applications: Conferring Structural and Design Flexibility to a Web Site Engine (Leonel Morgado, Mario

Guedes, Arsenio Reis, Mila Abreu, Jose Bulas-Cruz); Extending Site Reports on the Web: Dynamic Site Plans with Java (Mark Sweeting); The NAVIS Web Database. Java Implementations on a Cultural Heritage Site (Allard Mees); Internet Archaeology: Where next? (J D Richards, M P Heyworth, A G Vince, and J C Winters); ArchSearch: Integrated Access to Heritage Information Resources (J. D Richards, T F Austin and D J Robinson); A Theory of Archaeological Knowledge Building by using Internet: The DIASPORA Project (Igor Bogdanovic, Oriol Vicente and Juan A. Barcelo); ArchTerra: Extending the European Archaeology Web over Bulgaria, Romania and Poland (Martijn van Leusen and Andrzej Prinke); The Archaeological WEB of the Central Balkans (Nenad N. Tasic, Ivan Benussi, Viktor Farcic and Pavle Vuletic).

Among the topics discussed in the session on Management & Organisation, the following were included: Deconstructing the Product into Theory (Cesar A. Gonzalez Perez); Digital Archaeological Archives in the Museum Context: 'Traditional', 'Processual' or 'Post-Modern'? (Francis Grew); Risk Management in Heritage IS/IT Projects (Neil Lang); The Use of Computers in a Single Commercial Consultancy Context (Margaret Gowen); Digital Archeological Resources at the University of Bergen: An Efficient Tool in Research and Heritage Management? (Sonja Innselset and Asjorn Engevik).

Statistical modelling, visualization techniques, radiocarbon calibration, pattern recognition and sampling techniques were some of the subjects presented in the Statistics & Quantitative Methods session: Documentation and Reasoning on Parts and Potential Wholes (Christina Bekiari & M. Doerr); Three-Dimensional Visualisation on a VTK Programme (Sorin Hermon); Partially Preserved Colonnades in Greek Architecture: the Probability of Matching Column Drums (Seppo Mustonen and Jari Pakkanen); BCal: an On-Line Radiocarbon Calibration Package (Caitlin E. Buck, J. Andres Christen and Gary James); Bayesian Model Selection for Relative Archaeological Chronology Building (Caitlin Buck and Sujit Sahu); A new test by Monte Carlo simulation of oblique planning in Roman land surveys (John Peterson); New Data processing of Archaeological Artefacts from the Turdas Culture (Daniela Draghia); Starch Grains in Melanesia (Nick Fieller & Julie Hopkins); Patterns (Carlos Reynoso and Damian Castro); Exploring Archaeological Data with Projection Pursuit Methods (S. Westwood and M. J. Baxter); Clustering with KDEs: Art Historical and Archaeological Applications (C.C. Beardah, S. Porcinai and M.J. Baxter); Adaptive Sampling in Real Life: Large Objects and Stopping Rules (Clive Orton).

Surveying and Mapping Applications session consisted of papers discussing geophysical prospection, photogrammetry, GPS mapping, cartography, aerial imagery, CAD drawing and design. Presentations included: SiteMap: Innovations in Computer Based Mapping for Archaeologists (P.C. Zimmerman, W.R. Fitts and M.A. Pouls); Realtime Survey in Field Archaeology: Digital Surveying in Combination with Photogrammetric Methods (Stefan Groh); When the Future Meets the Past - Apocalypse at Armageddon (Tel Megiddo) (Natalie Messika); Producing Digital Elevation Models with Radar Interferometry (Kristof Ostir & Zoran Stancic); Digital Wide Area Survey from Aerial Photographs (Sam Redfern); Snail Trails and the Sergeant Major (Topographic modeling at Wroxeter Roman Town using Real-Time Kinematic GPS) (Glynn Barret); Imaging an Ancient Burial Site: The 3D Reconstruction of an Iberian Cemetery (Carmen Valenciano Prieto); Cartography in the Multimedia Technology Applied to Archaeology (Mercedes Farjas); Stone for Stone in Roman Corinth (David Gilman Romano and Nicholas Lowell Stapp); Survey at the Hindwell Neolithic Enclosure, Mid-Wales, Summer 1998 (Alex Gibson, Nigel Jones, Helmut Becker, Barry Masterson and Eoin Grogan); Geophysical Images of a Rath and Souterrain near Mayo Abbey, Co Mayo, Ireland (Kevin Barton, John Madden, Laura Hogan and Shane Rooney); Geophysical Images from an Early Christian Monastic Enclosure at Mayo Abbey, Claremorris, Co. Mayo (John Madden, Kevin Barton, Shane O'Rourke); To Core is to Know (B.C. Ridderhof and W.F.M. Beex); An Investigation into Non-Contact Methods of Profile Acquisition for Medieval Architecture (Gareth Bradshaw and Rachel Moss); An Integrated Approach to Archaeological Survey Design, Methodology and Data Management (Joe Fenwick); Carrowmore Revisited - Preliminary Results of the 1994-2000 Excavation Campaign (Gφran Burenhult); Paradox or panacea? - Archaeological Field Trials with the GEM-300 Multi Frequency Electromagnetic Profiler (Stephen Bullas, Glynn Barratt & Roberto Grassi); Marine Geophysical Investigation of the Inshore Coastal Waters of Northern Ireland - an application of marine digital acquisition and processing (Rory Quinn).

In the session of Virtual Reality, Presentation & Education presentations referred to the use of CD-ROMs, 3-D computer reconstruction and modelling, and computer educating systems. Presentations included the following: A New Approach to the Process of Exploration and Interaction for Visitors to a Museum Exhibition (S.J. Fleming, W.R. Fitts and P.C. Zimmerman); Hublot: Virtual Reality for On-Line Simulation of Archaeological Hypothesis: An Experiment on Krakow's Kramy Bogate (Jean-Yves Blaise, Pierre Drap and Iwona Dudek); Digital Stones: An Interactive CD-ROM for Lithic Use-wear Analysis (Ernest Lohse); Sanctuaries in Virtual Reality. Sarmizegetusa -Regia, Romania (Florin C. Stanescu); Educating Computer Applications the easy way (W.F.M. Beex); Three Dimensional Modeling of Scottish Early Medieval Sculptured Stones (Stuart Jeffrey); Computer Aided System on Archaeological Materials (Juan Josι Fuldain Gonzάlez); Imaging an Ancient Burial Site: The 3D Reconstruction of an Iberian Cemetery (Carmen Valenciano Prieto)

Extended abstracts can be found in the address: http://www.iol.ie/~caa991.

32nd International Symposium on Archaeometry
May 15-19, 2000 Mexico City, Mexico
http://www.archaeometry.unam.mx

17th International Radiocarbon Conference
Judean Hills, Israel, June 18-23, 2000
http://www.radiocarbon.co.il/

Archaeological Ceramics

Charles C. Kolb, Associate Editor

The column in this issue includes three major topics: 1) summaries of new publications related to archaeological ceramics, 2) notes about recently held and forthcoming conferences, and 3) additions to the website list on ceramic-related topics.

New Publications: Articles and Books

Philip J. Arnold III ("Flip" Arnold), Department of Anthropology, Loyola University of Chicago, recently published "Ceramic Ethnoarchaeology: Caught between 'Coming of Age' and 'Showing its Age'" in *Reviews in Anthropology* 27(1):17-32 (1998). His article assesses two books concerned with theoretical and methodological issues in material culture analyses, Dean E. Arnold's *Ecology and Ceramic Production in an Andean Community* (1993) and William A. Longacre and James M. Skibo's edited volume *Kalinga Ethnoarchaeology: Expanding Archaeological Method and Theory* (1994).

Nearly eight years ago *Reviews in Anthropology* 20(4):207-214 (1992) published Nancy L. Benco's "The Analysis of Ancient Pottery," an assessment of *Pottery Analysis: A Source Book* (1987), written by Prudence M. Rice, and William Y. Adams's *Ceramic Industries of Medieval Nubia, Parts I and II* (1986).

Colleagues interested in ceramic ethnography and ethnoarchaeology, or social anthropology and symbolic behavior will find and article entitled "In Pots We Trust: The Processing of Clay and Symbols in Sub-Saharan Africa" by Olivier P. Gosselain (University of Brussels), a thorough and forceful assessment. The article appears in *Journal of Material Culture* 4(2):205-230 (July 1999). Systematic comparisons of prohibitions and rituals connected to pottery technology are reported for 102 sub-Saharan African societies, and helps to explain why certain pottery making behaviors are found and others are not as he examines metaphors, prohibitions, and symbolic thinking.

Mike Tite, Research Laboratory for Archaeology and the History of Art, University of Oxford, has published a very significant article in *Journal of Archaeological Method and Theory* 6(3):181-233 (1999) entitled "Pottery Production, Distribution, and Consumption – The Contribution of the Physical Sciences." In this thoughtful evaluation, he reviews the contributions that the physical sciences have made to the life cycle for pottery produced in the past. Tite begins with production technology (raw materials, forming, surface treatment, and firing procedures), specialization and the organization of production (standardization hypotheses supplemented by two case studies), distribution (thin-section petrography, chemical analysis, integrating methodologies, exchange and trade, and case studies). He next considers consumption (use alteration and use inferred from performance characteristics, technological innovation and choice, and an evaluation of the beginnings of pottery production in the Near East). Constraints imposed by environmental, technological, and economic factors, those imposed by performance characteristics required in use, and others imposed by sociopolitical and cultural-ideological factors are assessed prior to a reflection on future developments. This article and the accompanying seven pages of up-to-date references are essential reading.

The journal *Catena* (Elsevier Science, ISSN 0341-8162) which usually publishes papers describing original laboratory investigations and reviews on geo-ecology and landscape evolution with emphasis on interdisciplinary aspects of soil, hydrology, and geomorphology, is also accepting articles on ceramic manufacture and provenience studies. I draw your attention to "Pottery Manufacture in Roman Galilee: A Micromorphological Study" authored by Moshe Wiedner and David Adan-Bayewitz which appears in *Catena* 35:327-341 (1999). The authors, both at Bar-Ilan University, 52900 Ramat-Gan, Israel, examined three Galilean pottery groups from the Roman period and related the ceramics to soils from three distinct communities. Readers may recall that David is the senior author, with Frank Asaro and R.D. Giauque, of the article "Determining Pottery Provenance: Application of a New High-Precision X-Ray Fluorescence Method and Comparison with Instrumental Neutron Activation Analysis" in *Archaeometry* 41:1-24 (1999) which documents other Galilee and Golan sites.

Robert C. Henrickson (Independent Scholar, Takoma Park, MD) and M. James Blackman (Smithsonian Institution, Smithsonian Center for Materials Research and Education) recently published "Hellenistic Production of Terracotta Roof Tiles among the Ceramic Industries at Gordion" in *Oxford Journal of Archaeology* 18(3):307-326 (1999). The authors report on the fabrication of Hellenistic third century BCE roofing systems and tile types at Gordion in western Turkey. Large rectangular pan tiles and long half-rounded cover tiles were manufactured locally. Ethnographic and historic accounts of tile production, forming techniques, and finishing methods, and the results of chemical composition analysis by INAA are reported. These results are also related to other ceramic industries serving the city and the local economy. *Maiolica in the Making: The Gentili/Barnabei Archive* by Catherine Hess (196 pp., 90 black-and-white and 20 color illustrations, ISBN 0-89236-500-5, $39.95, paper) was published in September 1999 by Getty Research Institute for the History of Art and the Humanities in Los Angeles (Getty Trust Publications, 1200 Getty Center Drive, Suite 500, Los Angeles, CA 90049-1682; telephone 310/440-6795, FAX 310/440-7706, http://www.getty.edu/publications) The author is associate curator of sculpture and works of art at the J. Paul Getty Museum and author of the catalog of the museum's collection of Italian maiolica. Hess's new volume emphasizes the pottery created by the potters of Castelli d'Abruzzo during the 17th and 18th centuries, considered to be the high point of the pictorial phase of this tin-glazed earthenware. A majority of the painted narrative pieces from this era were produced in the ceramic workshops of the Grue and Gentili families who dominated this era. The Getty Research Institute acquired the Gentili/Barnabi archives in 1988. This corpus included 276 documents concerning maiolica production, family papers and records, 150 engravings, drawings, transfer patterns, and even four cartoons

related to ceramic painting. Hess relates the archival material and illustrations to ceramic production in a scholarly and compelling manner.

Also published recently is Cristina Tonghini's important research on ceramics from the Middle Euphrates Valley, *Qal'at Ja'bar Pottery: A Study of a Syrian Fortified Site of the Late 11th-14th Centuries*. The 440-page volume has 103 halftones and 155 line drawings, and was issued as *British Academy Monographs in Archaeology* 11, distributed by Oxford University Press (ISBN 0-19-729010-7, $130.00, hardcover, 1999). There are 492 bibliographic entries (38 "Early Sources" and 454 "Modern Works") accompanied by 694 endnotes. In addition, there are contributions by H. J. Franken, H. J. de Haas, and J. Karlsbeek who co-authored "Appendix G: Technological Report on the Pottery from Qal'at Ja'bar" (pp. 97-102), and A. Zaqzug's "Appendix H: The Study of the Walls and the Excavation," (pp. 103-104). This volume derives from Tonghini's doctoral thesis (University of London, School of African and Oriental Studies, 1995). Her research is based in part on the site excavations of the late 1960s conducted by the Syrian Directorate of Antiquities. However, "a series of difficulties prevented the completion of the excavation, and all records were lost and the results remain unpublished" (p. 7). She excavated new sondages and attempts to derive an absolute chronology and occupational history of the site which includes a vaulted building, minaret, mosque, workshop, cistern, a tank (reservoir), and the "Southwestern Complex." The book provides a new means of interpreting and reconstructing the history of a significant fortified site and its relationships to neighboring regions. A detailed assessment of the ceramics ("Chapter 5: The Pottery," pp. 37-68) covers a period of more than 300 years and provides a chronological framework for the interpretation of major changes in ceramic production, and provides a paradigm that may be applicable to other sites. Among the ceramics considered are: Fritware; Intermediate Fritware; Fritware Types 1, 2, and 3; Turquoise-glazed Ware; the Lead-glazed Family (polychrome and monochrome grafitta wares, and monochrome glazed slipware); Unglazed Pottery; Early Glazed Slip-ware; Chinese Celadon; and Smokers' Pipes. Tonghini's analysis contributes significantly to our understanding of graffita ware. Oxford University Press, located in New York City, maintains a secure website through which credit cards orders many be placed: http://www.oup-usa.org

The University of Utah Press has just published Elizabeth Chilton's edited volume *Material Meanings: Critical Approaches to the Interpretation of Material Culture* in their Foundations of Archaeological Inquiry series, Salt Lake City: University of Utah Press, 240 pp. (ISBN 0872806070, $55.00 cloth; ISBN 0874806089, $25.00 paperback; 1999) Jim Skibo edits the Foundations series. Liz Chilton, an assistant professor of anthropology at Harvard University, organized a symposium with the same title at the 1996 annual meeting of the Society for American Archaeology in New Orleans, and edited the subsequent revised contributions. Chapters are authored by Chilton; Marcia-Anne Dobres; Miriam T. Stark; Dean E. Arnold, Hector A. Neff, Ronald L. Bishop, and Michael D. Glascock; Cathy Lynne Costin, Philip J. Arnold III; H. Martin Wobst; and Margaret W. Conkey. The purpose of the symposium was to assemble a group of researchers to explore the commonalties and divergences among current approaches to material culture and to assess future directions for the study of the material world. These contributions represent a broad range of theoretical perspectives, methods, and data sets, and they examine current approaches to material culture in the archaeological record from three perspectives: 1) ethnoarchaeology and technological traditions, 2) materials science, and 3) theoretical approaches to materiality. Rather than focusing on the artifacts themselves, the papers emphasize the social contexts in which they are produced and given meaning, the choices made by the artisan within the larger technical system, and the interpretations of the artifacts by modern researchers. The contributions document an appreciation of material culture as infinitely complex, content dependent, and a product of and precedent of human actions. A comparative review of this volume is being prepared by Charles Kolb for *Bulletin of the History of Archaeology* 10(1), Spring, 2000. The University of Utah Press (1795 East South Campus Drive, Room 101, Salt Lake City, UT 84112-9402) accepts telephone orders at 800/773-6672 and has a website at http://www.media.utah.edu/upress/

Ceramic Innovations in the 20th Century, edited by John B. Wachtman was published by the American Ceramic Society in 1999 (307 pages, hardcover, Order Code GO56, ISBN 1-57498-093-9, $39.00 list price, $31.00 for ACerS members). This synthesis contains six major sections: "The Development of Modern Ceramic Technology," "Descriptions of Important Ceramic Innovations in the Past 100 Years," "Basic Glass Processing," "Ceramics in the Processing of Other Materials," "Functional Use of Ceramics," and "Special Applications of Ceramics." A general, popular book on modern ceramics, *The Magic of Ceramics*, by David W. Richerson is scheduled for publication in December 1999 by the American Ceramic Society (Order Code G041, ISBN 1-57498-050-5). The book will have approximately 225 pp., 200 illustrations and photos (100 in full color) and covers the versatility and wide application of ceramics. Additional information on either of these volumes may be obtained from The American Ceramic Society (P.O. Box 6136, Westerville, OH 43086-6136), telephone 614/794-5890, http://www.acers.org

Karlene Jones-Bley is the author of *Early and Middle Bronze Age Pottery from the Volga-Don Steppe*, volume S-796 in the British Archaeological Report International Series and available for $56.00 plus shipping costs from BAR's American representative, The David Brown Book Company (P.O. Box 511, Oakville, CT 06779), telephone 800/791-9354. Brown has no website but the British publisher, Archaeopress, has a website for its BAR British Series and International Series at http://www.archaeopress.demon.co.uk/frmain.html Bar had published more than 1,000 volumes since 1974.

Andrea M. Berlin is the author of "What's for Dinner: The Answer is in the Pot," *Biblical Archaeology Review* (November-December 1999), a publication of the Biblical Archaeology Society. She discusses food residue analyses from ceramic vessels recovered at Tel Anafa, a small settlement in the far north of Israel. The article is also accessible at http://www.bib-arch.org

Due to be published early in 2000 is the second volume of Karen D. Vitelli's Franchthi Neolithic ceramics. This volume, *Franchthi Neolithic Pottery, Volume 2: The Later Neolithic Ceramic Phases 3 to 5*, is Fascicle 10 in the *Excavations at Franchthi Cave, Greece* series. It was prepared by Vitelli, professor of anthropology at Indiana University and Director of the Franchthi Project, and also contains a contribution of the Post-Neolithic remains by James A. Dengate. *Franchthi Neolithic Pottery, Volume* 2 (Bloomington: Indiana University Press, 352 pp., 108 black-and-white illustrations, ISBN 0-253-21306-1, paper, $59.95, 2000) completes the ceramic analyses and complements *Franchthi Neolithic Pottery, Volume 1: Classification and Ceramic Phases 1 and 2*, Fascicle 8 in the series (Bloomington: Indiana University Press, 528 pp., 22 black-and-white photographs, ISBN 0-253-31980-3, paper, $59.95, 1993). Indiana University Press (601 North Morton Street, Bloomington, IN 47404-3797) may be contacted by telephone: 800/842-6796 or by e-mail at iupress@indiana.edu , and has a website at http://www.indiana.edu/~iupress/

Recently published by Indiana University Press is Henry Glassie's newest volume entitled *Material Culture* (Bloomington: Indiana University Press, 416 pp., 170 black-and-white photographs, 16 black-and-white illustrations, ISBN 0-253-33574-4, cloth, $29.95, 1999), which has a chapter devoted to pottery.

Another forthcoming publication is a chapter entitled "Ceramics" being prepared by Cathy Costin, which is scheduled to appear in *Annual Review of Anthropology* Volume 29 in the fall of 2000. See http://anthro.annualreviews.org/content/vol20/issue1/

Professional Meetings: Held

The 5th European Meeting on Ancient Ceramics: Modern Trends in Research and Applications that I noted in this column in the previous *SAS Bulletin* was held from 18-20 October 1999 in Athens. The conference, organized by the Laboratory of Archaeometry, National Centre for Scientific Research "Demokritos," was attended by 127 participants who heard 44 oral presentations and saw 41 poster presentations. Circulars, the preliminary program, the list of conference participants, and the book of abstracts (the latter in a zipped Postscript file for personal use, not for redistribution) are available on line at http://www.ims.demokritos.gr.archae/confmain.html

The Council on Northeast Historical Archaeology held its 1999 Annual Meeting at St. Mary's City, Maryland, 22-24 October 1999. The preliminary program was posted at http://www.smcm.edu/Academics/soan/cheha/99CONF.htm Among the activities were a "17th century Ceramics Workshop" at Historic St. Mary's City (HSMC) Archaeology Laboratory, conducted by Henry M. Miller (Director of Research at HSMC), and Silas D. Hurry (Laboratory Curator at HSMC). Among the ceramic papers given at the conference were: "'Equal to any work in Philadelphia or Elsewhere:' Henry Piercy, an Alexandria Potter by Barbara Magid; "Clay Smoking Implements from the PPG SITE (36AL228), Pittsburgh, Pennsylvania" by Verna L. Cowin: "Donyatt Slipwares in the Chesapeake" by Taft Kiser; "Ceramics and Status in Seventeenth Century Newfoundland: A Planter's House at Ferryland" by Douglas A. Nixon; "Online 17th-century Ceramic Resource" by Bly Straube; "War and Pots: The Impact of Wars on Ceramic Consumption Patterns, 1806-1886" by George L. Miller; and "The Chamber Pot in Seventeenth and Eighteenth Century Culture" by Mary Ellin D'Agostino.

"The 18th Annual Northeast Conference on Andean Archaeology and Ethnohistory," organized by Donald L. Proulx, was held at the University of Massachusetts at Amherst, 23-24 October 1999. Two papers among the 38 presented dealt with ceramics, including "Long Distance Trade at San Pedro de Atacama, Chile: The Ceramic Evidence" by Emily Stovel (University of Binghamton, NY), which concerned Middle Horizon Tiwanaku imported wares. "Ethnoarchaeology in the Conchucos" by Isabelle C. Druc (Yale University) employed ceramic ethnoarchaeology, and chemical and mineralogical analyses of archaeological and modern ceramics to show differences in compositions related to areas and cultural periods. Additional information on the conference may be accessed at http://www.umass.edu/anthro/andean/

The Ontario Archaeological Society's 26th Annual Symposium was held in Waterloo, Ontario, 29-31 October 1999. Among the dozen papers presented was "Pots, Provenience, and Practicalities: The Impact of Discard, Breakage, Cataloging, and Curation on Archaeological Interpretations of Huron Ceramic and Social Systems" by Holly Martelle (University of Toronto). Additional information about the meeting is available on the society's website at http://arts.waterloo.ca/ANTHRO/OAS/OASpapers.html

"Ceramics for Archaeologists," co-sponsored by Historic Kenmore & George Washington Ferry Farm and Center for Historic Preservation at Mary Washington College was held 13-14 November 1999 at Mary Washington College, Fredericksburg, Virginia. The conference, organized by professional archaeologists, was designed for field and laboratory technicians, persons in the incipient stages of archaeological careers, and students, and focused on providing current and useful information of ceramic identification, classification, and analysis. The presentations on Saturday were followed by hands-on workshops on Sunday. The lecturers included Doug Sanford, Silas Hurry ("Ceramics 101"), Leslie McFaden (18th century), Julie King (collection management), Mike Klein (Native American ceramics), and Barbara Heath (Colonoware). Work sessions were given by Heath (Colonoware), McFaden (18th century), King (Chesapeake potters), Tom Higgins (19th century ceramics and chemical analyses), and Bernard Means (19th century ceramics). Additional information is available on the conference webpage http://departments.mwc.edu/chpr/www/ceramics1.htm

The Eastern State Archaeological Federation (ESAF) Annual Meeting for 1999 was held at Kings Island, Ohio, 18-21 November 1999. The preliminary program was posted at http://www.quad50.com/esaf98mt.html . Among the nearly 50 papers presented were "Huron Ceramic Traditions – A New Look at Old Pots" by Holly Martelle (University of Toronto), "A 1999 Ceramic Attribute Analysis of the Western Basin Tradition" by Andrew M. Schneider (University of Toledo), "The Middle to Late Woodland Tradition and Pottery Technology" by Christopher T. Espenshade (Skelly & Loy),

"Comparing Pottery from the McKees Rocks Village and Eisiminger Sites of Southwestern Pennsylvania" by Richard L. George (Carnegie Museum), and "The Riker Site and Simple Stamped Ceramics in Eastern Ohio" by Jennifer Filler (Kent State University). A highlight of the meeting was a symposium, "Ohio Archaeology: Its Past, Present, and Future," organized and chaired by William S. Dancey (Ohio State University). Eight presenters assessed Ohio archaeology from the Paleo-Indian through Historic periods.

The Fifteenth Annual Workshops in Archaeology held at the State Museum of Pennsylvania in Harrisburg, PA on 20 November 1999 included "Trends in 18th Century Red Earthenware Pottery" by Patricia Gibble (Department of Anthropology, Millersville University, Millerville, PA). Red earthenware pottery, one of the most common artifacts found in 18th century Pennsylvania colonial sites, has been largely ignored by archaeologists because the ceramic did not change very much through time. New research based upon six Pennsylvania archaeological collections has revealed datable trends in the form and style of a poorly understood artifact type.

The 98th annual meeting of the American Anthropological Association was held in Chicago from 17-21 November 1999 and was attended by 4,791 attendees (4,528 paid registrants). There were only 17 papers oriented to ceramic studies among the 2,631 papers presented. Ten papers were presented in the Ceramic Ecology XIII symposium co-organized by Charles C. Kolb (National Endowment for the Humanities) and Louana M. Lackey (Maryland Institute, College of Art), and chaired by Kolb. Frances Hayashida (The Pennsylvania State University) served as the discussant for these papers. Among the presentations were: "Introduction to the XIIIth Symposium" by Kolb; "Ecological and Environmental Determinants of Spanish Village Pottery Production" by Marcia Selsor (Montana State University at Billings); "Pottery Economics during the Early Historic Period in the Merkong Delta" by Miriam T. Stark (University of Hawai'i) and Andrew Balansky (University of Wisconsin at Madison); "Ceramic Archaeometry: Underwhelming the Audience versus Overinterpreting the Results" by Michael Galaty (Millsaps College); and "Long Broken Pots – Late Breaking News: Recent Research in Ceramic Studies" by Louana M. Lackey. There were five papers devoted to new World ceramic subjects: "Pottery Ethnoarchaeology in Michoacan [Mexico]: The Third Season's Report" by Michael Shott (University of Northern Iowa) and Eduardo Williams (Colegio de Michoacan), presented by the senior author; "The Yucatan Slates in Political and Economic Context: A Petrographic Approach" by George J. Bey (Millsaps College) and Susan Kepecs (University of Wisconsin at Madison), read by the latter author; "Variation in Ceramic Production Organization in the Classic Period of Southern Veracruz, Mexico" by Christopher A. Pool (University of Kentucky); "The Tzacualli Transition and the Beginnings of Urban Ceramic Production at Teotihuacan, Mexico" by Mary R. Hopkins, (Independent Scholar); and "'Small" Ceramic Artifacts from Classic Teotihuacan Period Sites in the Basin of Mexico: A Status Report on Specialized Studies" by Kolb. Jim Sheehy (The Pennsylvania State University) who suffered minor injuries in an automobile accident a few days before symposium was unable to present his paper. In early December, Jim was diagnosed with a serious kidney disease and is hospitalized. We wish him a speedy and full recovery.

The seven other AAA papers, scattered through various sessions, were: "The Women Potters of Mata Ortiz" by Kiara Hughes (University of New Mexico); "Competitive Feasting in Late Classic Maya Society at Xunantunich, Belize: Following the Trail of Cylinder Vases and Polychrome Plates" by Lisa Lecount (University of Alabama); "Divining the Ceramics: Dialects of Maya Late Classic to Terminal Classic Society on the Northern Belize Coast" by Shirley Boteler Mock (University of Texas at San Antonio); "The Ceramics of Piedras Negras, Guatemala" by Rene Munoz (University of Arizona); "Pottery: A Dynamic Expression of Ideology" co-authored by Lauren Sullivan (University of Massachusetts at Boston) and Kerry L. Sagebiel (University of Arizona); "Pottery and Identity: The History of the Potters of Miravet (Catalonia)" by Rob J.F.M. Van Veggel (University of Chicago); and a poster presentation by Jim Weil (Science Museum of Minnesota) "Chorotega Traces: Archaeological Time and Ethnographic Time in a Costa Rican Ceramic Tradition."

The Americas Society, 680 Park Avenue, New York City, and the Bard Graduate Center for Studies in the Decorative Arts were the sponsors of a lecture series entitled "Talavera Poblana: The Origins and Expressions of a Mexican Ceramic Tradition." Three lectures complemented an exhibition, "Talavera Poblana: Four Centuries of a Mexican Ceramic Tradition," at the Americas Society Art Gallery. The exhibit had 63 examples of historic Talavera and 23 contemporary works. The initial lecture, "Painting with Clay: The Talavera Tiles of Puebla [de los Angeles]," a survey of architectural tiles, was presented on 6 October 1999 by exhibit curator Margaret Connors McQuade. On 27 October, Robin Farwell Gavin (Curator of Spanish Colonial Collections, Museum of International Folk Art, Santa Fe, NM) presented "The Spanish Roots of Talavera Poblana" in which she documented the "migration" of tin-glazed earthenware from Spain to the Spanish colonies in the Americas. McQuade gave the final lecture, "The Renaissance of Talavera Poblana in the Early Twentieth Century," on 1 December. *Antiques Magazine* for December 1999 carried the speaker's article, "Talavera Poblana: The Renaissance of a Mexican Ceramic Tradition." Unfortunately, the exhibition organized by the Americas Society, The Hispanic Society of America (New York City), and Museo Ampara (Puebla, Mexico) was on view only from 17 September through 12 December 1999. Additional information is available at the website http://www.americas-society.org/va.html A catalog of the exhibit, *Talavera Poblana: Four Centuries of a Mexican Ceramic Tradition*, written by Margaret C. McQuade and Jaime C. Castro, is published in a hardcover edition (112 pp., ISBN 1-8791-2819-5) by the Americas Society for $30.00. Minimal additional information about the Amparo Museum is at their website http://www.mexicanart.com.mx/museums/amparo.html

Nearly 190 papers were presented at the 101st Annual Meeting of the Archaeological Institute of America, 27-30 December 1999 in Dallas, Texas. Among these were nine

presentations on ceramics (five papers and four poster presentations). The oral presentations included "The Importation and Imitation of Aegean Pottery in the Amuq Valley, Turkey" by Jan Verstraete (University of Cincinnati); "Amphora Production, Agriculture, and Trade: The Alonissos Archaeological Project, Greece" by Effie F. Athamassopoulos (University of Nebraska), Argyroula Inztessiloglou and Litsa Skafida (both 13th Archaeological Ephoreia, Volos, Greece); "The Roman Legionary Pottery from Binyanei Ha'uma, Jerusalem" by Jodi Magnus (Tufts University); "The Spread of Terracotta Tile Technology in Eturia and Greece" by Nancy A. Winter (American School of Classical Studies at Athens); and "New Ceramic Evidence from Mochlos: Regionalism and Eastern Crete During Late Minoan II and Early IIIA" by Angus K. Smith (Bryn Mawr College). The posters were: "Neolithic Pottery from the Palace at Pylos" by Andre Bekerman (University of Toronto); "Tile Kilns in the Peloponnese: The Evidence from Corinth, Nemea, and Olympia" by Eleni Hasaki (University of Cincinnati and American School of Classical Studies at Athens); "Postpalatial Pottery of Epano Angilianos Ridge" by Deborah Jackson (University of Minnesota) and Shawn Ross (University of Washington); and "The Ceramic Sequence at Hacimusalar, Lycia" by Ilknur Ozgen (Biulkent University). The "Gold Medal Colloquium in Honor of Dr. Patty Jo Watson" held on 28 December included six papers, one of which was "Ethnoarchaeology and Ethnohistory: A Study of a Palestinian Village" by Ghiada Ziadeh-Seely (AIA Society).

The program for the Society for Historical Archaeology annual meeting, held in Quebec City from 4-9 January 2000, has been posted on the SHA website in English, French, and Spanish-language editions at http://www.sha.org/meet20.htm Among the 640 papers presented were 15 on ceramics. These included: "Stonewares in the Cemetery: Wasters and Kiln Furniture from the African Burial Ground in New York City" by C. L. Morgenstein and M. F. Janowitz; "Envisioning the Culture of Urbanization: Ceramics as Indicators of New Behaviors in the Rituals of Tea-Drinking and Dining in Early 19th century Manhattan" by S. Brighton; "Shortwave Ultraviolet Light as a Tool to Speed Sorting and Improve Accuracy in the Classification of Refined Ceramics and Glassware" by G. W. Shorter, Jr.; "Chinese Porcelain in Late 16th and Early 17th Century Contexts in Panama Viejo" [Panama] by L. R. Schulsky; and "Out of Sight, Out of Mind: The Albany Pottery Dump" [New York] by P. McLaughlin. Additional papers were "Afro-Caribbean Ceramics from the Northern Lesser Antillies: Another View" by J. B. Petersen and D. R. Watters; "Symbolism and Iconography of African Clay Pipes from the Early French Regime in French Guyana" by J.-A. Bernardin; "Not All Watch Spring Motifs Come from New Jersey: Ceramic Analysis in the Age of Uncertainty" by M. F. Janowitz; "The Mineralogical, Micromorphological, and Chemical Characterization of Probably Locally-Made, Common Earthenwares of the Second Half of the Seventeenth Century Uncovered at the Rocher de la Chapelle, at I'ile aux Oies, Quebec" by Y. Monette; "A Statistical Comparison of Spode/Copeland Ceramics between Historic Metis and European Occupations in Central Alberta" by T. Panas. The presentations also included "*Botijas* or Olive Jars and their Marks from the Santo Domingo Monastery, La Antigua, Guatemala" by C. A. Carruthers; "Forgotten Potting Centers: Historic Ceramics Produced in the Basin of Mexico (1521-1940)" by A.-P. Games and P. Fournier; "Arsenic and Old Lead: Recent Excavations at the William Dennis Pottery Site" by L. F. Carnes-McNaughtom and H. E. Pugh; "Pipe Dreams:" The Study and Analysis of the Kaolin Clay Pipes from Port Royal, Jamaica" by G. L. Fox.; and "Tangible Interaction: Lowcountry Colono Ware" [Georgia and the Carolinas] by R. W. Anthony.

The eleventh annual "Workshops in Archaeometry" conference organized by the Archaeometry Research Graduate Group (ARGG) of the University of Buffalo was scheduled for19-20 February 2000 at the University of Buffalo. This two-day conference includes four half-day workshops, each of which will have an introduction by the session moderator, a 30-30 minute informal presentation of research, and a period of open discussion. Additional information many be obtained from Dr. Ezra Zubrow, Professor of Anthropology and ARGG Faculty Advisor, or Hex Kleinmartin, ARGG Conference Director (ARGG, 380 MFAC, Ellicott Complex, SUNY at Buffalo, North Campus, Buffalo, NY 14260) by telephone at 716/645-2511 or by e-mail: hfk@acsu.buffalo.edu

Professional Meetings: Forthcoming

Information on the 32nd International Symposium on Archaeometry which is to be held in Mexico, D.F. 15-19 May 2000 has already been distributed widely and summarized in the *SAS Bulletin* 22(1-2):2 (Spring-Summer 1999). The acceptance of abstracts of papers and posters submitted to the program committee will be known shortly, and may be accessed on the website at http://www.archaeometry.unam.mx/ The session entitled "Technology and Provenance of Ceramics and Slips" will be chaired by Mike Tite (Research Laboratory for Archaeology and the History of Art, University of Oxford).

The Clay Minerals Society 37th Annual Meeting is scheduled for the Watertower Campus of Loyola University of Chicago in Chicago, IL from 24-29 June 2000. The theme of the meeting is "Clays in the Past and Future Millennia." Eight symposia are scheduled (the names of the confirmed session chairpersons are in parentheses): "Redox Processes in Clays" (J. Stucki), "Archaeology and Clay" (B. Velde and C. Shriner), "Agrichemicals and Clays," "Vermiculites" (B. Velde), "Nanocomposite Materials for the Next Millennium" (T. Pinnavaia), "Clays in the Human Future" (J. Banfield and D. Ming), "Geology" (D. Pevear), and "Clay Minerals in Glacial Stratigraphy" (D. Moore and C. Rovey). A workshop "Industrial Uses of Clays" (W. Moll) is scheduled for Saturday. The General Chairman of the meeting is Dr. Alamah Fitch, Loyola University of Chicago, 6526 Sheridan Road, Chicago, IL 60626); telephone 773/508-3119, e-mail: afiotch@luc.edu

The "First Latin American Clay Conference – CLAYS in Volcanic Environments, will be held in Funchal, Madeira, Portugal, 17-22 September 2000. The conference emphasizes clay mineral formation in marine and continental volcanic environments, but all subjects on fundamental and applied clay science are welcome. The official language of the conference is English. Paper abstracts are due by 30 April 2000. The two and one-half day conference will have invited lectures and

poster presentations, and there is a one-day field trip to Porto Santo Island to see bentonite deposits and a half-day field trip to Madeira Island to see altered tephra deposits. Additional information is accessible at http://event.ua.pt/lacc2000/

Websites

If readers are not already familiar with the Program on Ancient Technologies and Archaeological Materials (ATAM) at the University of Illinois at Champaign-Urbana, directed by Sarah Wisseman, and its website, you should visit it at http://sss.uiuc.edu/unit/ATAM/ The site also has an events calendar, and lists of colloquia, workshops, and lectures. Of particular note was the 25 October 1999 presentation entitled "The New PIMA® (Portable Near-Infrared Mineral Analyzer): A New Aid in the Mineralogical 'Sourcing' of Stone and Ceramic Artifacts" given by Randy Hughes (Senior Geologist and Head of the Industrial Minerals and Resource Economics Section, Illinois State Geological Survey). He noted that chemical and XRD analyses are time consuming, expensive, and destructive when compared to PIMA. The advantages of PIMA are: 1) it is completely portable and fast (one/minute); 2) it uses a 1.5 cm rock surface, powder, or thin section; 3) it is completely nondestructive; and 4) it complements, constrains, and "screens" sites, borings, and sample sets for XRD and chemical analyses. PIMA measures hydroxyl, water, and carbonate bonds, and is useful for pipestones, limestone artifacts, ceramic clay sources, and flint. An abstract of the presentation is available at http://wwwmuici.edu/unit/ATAM/cur_events.html

The Tables of Contents and article abstracts from the Austrian periodical *Forum Archaeologiae* may be accessed at http://149.148.83.8forum/welcome.html or http://149.148,83.8/forum/count.html-ssi The articles are, in the main, in German and concern topics in the Mediterranean world and Southeastern Europe. Among the contributions relating to ceramics are: "Keramikmaterial aus Xanthos: Die Sondage West 3.95 an der Ringmauer" by Banu Yener-Marksteiner, Ausgabe12/IX/99; "Recycling Misfired Pottery" by J. Polombe et al., Ausgabe 9/XII/98; "Keramik aus Phemeos' by G. Erath, Ausgabe 8/IX/98; "Red Slip Ware" by J. Polombe and "Sigillatadepot: St. Polten" by Ch. Riegler, both in Ausgabe 7/VI/98; and "Keramik und Laser" by M. Kampell and Ch. Lista, Ausgabe 6/III/97.

Harrison Eiteljorg II established the *CSA Newsletter*, published by the Center for the Study of Architecture at Bryn Mawr College, as a means of disseminating information on and providing an archives for computer models of architectural monuments and archaeological sites. This extremely valuable and highly recommended website is maintained by donations, may be accessed at http://csa.brynmawr.edu/web1/ There is an "Index of Related Articles" including an entry entitled "Articles on pottery profiles and capacity calculations" (12 articles). Ten of these articles from past issues may be downloaded from the website http://csaws.brynmawr.edu:443/web1/nlxref.html Readers will also find many entries on ADAP, CAD modeling, GIS, electronic publishing, the design and use of databases, and the use of electronic media in the humanities.

"Processing Pottery in the Field: The First Step Toward Publication," the Second Annual Workshop on the Publication of Pottery, held at the 1997 annual meeting of the Archaeological Institute of America in Chicago, 30 December 1997, was organized by Andrea Berlin. The website contains four questions with answers provided by six respondents concerning the practical and theoretical aspects of the processing of excavation pottery during and after an excavation season. Responses from other archaeologists are also now included as is Appendix I: Troy Pottery Analysis Sheets. The lengthy report, comments and appendix are still posted at the following URL: http://www.cla.umn.edu/cnes/pottery/

Also on the WWW is a URL for the "Wilson Pottery Site 41ND19," located in Corinth, Texas that can be accessed at http://members.tripod.com/~redbear_7/wilson.htm Site and feature descriptions, and artifacts are included. Among the features are kilns, waster piles, clay pits, a potter's shop, a forge/kiln, a house and storage buildings. The site, occupied since the 1840s, was placed on the National Register of Historic Places in 1979, but the land is soon to be the location of a new housing subdivision. The kiln and artifacts were excavated and donated to the Denton County Historical Commission as a part of an agreement with the developers, Lake Sharon Limited Partners, Inc. and Zena Development Corporation of Southlake.

Corpvs Vasorvm Arretinorvm, 2nd edition, 1st electronic edition, developed by Philip Kenrick, Institute of Archaeology in Oxford is accessible at http://www.arch.ox.ac.uk/projects/web_cvar.htm The project began in 1992 with the aim of completing a new catalog of potters' signatures on Italian terra sigillata ceramics, mid-1st century BCE to mid-2nd century CE. This catalog was devised to emend and expand paper-based catalog developed by the late August Oxe and Howard Comfort (*Corpus Vasorum Arretinorum*, Bonn, 1968). The new catalog was formulated as a searchable database, and has displays that introduced the database, provide information on stamps, the potters, motifs, findspots, and chronology; and provides reports on selected potters.

"Database for Archaeological Pottery" created by Progetto Finalizzato Beni Culturali (Dr. Mariangela Bertelle, Dr. Giovanni Leotta, and Prof. Sandro Calogero [all, University of Venice], and Dr. Anna Bini [University of Ferrara]). Prof. Calogero (Dipartimento di Chimica Fisica, Universita di Venezia) is the head of this database project. Chemical data for the composition of archaeological pottery are listed following the excavation sites. Data are given in percents of the relative oxide or element: http://helios.unive.it~termo/DataBank/BancaDati.htm The site has the following subdivisions: Italian Pottery, Aegean Pottery, European Pottery, American Pottery, African Pottery, and Asian Pottery.

The Archaeological Ceramic Building Material Group (ACBMG) located in York, UK is a new and growing organization whose members specialize in brick and tile identification and welcome inquiries. American and European members are welcome according to the ACBMG's Secretary, Sandra Garside-Neville. 63 Wilton Rise, YO24 4BT, UK. The group's website may be accessed for additional information and the membership fee structure at http://www.tegula/freeserve.co.uk/acbmg.html

The ACBMG's inaugural meeting was held on 9 October 1999 at Carey Baptist Chapel Rooms, Hackleton,

Northamptonshire, UK, and included the presentation of five papers and a trip to the Piddington Museum (site of a famous Roman villa). The initial meeting attracted 30 people. In addition to the presentations, discussion centered on developing standards for recording brick and tile. There is also a Discussion List that may be accessed at majordomo@durham.ac.uk and joined by sending the text message <subscribe batg>

Greek archaeologist Vangelis Tsakirakis (Proussis 48, 26226, Patras, Greece; telephone and FAX 0030061327269, e-mail bm-ecoikk@otenet.gr) has developed a website at http://users.otenet.hr/~bm-ecoikk/ Among the entries in Greek (with summaries in English) are reports on the surface survey of Western Achaia (Greek and Roman materials); the excavation and surface survey at Ano Mazaraki (Rakita) of Achaia; database application for historical-archaeological research; "Statistical Notes on Archaic, Classical, and Early Hellenistic Pottery from the Intensive Survey at Western Achaia" and "Archaic and Classical Pottery From Surface Survey at Western Achaia."

An article, "The Center for the Study of Modern Pottery and Its Educational Programs" authored by E. Gratsia, documents current educational efforts for the "promotion of neohellenic traditional pottery." The English-language version may be accessed in *Pyxida: Newsletter of the Landscape Archaeology Group (L.A.G)* Volume 3 (1997-98), WEB edition 1999 at http://omart.gr.pyx3eng.html L.A.G., co-edited by V. Agruropoulous, H. Simoni, and V. Tsakirakis, may also be contacted by e-mail at mailbox@omart.gr

Sebastian Heath has publicized his website "Roman Amphoras," a bibliography of 103 items concentrating on works that present or discuss the typology, origins, and distribution of Roman amphoras. The bibliography is accessible at the following URL http://openarchaeology.org/bibliography/grps/romanamphoras.html

An interesting website about Mexican ceramics, "Oaxacan Pottery: Traditional Ware of Southern Mexico," has been developed by Eric Mindling, who is also engaged in the export of this ware. The Table of Contents of his site includes "The Potters of Oaxaca," "Manos de Oaxaca" (a craft organization established by Mindling that locates and exports the pottery), "The Villages," "Tales from the South," and "Oaxacan Pottery Workshops and Field Study" (visits to traditional potters). Among the villages profiled on this updated website are: San Marcos, Esiritu Santo, Zapotec Serrano, Yojuela, Tonaltepec, Coyotepec, Mixtepec, and Tlatzacualpa. An interview conducted in September 1998 with Leopoldo Barranco, a traditional potter in San Bartolo Coyotepec is enlightening, and there are outstanding color images of ceramic vessels. The website is located at http://www.foothill.net/~mindling/villages.htm

A website devoted to "Canadian Clay Tobacco Pipe Industries" that emphasizes 19th century production (1845-1902) in Montreal, Quebec City, and St. John, New Brunswick, and centers in the United States (Detroit, MI; Rouses Point, NY; and New York City) is accessible at http://www.virtlogic.ca/pipe/pipes.html

"Methods of Conserving Archaeological Material from Underwater Sites" (Anthropology 605: Conservation of Archaeological Resources I) was developed by Donny Hamilton (Nautical Archaeology Program, Department of Anthropology, Texas A&M University, College Station, TX 77807). The 17 files and class syllabus files on the website constitute a laboratory manual used in conjunction with the course and were first posted in the spring of 1998 but were revised 1 January 1999, and many be accessed at http://nautarch.tamu.edu/CLASS/ANTH605/File0.HTM Among the files are: basic conservation procedures; adhesives and consolidants; conservation of bone, ivory, teeth, and antler; conservation of pottery; conservation of glass; wood conservation; leather conservation; textile conservation; metal conservation (there are separate, lengthy files on iron, non-ferrous, cupreous, silver, lead, tin, and lead alloy, gold and gold alloy); casting and molding; and a comprehensive bibliography. Readers of the "Archaeological Ceramics" column will benefit from a review of this extremely valuable resources, especially the files on adhesives and consolidants, the conservation of pottery, and the bibliography.

Other important websites include:

"Guide to German Stoneware 1500-1800" (A Collectors's Guide to Antique German Stoneware 1500-1800) is located at http://www.harmic.com/collect.htm

The "English Antique Transferware Resource" site includes information on fabrication, manufacturers, cleaning transferware, and a bibliography. The website is at http://www.concentric.net/~Jspode/

Historic information about ceramics from the 1750s to date can be accessed at three commercial pottery websites:

The Spode Ceramic Factory at http://www.spode.co.uk/home_main.html

The Wedgwood Ceramic Factory at http://www.wedgwood.co.uk

The Royal Doulton Company at http://wwwroyal-doulton.co.uk

Book Reviews

Michael D. Glascock, Associate Editor

Early Iron and Steel in Sri Lanka. By Gillian Juleff, 1998. Mainz: Verlag Philipp von Zabern. ISBN 3-8053-2512-6. This is a weighty large format tome (422 pp), beautifully produced with many monochrome and full-colour photographs. DM 78 plus DM 14 postage and handling and is available from Verlag Philipp von Zabern, Nymphenburgerstrasse 84, D-80636 Munchen, Germany. The fax number is (089) 121516-16.

From a posting to Arch-Metals by David J Killick, Department of Anthropology, University of Arizona, Tucson, AZ 85721-0030 USA

Although I have been following this project closely, I am still blown away by the quality of this volume and would urge anyone at all interested in archaeometallurgy to read it closely. I think that it is particularly notable for its exemplary integration of field survey, excavation, documentary and oral history, experimental archaeology and archaeometry.

The volume describes the discovery, during survey of a valley to be flooded by construction of a large dam, of two features of interest. The first was the site of the crucible steel production famously described by Coomaraswamy in 1904. Juleff found that the descendants of those steelworkers still possessed some blooms, crucibles and ingots of crucible steel, and an excellent metallographic study of these by Michael Wayman is included here as an appendix. The second feature was the discovery of an entirely new type of iron-smelting furnace. As reconstructed by Juleff (and the data presented here allow no doubt as to the accuracy of her reconstruction) these were low subrectangular structures, 1.5 - 2 m in length, 0.4-0.8 m wide and (particularly suprising) only 0.5 m high. Large numbers of these were found, invariably placed near the crest of west-facing hills, with the front long wall, bearing a single line of up to a dozen tuyeres, facing downslope. Juleff argued that these were wind powered furnaces utilizing the force of th seasonal monsoon (July to September), which (as she shows in an innovative chapter packed with wind-velocity measurements) achieve sustained wind speeds of 40 km/h, with periodic peaks up to 60 km/h.

Since Juleff was not an archaeometallurgist (at least not yet!) and there was no precedent for the technology that she proposed, her reconstruction encountered intense scepticism from the archaeometalurgical community. She countered this in the most effective way - by building full-scale replicas and smelting iron in them successfully on four separate occasions, using only the force of the monsoon wind. There can be no doubt that she is correct and that the Sri Lankan furnaces, for which available dates run from the seventh through the eleventh centuries AD, are a significant new chapter in the history of metallurgy. Mathematical modelling of the windflow patterns by David Wilson, an aeronautical engineer, explains why these furnaces work. A complex pattern of boundary layer separation occurs where the pasees over the lip of the front walls, producing a low pressure zone that draws air in through the tuyeres. This is NOT a natural draft furnace - Wilson's calculations suggest that the pressure drop achieved in these 0.5 m furnaces is equivalent to that in natural draft furnaces 3 to 6 m tall.

This is the kind of publication that sets new standards for an entire field. The quality of the fieldwork is very high, it is superbly documented, and it is all woven into a complex and extremely coherent argument. Furthermore, unlike much contemporary archaeometallurgy (and I am thinking here particularly of European and Latin American archaeo-metallurgy) this study stands out for its wide-ranging use of comparative material - African, European, Near Eastern, Indian and Japanese. In summary, this is about as good as it gets in our field.

Archaeological Sciences 1995. Proceedings of a conference on the application of scientific techniques to the study of archaeology, Liverpool, July 1995. Edited by Anthony Sinclair, Elizabeth Slater & John Gowlett. Oxbow Monograph 64, Oxford, 1997. 448 pp. $120 (cloth). ISBN 1 900188 04 X.

Reviewed by Robert H. Tykot, Department of Anthropology, University of South Florida, Tampa, FL 33620 USA

This volume is the proceedings of the 5th Archaeological Sciences conference, a biennial meeting held in Britain since 1987. This is the second of the proceedings to be published by Oxbow; another was published in the British Archaeological Reports series (Slater & Tate 1988; Budd et al. 1991). While the conference has rotated through various British venues, the nationality of the participants and the subjects of the research presented is international. The participants at this particular conference were heavily biased towards the USA, Canada, and western Europe.

As with proceedings of other conferences, including the longer-standing International Archaeometry Symposia, the contributions are a mixed bag in terms of subject matter, quality, and significance. *Archaeological Sciences 1995* includes 68 papers, ranging in length from mere abstracts to a maximum of a dozen pages including references and illustrations. The concise nature of the papers is in keeping with the original presentations and, as an overview of a wide range of current scientific applications in archaeology, should make the volume appealing to readers with broad interests who prefer not to get bogged down in full journal article-length detail. For such readers, an introduction and/or epilogue which discussed the range and significance of the papers, current and future trends, etc., would have been useful; the editors chose to contribute only a half-page preface instead. Many of the articles would be suitable for use in graduate or advanced undergraduate courses as examples of scientific applications in archaeology, in conjunction with text/lecture material on the principles of the various techniques.

The papers are effectively organized into sections by methodology or material: Petrography (3 papers); Glass (5); Ceramics (7); Metallurgy (9); Chronological (9) and Dendrochronological (3) Studies; Ancient Environments (16); Remote Sensing (2); Human Remains (5); and Human Evolution/Hominid Artifacts (9). It is not possible here to discuss the individual papers in any detail.

Compared to *Archaeological Sciences 1989*, the most noticeable change is in the inclusion of the large number of papers on ancient environments, a topic of resurgent interest in archaeology. In general, the organizers of the conference were broadminded in their definition of archaeological science; in some circles, the study of biological remains, unless technologically sophisticated, would not have been included. Papers in the environmental section include studies of pollen and phytoliths (Tipping et al.; Madella), microfauna and flora (Clapham et al.; Pantazidou et al. [2 papers]; Turner-Walker

& Scull), landscape and environment (Caple & Dungworth; Endfield; Krahtopoulou; Clare; Gonzalez et al., Ivaschenko; Sazanov), dental microwear (Mainland), and phosphorus or heavy metals in sediments (Jenkins; Willies & Maskall). Most of these studies exemplify the importance of understanding the environmental context when we interpret archaeological remains and the human behaviors they represent.

Among the papers on human remains are three dealing with bone chemistry, including stable isotope analysis of carbon and nitrogen for dietary information (Richards & van Klinken), dentine degradation (Lucy & Pollard), and using amino acid racemization in teeth to determine age at death (Carolan et al.). I found these to be among the most original and significant papers in the volume, and they presage an increased emphasis on bioarchaeology in the later 1990s. Two other contributions focus on cranial morphology (Panagiaris et al.) and skeletal taphonomy and preservation (Tiley-Baxter).

More varied and somewhat out of place are the papers on human evolution and hominid artifacts, which range from studies of lithics (Crompton; Crompton & Gowlett; Weber; Cormack; Andresen et al.) to morphology and functionality of jaws, teeth, and locomotive adaptation (Quinney & Collard; Spears & Crompton; Crompton & Yu). They are out of place in the sense that the only 'scientific' or techno-analytical component of these studies is the computer - either for statistical manipulation, or for generating models, e.g. on the mechanical significance of thick enamel (Spears & Crompton). It's not that archaeological science is all about black-box instrumental analysis, but for the most part these studies aren't explicitly scientific, i.e. with experimental laboratory-based testing of specific hypotheses.

Chronological studies, always important to archaeology, focus in this volume on methods less well-established than radiocarbon and radiopotassium dating, although two papers mathematically combine C14 dates and stratigraphic sequence to refine age estimates (Farid Khan & Gowlett; Curl & Latham). Alternative dating methods to radiocarbon are important because carbon-containing materials aren't always available or suitable in many contexts. The chalk figure of a horse at Uffington, for example, is dated using optically stimulated luminescence (Rees-Jones & Tite). Several other papers also use luminescence or uranium-series dating on a variety of materials (Barnett; Shepherd; Brown et al.; King); the usefulness of amino acids for dating organic materials is still being investigated (Csapo et al.; Csapo-Kiss et al.); and dendrochronology remains the most precise technique when wood samples are available (Bonde; Bonde et al.; Groves).

The remaining papers fall in the category of materials analysis. Stone is the subject of only three papers, including an historical overview of implement petrology (Davis), a novel and useful approach to non-destructive obsidian characterization using back-scattered electron imaging on an SEM (Kayani & McDonnell), and petrographic provenancing of Stonehenge dolerites (Ixer). Studies of glass comprise technology (Merchant et al.; Blek & Gilmore; Nicholson) and conservation issues (Early & Watkinson; Mills & Cox). An important contribution is Nicholson's on the results of recent excavations at Tell el-Amarna where kilns and a workshop for glass and faience have been uncovered.

The papers on ceramics are split between petrographic (de Domingo & Johnston; Eiland; Joyner; Williams & Jenkins) and chemical (Brodie; Hughes et al.;Whitbread et al.) studies. These papers are limited in their geographic representation, with five on Greece and Italy, one on Roman pottery in Britain, and the last on Parthian ceramics in the Near East. Two of the chemical studies use atomic absorption, and the other neutron activation analysis. AAS has been widely superceded by ICP spectroscopy, while NAA is expected to become less available in the coming decade due to the closure of many research reactors. Perhaps the most important paper in this group is the cautionary tale by Whitbread et al. who attempt to establish a representative 'control group' of local ceramic fabrics by analyzing a kiln and its associated pottery.

The papers on metallurgy cover compositional analysis, technology of production and decay, and sourcing. They include studies of alloy composition (Bayley & Butcher; Bean), bronze production and possible tin sources in south India (Srinivasan), silver refining (Bayley & Eckstein), early Islamic steel manufacture (Griffiths et al.), documenting punchmarks using the SEM (Mortimer & Stoney), the possibility of dating gold-copper-silver alloys (Seruya & Griffiths), copper sourcing using lead isotope ratios (Joel et al.), and trace element fingerprinting of gold using laser ablation ICP mass spectrometry (Taylor et al.). While this last paper is only a preliminary report, it demonstrates the efficacy of this technique to produce quantitative trace element information in an almost non-destructive manner.

Two papers on remote sensing are also included, one on using techniques appropriate to specific geological and architectural circumstances (Shell) and the other on theoretical aspects of resolution on data interpretation (Schmidt & Marshall).

While it was undoubtedly a massive effort to extract all of the conference papers in a timely manner - and the editors are to be commended for publishing the proceedings within two years of the conference - there are too many inconsistencies in format that could have been addressed. Many papers have abstracts, but some have none at all, and two 'papers' are in fact only half-page abstracts. For two papers with the same first author, the abstract for the first is just two lines in length; for the second paper, the abstract is 24 lines in length! The extent of typographic errors are equally variable, indicating that proofreading was largely left in the hands of the authors rather than the editors. The paper by Kayani and McDonnell is particularly rife with distracting errors. In some cases a blank left-hand page is included so that papers begin on the right-hand page; in other cases the papers begin on the left. The table of contents is not necessarily accurate; for example, the author 'Brodle' should be 'Brodie'; M.S. Tite has been left out as the second author of the paper by Rees-Jones; and the sequence of the two papers by Pantazidou et al. have been switched.

The volume is printed in the large A4 format, with text in two columns. This is the now-standard format of all Oxbow publications, and the quality of the text and illustrations is very good. Photomicrographs, remote sensing images, and other figures are sharp and fully detailed. The cloth binding is

adequate but my copy is already torn a bit at the spine; large volumes such as this one need a heavier duty binding. The price is undoubtedly a limiting factor for individual purchase, even at a 20% conference discount, although the price is not out of line relative to other publications of similar length and narrow target audience.

In conclusion, this volume is reasonably representative of the broad range of scientific applications in archaeology in the last decade of the 20th century, save for the wide array of recent work on biological remains, especially bone chemistry and residue analysis. While the sheer number of contributors alone attests to the vitality of and continued interest in scientific studies, it is equally clear that science-based archaeological research is not a standard or principal component of many archaeological projects, but something often done as a discrete effort from excavation and classificatory/typological analysis and publication. For the most part the papers in *Archaeological Sciences 1995* are useful contributions to the literature, but won't change the reasons why many archaeologists find archaeometry to be boring. In some cases it may be the overly narrow focus of some scientific research; in others it may be lack of 'middle range theory' which connects the analytical data to the broader humanistic interpretation of archaeological issues of current interest. Hopefully the 21st century will see more widespread integration of scientific studies into archaeological research design and interpretation.

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Space and Time Perspective in Northern St. Johns Archaeology, Florida. John M. Goggin, University Press of Florida: Gainesville, 1998. Southeastern Classics in Archaeology, Anthropology and History Series. xx + 147 pp., 9 figures, 12 plates, 2 appendices, bibliography, map. $29.95 (paper). ISBN 0-8130-1634-7.

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Considered by James J. Miller, chief of the Florida Division of Historical Resources Bureau of Archaeological Resources, to be one of "the three founding monographs of modern Florida archaeology," Goggin's 1952 publication, **Space and Time Perspective in Northern St. Johns Archaeology, Florida**, has been reprinted by the University Press of Florida as part of the Southeastern Classics Series. The series editor is Jerald T. Milanich, whose most recent works include *Florida Indians and the Invasion from Europe* and *Laboring in the Fields of the Lord: Spanish Missions and Southeastern Indians*. In his Foreword to the 1998 edition of **Space and Time Perspective** Milanich states that the purpose behind the reprinting of Goggin's work is to make this "timeless treasure" affordably available to today's students and scholars. With the exception of a few additional pages of front matter, the 1998 edition is a replica of the 1952 original.

This relatively short book contains only eighty pages of text supplemented by two appendices, one listing sites keyed to a map and the other listing artifacts. The book summarizes data gathered from four hundred thirty-two archaeological sites spanning approximately two thousand years' of occupation by a variety of groups. It does suffer from two shortcomings common to early, fundamental research in archaeology. First, it is descriptive and classificatory rather than interpretive. Second, its dating is relative. Reliable absolute dating was not possible, as this book was written before the use of radiocarbon dating.

Its major strengths include its instrumentality in the development of historical archaeology, and its high level of accuracy. Goggin's work was so accurate that only minor revisions have been found necessary over the course of the past fifty years. Written before the term "Native American" came to be politically correct, Goggin's book is "modern" in his concern with the ecological impact of human occupation. Just as forward thinking was Goggin's inventing of underwater archaeology as a method for learning about Florida's submerged sites.

Goggin begins by defining the boundaries of the Northern St. Johns Region and introducing the reader to the human and physical geography of the area under consideration. He describes the topography, mineral resources, and the marine and terran plant and animal life. He explains the changes that occurred over time in sea level and climate. He discusses contact between the Native Americans and Europeans, starting with the early 1500s and continuing through the beginning of British occupation circa 1750. He concludes his overview with the disappearance of the Timucua tribe and the appearance of the Seminoles. In providing the ethnological background, Goggin defines the terms he uses to name the tribes, locates them geographically and discusses their language and styles of pottery. He speculates on population size and briefly describes the social and religious hierarchy.

He begins his discussion of the archaeological history of the area with the year 1605 when mounds of oyster shells were discovered and studied. He continues by discussing the eighteenth century, including 1765-1766, the period during which the British paid more organized attention to shell mounds and burial sites. He also includes the contributions made by prominent Florida archaeologists of the nineteenth and twentieth centuries, and concludes with a summary of his own publications.

He explains the process of developing the chronology of the area and defining the eras during which different cultures flourished. Goggin also explains how he combines the findings of several researchers to develop his chronological sequence. Using material remains—primarily pottery—as the basis, the

author briefly theorizes about the complexity of the cultures involved.

The excavated objects are described and ordered chronologically. As has been stated before, the chronology is relative; absolute dating came later with radiocarbon technology. Goggin notes the stylistic variety which occurred over time and which was seen in different geographical areas in pottery fabric and decoration, burial practices, ornamentation, tools, metalwork, pipes and structures. He traces the pottery styles chronologically, laying down an important baseline as a foundation upon which subsequent work could be built. He further elaborates, tying together the styles of separate cultures into longer-lasting and wider-spread "traditions." He uses his broad understanding of the material remains to theorize on aspects of how the Native Americans lived their lives, including their rituals, art, technology and practices of obtaining food.

In summing up his findings, Goggin identifies areas for future work needed to solve specific problems. Among these include the identification and excavation of at least one, single site which was occupied over a relatively long time period, and which spanned several major cultural changes. In addition, the need to identify and study other sites which were occupied by certain cultures, particularly that of the eighteenth-century Seminoles, which had not been studied adequately. He also believes that correlating the findings of physical anthropologists and ecologists with the findings of the archaeologists would prove informative.

Although originally published almost fifty years ago, **Space and Time Perspective in Northern St. Johns Archaeology, Florida** remains central to the archaeological literature of the southeastern United States. The only criticism I have of this reprinted version is that the second generation of images of the finds are darker than those in the original 1952 edition, and some of the detail has been lost. In spite of this difference in the illustrations, the reprint of Goggin's book is valuable and useful. Not only will it allow younger scholars to augment their personal libraries with a respected, time-honored standard, it will also continue to preserve the archaeological record of sites destroyed long ago.

Chronometric Dating in Archaeology: Advances in Archaeological and Museum Science,Volume 2. R.E. Taylor and Martin J. Aitken, eds. Plenum Press: New York & London, 1997. xix + 395 pp. $95.00 (cloth). ISBN 0306457156.

Reviewed by Peter Ian Kuniholm, Department of the History of Art and Archaeology, Cornell University, Ithaca, NY 14853-3201 USA

I volunteered to write this review of **Chronometric Dating in Archaeology** (hereafter *CDiA*) because the table of contents made it sound like a good possibility for adoption in a course. The book is a discussion, by a group of recognized archaeometrists, of twelve varieties of chronological dating that are (or should be) of interest to archaeologists. Moreover, the first editor (Taylor) is known for his expository skills. *CDiA* seemed a good bet, then, for an archaeometry course, albeit expensive. Here is the menu, all of which seems reasonable at first glance:

Chap. 1: Climatostratigraphy (Aitken & Stokes)
Chap. 2: Dendrochronology (Dean)
Chap. 3: Radiocarbon Dating (Taylor)
Chap. 4: Potassium-Argon/Argon-Argon Dating Methods (Walter)
Chap. 5: Fission-Track Dating (Westgate, Sandhu, & Shane)
Chap. 6: Uranium Series Dating (Schwarcz)
Chap. 7: Luminescence Dating (Aitken)
Chap. 8: Electron Spin Resonance Dating (Grün)
Chap. 9: Protein and Amino Acid Diagenesis Dating (Hare, Von Endt & Kokis)
Chap. 10: Obsidian Hydration Dating (Friedman, Trembour & Hughes)
Chap. 11: Archaeomagnetic Dating (Sternberg)
Chap. 12: Surface Dating Using Rock Varnish (Schneider & Bierman)

The general layout for each chapter is sufficiently similar: abstract, introduction, description of the technique, special problems, applications or case studies (but not uniformly: Aitken in "Marine and Ice-Core Predictions" says, in regard to the increased continentality of land masses and the potential development of land bridges, "Both of these have direct relevance to archaeology." Why? How? Aitken lets it go at that which is a pity), then conclusion and references, to suggest that there must have been some kind of general format proposed by the editors at the very beginning.

The twelve essays are prefaced by Taylor's and Aitken's statement of what they expected to achieve. One paragraph from the preface deserves to be repeated here because it seems to indicate what the editors had in mind when they started the enterprise: "...because of the increasing complexity of many techniques, it is no longer possible for one author to encompass adequately the literature and research direction of more than one or, at most, two techniques....In the present volume, the author (or, in most cases, the authors) of each chapter were asked to provide a summary of progress in their respective technique over the last three decades—with an emphasis on a review of developments doing [sic] the last five years—and the status of current research. We were interested in providing archaeologists, specialists interested in techniques with which they do not directly work, and advanced undergraduates and postgraduate students in archaeology, with an authoritative review of the current status of the major Quaternary dating methods."

This must have been an almost impossible assignment for the authors: in thirty pages tell everything that has happened in your field in thirty years, emphasize the progress of the last five years, provide an up-to-date bibliography, and do it so that both specialists and non-specialists can understand what you are talking about. If the authors had been able to pull it off, this would have been a must-buy book. Unfortunately only three-and-a-half were able to do it: Jeff Dean on dendrochronology, R.E. Taylor on radiocarbon, Robert Sternberg on archaeomagnetic dating, and maybe Rainer Grün on electron

spin resonance dating, largely because they write in clear English (with occasional lapses), give the reader a clear explanation of how their methods work, and provide enough case studies so that the archaeologist can see practical examples of the method in action.

The other essays in *CDiA*, however useful they might be for the specialist, border on the incomprehensible for the archaeology student, however advanced. In the chapter on protein and amino acid diagenesis dating, the section on racemization and epimerization processes is singularly opaque. I showed the eight chained equations to some senior undergraduates at Cornell, also the sixteen equations from the potassium-argon chapter. Only one chemistry major could figure out what was going on, and she admitted it was a struggle. The archaeologists were clueless.

We have here the same sort of producer-vs.-consumer problem that manifests itself in the biennial archaeometry meetings (and I have been to four now) where the physicists talk to the physicists, the chemists to the chemists, etc. The consumers or end-users of this archaeometric information, namely the field or museum archaeologists, are generally ignored. It seems to me we need to do a better job of explaining ourselves to the professional public whom we serve, unless we are satisfied to talk only to each other.

The flow of the text is marred by extraordinarily sloppy editing. In Aitken's first essay, for example, there are at least 18 typos or errors, aggravated by the fact that somebody's word-processing software deleted all umlautted vowels. Poor Kaiser (1993): "Beitrge zur Klimageschichte vom spten Hochglazial bis ins frhe Holozn...." Come on, Plenum, who does your copy-editing? I have a long article in a similar book currently in press at Plenum, and I shudder to think what the final copy is going to look like. When one has struggled through stuff like this, and then one encounters an unfamiliar word, the first instinct is to think that here is yet another typo. Take, for instance, the last two sentences of Taylor's and Aitken's introduction quoted above: "Finally, we should note that in several chapters the term 'ka' appears. In such cases. [sic] 1ka = 1kvr [sic] = 1000 Years." I have always considered bad spelling and punctuation to be signs of moral turpitude, and I had to go to the geology department to reassure myself that I had not missed out on yet another new way to say "1kyr." Why not just say "1000 years" and be done with it? Making an effort to be "scientific" at the expense of clarity and exactness does not inspire confidence in the substance of what follows.

The scientific content of the *CDiA* is adequate, and no fellow practitioner of archaeometry should find serious fault with what is said. All twelve papers address what is going on in each field. None of this is "new" information in the sense of something that might make the cover of *Nature* or *Science*, and a corpus of basic information and standard way of explication has grown up around each topic. Specialists will understand the discussions immediately.

However, what a pity the bibliographies were not annotated. Do Hare and colleagues seriously think that readers, however earnest, will look up *all* their references to amino acid dating? 202 citations for this one chapter alone seem excessive, especially for a reader who is just getting started. Which are the fundamental ones? How might one guess? I remember an early lecture at Brookhaven by Jeff Bada when he said that amino-acid dating is more of an art-form than a dating technique. Have we made serious progress since then? Where does one go look? The specialist who already knows how to weed through them will certainly scan the bibliographies in *CDiA* for the nuggets he/she might have missed. There are some 1400 up-to-date references in this book, or an average of around 120 per chapter, and that alone makes *CDiA* worthwhile for the professional. However, it is a curiosity that only some four of these authors cite work in any language other than English. Is archaeometry the exclusive province of Anglophones?

More on the topic of looking: the table of contents directed me to the last page of Martin Aitken's thermoluminescence chapter where I was able to find the latest word on error limits: the TL people are still hoping for ±5% accuracy, although the example Aitken gives is closer to ±7.3% at the 68% level of confidence. In other chapters the reader has to scramble about for this information. I wish the other authors had been as forthcoming or that the editors had required them to be more specific about the accuracy of each technique. After all, what does the non-specialist reader want to know? 1. How does the method work, and who is doing it? 2. How accurate is it or might it be in the near future? 3. What are the basic references?

It is a pity that the editors did not beat into the contributors the necessity for remembering who the potential audience (namely, archaeology students) for *CDiA* was going to be. Or is it possible that the worthy goals set forth in the Preface were merely afterthoughts?

Overall, if the preface had not gotten my hopes up unnecessarily, these remarks would have been much more positive except for the copy-editing, the bibliographies, and the unevenness of discussion of error limits. But non-initiates are going to be confused with the kind of writing they face in *CDiA*. I regret to report that *CDiA* is not a book for a general bookshelf, much less for archaeology students, however advanced they may be. I do not intend to assign it to mine, with the exception of the three-and-a-half chapters noted above, even though these are all fundamental techniques about which they need to know.

The Cambridge Encyclopedia of Human Paleopathology. Arthur C. Aufderheide and Conrado Rodriguez-Martin with a dental chapter by Odin Langsjoen, Cambridge University Press, 1998. xviii + 424 pp., 360 figures, 9 tables, references, index. Price: $100.00 (cloth). ISBN 0-521-55203-6.

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The Cambridge Encyclopedia of Human Paleopathology is a comprehensive reference guide on the expression of disease in human skeletal and soft tissue remains. Taking a medical approach, this book presents information on diseases that produce gross pathological changes and can be recognized by the unaided eye or epidemic diseases that affect human populations while not necessarily leaving gross changes

in tissues. These selection criteria allow for the inclusion of many infectious diseases that have had profound physical and/or cultural impact on human groups, such as cholera, smallpox, tuberculosis, treponematosis, and plague; with joint diseases and metabolic disorders which maybe individually specific but can help in the diagnosis of group lifeways.

Aufderheide and Rodriguez-Martin organized this volume into fifteen chapters, the first being an introduction to the history of paleopathology. Following an approach similar to other publications by Rodriguez-Martin, this chapter breaks the history of paleopathology into four phases (antecedent, genesis of paleopathology, interbellem consolidation and new paleopathology) and provides a brief, yet informative overview of the major accomplishments and publications of each period. While by no means a complete guide to the history of disease studies, this introduction serves as a starting point for first-time readers or refresher for current professionals.

Brilliantly, the authors follow this introduction with two chapters addressing non-disease-related changes in human remains. These chapters emphasize the first step in the study of disease—discerning what is and what is not a disease artifact. The chapter on pseudopathologies addresses taphonomic processes, including embalming, scavenger activity, excavation and specimen handling, botanical effects, chemical erosion and microbiological agents, which can affect both soft and skeletal tissues. While figures demonstrating how these processes can mimic true pathologies are few, the authors do briefly discuss common points of confusion and offer some aid in distinguishing a few of the pseudopathologies discussed in this chapter from true pathologies. Chapter three (Traumatic conditions) presents examples of human-made skeletal and soft tissue damage/mutilations (intentional or otherwise) such as fractures, trephinations, amputations, circumcisions, tattoos and piercings. Unlike the previous chapter, the authors offer numerous photographs and figures to illustrate trauma in human remains. One of the highlights of this section, the discussion of trephination, offers a history and geographic distribution of the practice in addition to information on methodology, survival, and differential diagnosis.

Aufderheide and Rodriguez-Martin organize the remaining twelve chapters along disease etiology/typology so that there are sections that deal with congenital anomalies, circulatory diseases, joint diseases, infectious diseases, disease of the viscera, metabolic diseases, endocrine disorders, hematological disorders, abnormalities in skeletal development (dysplasias), neoplastic conditions and dental diseases (written by Odin Langsjoen). Perhaps the pathology sections of greatest interest to physical anthropologists and archaeologists are those dealing with joint diseases, infectious diseases, metabolic disorders and dental diseases. These sections offer clear descriptions and exceptional illustrations of many of the diseases encountered in archaeological populations usually with information on antiquity, etiology, soft tissue and skeletal evidence and distribution in human groups. In particular, many of the discussions of bacterial infections and metabolic disorders are excellent not only for their scope and depth of coverage but for the important additional information on distribution of lesions on the body (both on the skeleton and soft tissue) and possibilities for differential diagnosis in reference to other taxonomically similar pathologies. Noteworthy, the chapter on diseases of the dentition begins with a brief but helpful overview of dental development, organization and descriptive terminology to aid readers in understanding later discussions of attrition, periodontal disorders, dental caries, enamel hypoplasia.

Overall, the quality and scope of this publication make it an extremely useful addition to the field of paleopathology. This book provides numerous illustrations to help professionals understand disease expression for both skeletal and soft tissue. In fact, it is the expanded look at soft tissue pathologies that is one of the strengths of this publication, something the authors feel was not sufficiently provided for in other publications and was needed since "an understanding of (such) disease processes is incomplete if the paleopathologist is unaware of the soft tissue alterations" (Aufderheide and Rodriguez-Martin,1998: xvi). For physical anthropologists and archaeologists with a basic understanding of human biology, *The Cambridge Encyclopedia to Human Paleopathology* can be a useful reference source. This book is an excellent source for information on disease distribution and expression with numerous skeletal and mummified archaeological illustrations and references that allow the researcher numerous opportunities for further study. Particularly in the case of bacterial infections, the authors consider the cultural implications of several diseases for human populations.

However, despite these exceptional discussions, there are some points concerning the applicability to this text to anthropological discussions which need mentioning. First, the inclusion of more references to soft tissue disease, while important to understanding paleopathology, necessitates the use of a more medical vocabulary and background which will discourage some readers from certain sections, such as diseases of the viscera. Aufderheide and Rodriguez-Martin recognized this dilemma but resisted the attempt to lessen the technical aspects of gross anatomy. In an attempt to reconcile any problems, greater detailed explanations are offered for the more technical descriptions of topics, such as cell membrane chemistry. Still, readers who lack a course in gross anatomy or biochemistry may find it difficult to comprehend many of the medical aspects of the book.

Secondly, the organization of this text by disease typology assumes a basic understanding of disease etiology. This assumption will further limit readership since an individual must have already know what general class of disease their specimen exhibits in order to look up information on epidemiology and lesion distribution. Accordingly, this book cannot to be used as a guide for disease diagnosis but should serve as a reference text in support a researcher?s understanding and testing of disease expression in human remains.

Thirdly, there are no indices of terminology, illustrations or tables. Due to the medically organized approach of this book, such sections might be useful in expanding the readership into the more general levels of anthropology just as providing an index of diseases by region of the body (head, upper extremities, etc.) would facilitate use of this book by non-medical/paleopathology professionals.

Finally, there are some points which may have significant bearing in anthropological discussions that the authors failed to include or address completely in there section of traumatic conditions. Perhaps due to the emphasis on soft tissue lesions, the dental markings of labrets on the mandibular incisors as discussed by Cahue, Sauer and Pollard (1998); Scott and Turner (1997); and Jerome Cybulski (1992) were not mentioned. Since lip plugs and other forms of body ornamentation may be used to identify group social structure and ranking, recognizing the physical changes produced by body ornamentation can be important for understanding social organization of past populations. From an anthropological standpoint, the authors also offer very little information on the differential diagnosis of scalping from pseudopathologies. Used by many as an indicator of intergroup warfare, scalping can and has been mistakenly identified in human remains for which further study revealed the markings to be the products of post-depositional processes. Additionally, tooth mutilation (intentional or unintentional) was not discussed or eluded to within the chapter on traumatic conditions but was placed within the chapter on dental diseases conditions and then only offered one poor quality example of a dental inlay and very little discussion of antiquity, distribution and cultural significance. In the end, such oversights as these do not affect the overall quality of this text and its usefulness to current or future paleopathologists but do illustrate the need for a greater dissemination of information on how cultural behaviors and post-depositional processes affect human remains.

In conclusion, *The Cambridge Encyclopedia of Human Paleopathology* should be a welcomed addition to the library of any paleopathology professional, upper-level graduate student interested in paleopathology or archaeologist with an advanced understanding of human anatomy.

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Archaeological Obsidian Studies: Method and Theory. Edited by M. Steven Shackley. Advances in Archaeological and Museum Science, volume 3. Plenum Press: New York and London, 1998. 243 pp, includes reference and index. $49.50 (cloth). ISBN 0-306-45804-7.

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Two decades ago, a now-classic book entitled *Advances in Obsidian Glass Studies* (Taylor 1976) surveyed the state of archaeometric studies of volcanic glasses, with a focus on new developments in geochemical sourcing and obsidian hydration dating. The present volume is a report of progress in those same fields. Seven chapters explore a range of techniques and issues related to geochemical sourcing of obsidian and other volcanic glasses, and two chapters are devoted to improvements in obsidian hydration dating and its application. These research articles are sandwiched between an introduction (by M. S. Shackley) that highlights key issues in volcanic glass studies today, and by an illuminating commentary by R. C. Green, one of the pioneers in the field. As a whole, the book ably illustrates many of the advances occurring in both fields, on three main fronts: (1) a deeper understanding of underlying processes and causes of variability, (2) better measurement tools and approaches, and (3) widening utilization worldwide.

Processes responsible for variability in geochemical composition of volcanic glasses, such as magma-mixing, fractionation, and magma-parent rock interactions, are discussed only in passing (by M. Shackley), but many of the authors explore the many implications of this variability for geochemical sourcing. The amount of geochemical variation present within single sources or within regions clearly affects how well different sources can be distinguished. Most of the chapters devote considerable attention to different techniques that can tease apart different, chemically heterogeneous sources. Additionally, recognizing that volcanic glass sources are often internally variable requires more intensive field studies and more samples analyzed, to adequately explore that internal variability: as Shackley (p. 99) observes, "no longer can the archaeometrist analyze a few samples from a source sent by a collector and *characterize* a source."

Moreover, volcanic glass is not always found only in primary depositional context, but often extends to a much broader area where glass has been transported by secondary depositional processes. (In southern Nevada, for example, I have found that usable obsidian nodules are quite rare in the vicinity of primary air-fall tuff exposures, but they are much more plentiful in streambeds that erode the tuff units and accumulate nodules of appropriate sizes.) For determining patterns of transport and exchange of lithic materials, it is therefore often important to measure geochemical variability within these 'source areas' as well. The proliferation of geochemically distinctive source areas can raise serious problems of sampling and certainty in sourcing studies. Some chapters (e.g., Glascock et al.) advocate characterizing each and every likely obsidian source in a region, but as other authors (e.g., Weisler and Clague) point out, this laudable goal may be infeasible or impossible in many circumstances, and research programs must recognize these limitations.

The causes of variability underlying the hydration process, summarized in a chapter by C. Stevenson et al., are becoming much better understood. The authors highlight the dominant role of intrinsic water content of volcanic glass (more specifically, the concentration of OH^- ions) in determining the rate of hydration, and point out that OH^- may vary considerably within a single source or flow. Consequently, accurate rates

for individual artifacts may require knowing the OH^- content of those artifacts. (Although not discussed in this book, Stevenson and his colleagues have argued elsewhere [e.g., Stevenson et al. 1996] that the OH^- content of obsidian is strongly correlated with specific density, which is a simple measurement to obtain, and which enables one to derive intrinsic hydration rates for individual artifacts.) Stevenson et al. go on to discuss the important roles of effective temperature and relative humidity (more specifically, partial water vapor pressure) in affecting hydration rates. Effective hydration temperature is widely known to affect hydration rates at local scales, but the combined effects of temperature and humidity has only recently begun to be fully appreciated. Effects of variable humidity are most pronounced in surface or near-surface contexts, and in many situations temperature and humidity are negatively correlated, so that the two factors may offset each other (Friedman et al. 1994).

The development of better measurement tools is expressed most clearly in the series of chapters devoted to geochemical sourcing. Different volcanic glasses can be distinguished by an alphabet soup of techniques, such as NAA (neutron activation analysis, described by Glascock et al.), ICP-MS (inductively coupled plasma-mass spectrometry, used by Tykot), EDXRF (energy-dispersive x-ray fluorescence, used separately by Shackley, by Weisler and Clague, and by Davis et al.), PIXE-PIGME (proton induced x-ray emission-proton induced gamma-ray emission, utilized by Summerhayes et al.), electron microprobe (by both Tykot and by Weisler and Clague), and good old visual inspection (also by Weisler and Clague). These techniques have different strengths, weaknesses, applicability, sensitivities, and costs. Side-by-side comparison of the different techniques is not attempted, nor does it really need to be, since (as Shackley's introductory chapter points out) the kind of instrumentation best suited for a particular problem depends mostly on the nature of the problem. Building better measurements tools is not limited to hardware; several chapters explore the merits of various statistical techniques (e.g., principal components analysis, cluster analysis, discriminant functions, and visual examination of bivariate plots), to distinguish different glass sources.

In the quest for better geochemical characterization, the need for comparability of results is increasingly important. This need is being filled with increasing interlaboratory comparisons and wider dissemination of geochemical datasets. Inter-artifact comparability may also be affected by artifact size or morphology, a point examined in detail for EDXRF by Davis et al. and (to a lesser degree) for PIXE-PIGME by Summerhayes et al. A final important factor is affordability, and several chapters pursue the development of techniques that are as cheap and non-destructive as possible, while maintaining enough accuracy to allow good geochemical discrimination.

Better measurement techniques is also an important theme in the papers on obsidian hydration dating. Recent advances in obsidian hydration dating techniques, discussed by Stevenson et al., include more accurate measurement of hydration rind thickness using infrared spectroscopy, improved characterization of intrinsic hydration rate using new experimental designs, and improved methods to measure effective hydration temperature and relative humidity. Related developments are discussed by Ambrose, who reports on refinements in the measurement of hydration rinds using digital image analysis, and selection of rinds that are not subject to surface erosion and dissolution. Ambrose points out that obsidian hydration dating holds great promise in chronological control during the last few hundred years, a time when radiocarbon dating is effectively useless.

Finally, several authors (including Shackley, Glascock et al., and Green) point out that geochemical sourcing techniques and obsidian hydration dating are being increasingly used worldwide. While this statement is undoubtedly true, the research chapters tend to focus their studies within several of the familiar long-time centers of obsidian research: Mesoamerica, Oceania, the eastern Mediterranean, and western North America. Such a perspective is valuable for showing how research is advancing in already well-known areas; it would equally worthwhile to know how researchers are approaching the same problems in new areas.

I have one (minor) complaint: although the book is generally well edited and illustrated, it could have benefitted from a bit more attention in places. I noticed a number of annoying typos, several figures are cumbersome for the information they convey, and some statements in the chapters conflict unnecessarily: an example used to illustrate an important point in one chapter turns out not to be true, we find out in another chapter.

Overall, however, the volume stands as a very useful summary of current approaches in geochemical sourcing and hydration dating of volcanic glasses. The chapters illustrate the promise of a range of techniques, and repeatedly stress the key factors affecting variability in geochemistry, source distributions, measurements, or hydration rates. Clearly, the archaeometry of volcanic glasses has advanced significantly during the past twenty years. In contrast, as several authors (most notably Tykot) point out, development of theoretical models of obsidian procurement, utilization and movement seems to have lagged behind. It is true that no new theoretical 'social' or 'technological' models are discussed in this book (another book-length treatment would be needed to examine this issue properly). Yet the examples discussed herein do suggest how archaeometric improvements can alter our understanding of particular archaeological situations. By changing our understanding of the archaeological record, advances in archaeometry may ultimately serve as incentive to improve our theories about the social and technological significance of volcanic glasses as well.

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Lithics: Macroscopic Approaches to Analysis. William Andrefsky, Jr. Cambridge Manuals in Archaeology. Cambridge University Press, Cambridge, 1998. 258 pp., 100 figures, 36 tables. Price: $69.95 (cloth), ISBN 0-521-57084-0; $27.59 (paper), ISBN 0-512-57815-9.

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William Andrefsky, Jr., wrote this book "for students interested in learning about lithic analysis," "to help graduate students structure lithic analysis for their own research problems and regions," and for teachers of lithic analysis (pp. xvii-xviii). Andresfsky begins with a glossary and a chapter introducing the field of lithic analysis. Chapters 2 and 3 discuss how stone tools are made and the materials used in making them. Chapters 4 to 7 are the core of the manual, presenting basic procedures for the description and analysis of chipped stone artifacts. In chapters 8 and 9, Andrefsky provides examples extending lithic analysis beyond stone tools to issues such as sedentism and site function. The book ends with a short conclusion which pulls together much of the information in chapters 4-7 in a discussion of Andrefsky's mode of proceeding when faced with a lithic assemblage.

It is, in my experience, quite unusual to have a glossary at the beginning of a book, and it is a valuable innovation, particularly in a manual such as this. Most definitions in the glossary are clear and standard, but some are marred by copy editing problems - for example, collateral flaking is defined as "The process of removing expanding flakes removed from..." (p. xxii) and feathered termination as "The distal end of a flake with a very sharp edge"(p. xxiii) - awkward locutions such as core: "A nucleus or mass of rock that shows signs of detached piece removal. A core is often considered an objective piece that functions primarily as a source for detached pieces"(p. xxii); and ambiguous or imprecise definitions such as formal tools: "Stone tools made as a result of extra effort in their production. These tools are in contrast to expediently made tools with little or no effort expended in their production"(p. xxiii).

Chapter 1 introduces the volume and provides a brief history of flint knapping experimentation, focusing on microwear and replication. The coverage is too brief to do justice to the arguments swirling around these approaches to lithic analysis, but Andrefsky does hint at the nature of the controversies and provides his opinion that both approaches are valuable though neither a panacea. Chapter 2 is quite a good general discussion of stone tool production. It is brief, but sufficient to give students and idea of how stone tools are produced initially and how they are modified by use. However, again there exist problems which should have been caught by a copy editor. For example, on p. 11, "The processes of percussion and pressure flaking are called application of loads" - a process isn't an application - and on p. 28, "hinging and plunging...turn toward or away from the objective piece:" hinging turns away and plunging toward.... In writing earlier about plunging blades, Andrefsky defines them first as "reverse hinges," a term which does not even exist in the glossary, and then gives 3 more terms, the last of which is the caption in the figure and the main glossary entry - confusing for an experienced reader, not to mention a neophyte. I also had trouble following the discussion of wedging and bipolar flaking. Chapter 3 is probably not detailed enough to allow a student to identify a rock, but does provide a nice primer on hard rock geology and how various rocks came to be and can be identified. Particularly nice, after all the details, is Andrefsky's comment in the summary to the chapter that what is important about a rock from a flintknapper's point of view is neither its name nor its genesis but what it does when the knapper bashes it. Of course, its type and its source, as Andrefsky also notes, can be of great importance to the analyst who may be considering the prehistoric peoples' range or knowledge of lithic resources and their quality. The one thing I would have liked to see in this chapter was at least some mention about the nature of hammerstones. Hammerstones appropriate to the material being worked seem to have been very important to prehistoric knappers, and I would like to see a manual such as this pay them a little more attention.

In Chapters 4-7, Andrefsky sets out the basics of lithic analysis, beginning with identification and classification and ending with a detailed discussion of bifaces. These chapters, which form the core and the longest part of the volume present a clear discussion of a number of the characteristics of lithic artifacts which archaeologists have measured and defined - out of the infinitude of possible measurements and definitions - and the ways in which these characteristics have been combined to describe artifacts. Andrefsky evaluates these characteristics and presents a reasoned, rational and well-explained choice of measurements to use.

Chapter 4 covers attributes and types and presents a clear and useful generalized morphological typology for all chipped stone artifacts. Although this typology does not use functional labels, Andrefsky does try to defend the use of functional type names to label morphological types. I disagree: if you call a tool a scraper, people will assume it was used to scrape something no matter how hard you protest that it's just a morphological label. Functional terms should not be used unless there is clear evidence that the artifact or artifact class served that function. Particularly well-done in this chapter is the discussion of flakes versus flake shatter versus angular shatter. The distinctions are clearly made and Andrefsky presents a compelling rational for creating and separating these classes of debitage.

Chapter 5 presents an excellent discussion of flake debitage attributes, indicating most if not all characteristics archaeologists have tried to measure or define and demonstrating which ones should not be used because of the impossibility of consistant replicability: striking platform angle and facets and number of dorsal ridges on a flake. For dorsal flake surfaces, Andresfsky proposes 4 value scales for both amount of cortex and number of ridges which are clear, easy to apply, and replicable. Andrefsky concludes that, for platforms, the useful measurements are platform width and thickness, but he doesn't indicate how he deals with point platforms, following his discussion they would probably be listed as present but with 0 values for length and width. I also disagree with Andrefsky's

assertion that all step fractured flakes are broken (p. 97): they are all failures, but, like hinge fractures, they can be "whole." Chapter 6 takes the debitage identified in Chapter 5 and indicates various ways in which it has been analyzed and used to derive information about lithic industries. Andrefsky critiques these studies carefully and comprehensively, concluding that indications about the nature of lithic industries can be derived from the aggregate analysis of debitage but that individual flakes in particular and even assemblages of flakes cannot be unambiguously assigned to particular reduction strategies.

In chapter 7, the longest in the book (52 pp.), Andrefsky attacks the central problem of stone tool analysis: how should cores and tools be analyzed and what can they tell us about prehistoric mobility? How are flakes produced and how can these production sequences be recognized from flakes alone; how are flake tools held and how can hafted flake tools be distinguished from hand-held tools; how are retouched edges formed, used and measured? How can unhafted bifaces be classified as tools or cores - or can they be; how should hafted bifaces be described and how are they made? Throughout this chapter Andrefsky cautions the reader about the dangers of replication analysis, the need for replicability in measurement and description, and the fact that different measurements will be important depending on the goals of the analysis. He refuses to propose THE method of correct analysis, which will disappoint folks looking for a cookbook, but which, he shows, is the only responsible approach to the diversity of stone tools. This excellent chapter is a fine capstone to this set of analytical chapters.

Up to this point, Andrefsky has looked at lithic artifacts in a world of their own; in the next two chapters he evaluates attempts to link stone tools to other aspects of human life. In chaper 8 he examines studies in which stone tools have been used to determine different site functions within particular subsistence-settlement systems and in chapter 9 how lithic artifacts change through time with increasing sedentism. The major hypotheses Andrefsky examines in these two chapters are that tool diversity will be greater in sites which are occupied for a longer period of time, and vice versa, and that formal tools and raw material diversity will decrease with increasing sedentism. It should be clearly noted that Andrefsky does not consider fully sedentary complex societies, in which, one might suggest, formal lithic tools will increase again, but only relatively early and simple sedentary societies. None of the examples Andrefsky proposes in chapter 8 is conclusive, but Andrefsky makes good suggestions about how they might be improved to better test the hypotheses. The hypotheses relating stone tool formality to sedentism presented in chapter 9 are better supported by the studies Andrefsky cites, though he also indicates a number of potential confounding factors such as the nature of local lithic resources and their acquisition.

In his final chapter, Andrefsky relents and does inform the aspiring lithic analyst how he goes about performing a lithic analysis. This procedure, linked to the methods discussed in Chapters 4-7, will allow a student to get a grip on her/his assemblage before moving into the murkier waters of figuring out what it means.

The volume, like all of the Cambridge Manuals in Archaeology, is very nicely produced and attractive. The illustrations are extensive and excellent and are well tied into the text. The bibliography has ample references to help any interested reader delve into the continually expanding literature on lithic artifacts and their interpretation.

While there are difficulties with this book, as discussed above, it should accomplish Andrefsky's aim of helping students to both understand and undertake lithic analyses. It also provides project ideas for advanced students of lithic analysis, though it may also convince them that such analyses are not particularly well suited to answer questions about site function. I learned a good deal from **Lithics** and will be using insights and methods from chapters 4-7 when I approach my next lithic collection.

Mummies, Disease & Ancient Cultures (2nd edition). Cockburn, A., E. Cockburn & T.A. Reyman (eds.), Cambridge University Press, 1998. ISBN 0-521-58954-1 (paper, $29.95); ISBN 0-521-58060-9 (cloth, $74.95).

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The second edition of *Mummies, Disease, and Ancient Cultures* remains, just as with the first, a valuable resource to the professional and novice interested in mummy studies. It does not cover every type of mummy known, but it does provide an in depth look at different mummification practices from around the globe.

The book is a collection of sixteen chapters that have been divided into four sections. The four sections are: Mummies of Egypt, Mummies of the Americas, Mummies of the World, and Mummies and Technology. The definition of mummification for this volume includes what Vreeland (Chapter nine) calls Type I, II and III mummies. Type I includes those individuals mummified through natural processes such as desiccation or freezing. Type II mummies are intentionally placed in on mountain tops, or in caves and other environments known to preserve. Resins, evisceration and other artificial preservation techniques define Type III mummies.

Approximately one-third of the book is dedicated to Part I, Mummies in Egypt. The section is composed of six chapters, none of them are altered extensively from their original form. The first chapter by William Peck provides an overview of mummification processes from the Predynastic to the Roman Period, but New Kingdom practices are discussed the most extensively. Chapters Two and Three are dedicated to disease and dental history in Ancient Egypt. Sandison and Trapp list a case history of diseases found so far in skeletal and tissue studies. They divide them by category and while some trends in the health history of Egypt are approached, original cases are given prominence. Harris, Ponitz and Engels have done precisely the opposite with the dental health data. They summarize the current literature on Ancient Egyptian dental health and present the trends in a chronological format. Chapters

four through six recount the examination of different mummies. Chapters four and six present two mummies originally from the Philadelphia Art Museum, but they are currently housed in the Pennsylvania University Museum. PUM II was studied extensively by Cockburn et al. This was considered to be a 'classic' Egyptian mummy, but of the Ptolemaic Period. Chapter six is a brief account by Reyman and Peck's research on PUM III and PUM IV with regards to evisceration. A weaver, named Nakht (ROM I), of the late New Kingdom was studied extensively by Millet et al. The mummy is kept at the Royal Ontario Museum in Toronto. The extensive results of their dissection are presented in Chapter five.

Part II, Mummies of the Americas, contains four chapters. The first two are dedicated to North America. Chapter seven is a summary of mummies found in the South and Southwestern US. El-Najjar et al. note that since 1980 most new research has centered on mummies from Texas, but that little new work has come about due to the repatriation movement in the US. For this reason all photographs that were in Chapters 7 and 8 in the previous edition have been removed to respect Native American traditions. Chapter eight focuses on Alaskan and Aleutian mummies. Zimmerman stresses the remarkable accuracy of paleopathological studies, although there have been few undertaken.

The profile of South American mummies has increased dramatically in the past twenty years and the synthesis presented Chapters nine and ten is one of the great successes of this entire volume. Chapter nine is dedicated solely to the mummies of Peru. Vreeland not only discusses the different types of mummies found, but provides an informative historical account of their discovery and mummification practices. Chapter ten expands continuing with information about the cultural and disease aspects of not only Peruvian, but also all South American mummies. Arriaza, Ardenas-Arroyo and Kleiss present the cultural data and Verano presents a summary of paleopathological studies.

Mummies of the World, Part III, begins with an account of the bog people of Northwestern Europe. Fischer presents information on each bog person that has been reported or examined in a straightforward synthesis of their history, archeology, and skeletal biology. Following chapter eleven the book becomes a collection of manuscripts by different authors representing mummies found throughout the rest of world.

Chapter twelve represents mummies found in Italy, Northern Africa and the Canary Islands. Asenzi and Bianco present the mummy of a Roman girl from Grattarosa, Italy. Fornaciari follows with an overview of Italian mummies but specifically addresses those found in the Basilica of San Domenico Maggiori in Naples. An infant found in Libya is the only example discussed from Northern Africa. Rodriuguez-Martin completes the chapter with a synopsis of the Guanche mummies of the Canary Islands. Pretty and Calder (chapter thirteen) were not able to publish photos of the Australian mummies for similar reasons to those chapters on the US mummies. However, they present a thorough account of the complex Aboriginal mortuary practices and how they relate to the practice of mummification there. Nine of the nineteen known Japanese mummies are described in detail by Sakurai et al. These mummies were all Buddhist priests and they were mummified in a seated meditative posture. The only mummies presented from China are the Mawangtui-type. These mummies were chosen for inclusion in the volume because they have been well studied. Chapter fifteen concludes the presentation of mummies found throughout the world in frozen climates. This includes mummified individuals from the Alps, the Andeans, Siberia and Greenland.

It can be hoped that all the mummies presented in the pages previous to Part IV, will benefit from the technologies presented in this final section. Mummies and Technology is a single chapter comprised of manuscripts by seven different experts. They cover paleoimaging, paleogenetics, paleonutrition, archaeoparasitology, and endoscopy and population studies. Each section discusses the technique, how it has been used to examine mummified remains, and its potential for future scientific enquiry. These techniques differ from those presented in the first volume and are meant to introduce the reader to new techniques being used in the field that may be unfamiliar.

The chapters of this edition combine to make an easily digested volume of information. It is not meant to be a complete presentation of all mummies throughout the world, but yet it is very successful at giving the reader a thorough introduction to those mummies which have been examined by different types of professionals. Most chapters contain listing of the mummies presented and their current locations which is helpful for those wishing to look further. The later sections may seem choppy, given the number of authors and different types of information presented, but the breadth of information presented more than overcomes this drawback.

The biggest changes between the first and second editions are in the final chapter on technology and the inability to publish photographs that were in the first due to changing political climate. New research is dispersed throughout the volume, but some chapters do remain unchanged, such as those on the dissection of specific mummies.

Overall the edition is a success. It could be used for an introductory course on mummification practices or merely as a resource. It is not gauged to the novice, but the beginner and the professional should welcome it to their collection as a helpful and highly informative edition to their library.

In This Issue

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