

SAS Newsletter

Society for Archaeological Sciences

Volume 11

Number 2

April-June 1988

Annual Meeting of the SAS

As is the SAS custom, during the years that the International Archaeometry Meeting convenes in the Western Hemisphere, the SAS will hold only a business meeting. The tenth annual SAS business meeting will take place on Thursday April 28 at 5:00 PM in the Pima Room of the Sheraton Phoenix Hotel in Phoenix, Arizona. The annual Executive Board meeting is set for the Pima Room at 12:00 noon the same day.

Items on the agenda for both meetings include a request from the Society of Professional Archaeologists for SAS representation on their Board, a report of the work of

the Coalition for Applied Preservation Technology (CAPT) toward the establishment of a National Center for Preservation Technology, and a report on work to develop a new publication series in Archaeometry and Archaeological Sciences to be undertaken by a major American publisher with the SAS as the sponsoring professional organization. Other matters of interest include the appointment of chairs to head standing committees, the beginning of a membership drive, and an announcement of the results of the 1988 election.

R. E. Taylor, SAS General Secretary

Workshops

Taos Workshops on Archaeobotany and Zooarchaeology

Southern Methodist University announces a one-week workshop in Archaeobotany to be held at its Fort Burgwin Research Center near Taos, New Mexico, from June 5-11, 1988. The course may be taken for two hours credit, or as a non-credit course.

The workshop will focus upon honing participants' skills and perceptions of those aspects of the archaeological plant record that ultimately reflect in interpretations. Participants will be directly involved in processing modern seeds and in the floating, sorting, classifying, and interpretation of archaeological plant remains. The workshop will develop understanding of the potential movement of plant material within a culture until it becomes incorporated into an archaeological site. Insights into post-depositional factors destined to affect interpretations will be developed, including rodent disturbance and differential preservation. Participants will be involved in recognizing methodological biases in retrieving plant material.

Dr. Vorsila Bohrer will conduct the workshop. Dr. Bohrer is a widely-recognized scholar with years of experience in the Southwest. She is particularly knowledgeable about the archaeobotany of the Anasazi and Hohokam areas, and has conducted research at Salmon Ruin, Snaketown, and La Ciudad. She is currently Director of Southwest Ethnobotanical Enterprises.

The archaeobotany workshop is limited to fifteen participants. It is open to graduate and undergraduate students, faculty, and post-doctoral staff.

There will also be a one-week workshop on zooarchaeology to be held at its Fort Burgwin Research Center near Taos, New Mexico from July 31-August 6. It may be taken for two hours credit, or as a non-credit course.

The course will provide intensive instruction in modern techniques of faunal analysis. Participants will receive lectures on zooarchaeological method and theory, key osteological characteristics for identifying vertebrate remains in North America (particularly fragmentary remains), and interpreting ecological conditions present in the past on the basis of faunal remains. Laboratory sessions will provide information on methods for careful recovery of fauna, and techniques for preparing comparative modern specimens.

Professor Stanley Olsen will conduct the workshop. Professor Olsen is an internationally-recognized expert in zooarchaeology and a Professor of Anthropology at the University of Arizona. He has worked extensively in the Southwestern United States, China, and in the Soviet Union.

The zooarchaeology workshop is limited to fifteen participants. It is open to graduate and undergraduate students, faculty, and post-doctoral staff.

Tuition/fees: \$300.00

Room and board \$224.00

For more information and application materials:

Dr. Patricia Crown

Department of Anthropology
Southern Methodist University

Dallas, TX 75275
(214)692-3236

Laboratory Profile

The Amber Research Laboratory (ARL) at Vassar College is the only archaeometric installation in an undergraduate liberal arts college, and the only such laboratory devoted exclusively to organic archaeometry. It was established in 1963 around the research interests of its organizer and director, Dr. Curt W. Beck, Professor of Chemistry on the Matthew Vassar Jr. Chair. Since then, work done by 68 students (all but 4 of them undergraduates) on fossil resins ("amber"), and on more geologically recent resins from archaeological contexts, has been reported in 78 publications. About half of the projects are generated within the ARL, with a principal focus on the systematic study and provenience analysis of the archaeological amber artifacts of prehistoric Europe. The other half is service work, dealing with fossil resins and an increasingly wide variety of other organic remains that are sent to the ARL by archaeologists from around the world. A typical example is the fragment of a ring bead from the excavation of ninth century B.C. strat at Tepe Marlik (Iran), sent to the ARL by Japanese archaeometrist Teruko Muroga, identified there as Baltic amber from northern Europe, and published by Beck and Muroga in Japan.

Because of its setting in an undergraduate institution, the ARL is structured as a teaching as well as a research laboratory. It is physically and organizationally integrated with the Department of Chemistry. Its identifiable facilities, an office, a laboratory, and an instrument room, are located in Vassar's Mudd Chemistry Building. As such, it draws on the full range of resources offered by this state-of-the-art 7.1 million dollar, 32,000 square foot structure, constructed in large part through the contributions of the Seeley G. Mudd Fund. The operation of the ARL depends heavily on Vassar College, which provides not only space and utilities, but also clerical support, library facilities, computer access, routine laboratory supplies, small grants for special equipment and travel, and, above all, student assistants. External support has been provided by research grants awarded by public and private foundations. Recent support by the National Science Foundation has been notable, but funding has also been forthcoming from the governments of the Federal Republic of Germany and of Hungary. Over the years, 17 such grants have made it possible to adhere to the ARL policy of carrying out service analyses

without charge. Except for the director, all of the ARL staff are Vassar students. Some of these have written their Bachelor's theses (or, in a few cases, Master's theses) on ARL projects. Others work for academic credit in Undergraduate Research or Advanced Laboratory courses. Still others have been salaried student assistants paid either by the college or from ARL research grants.

The workhorse of the ARL research program has been the infrared spectrophotometer. Early dispersion instruments, both prism and diffraction types, were provided by gifts from the DuPont Company and by Vassar College. The current Perkin-Elmer Model 1750 Fourier-Transform Infrared (FTIR) spectrophotometer and its associated Perkin-Elmer Model 7300 Laboratory Computer was acquired with the help of a RUI (Research in Undergraduate Institutions) Equipment Grant from the NSF Division of Anthropology in 1984. Among major instruments in the Department of Chemistry used in ARL work are gas chromatography, including a gas chromatography/mass spectrometry system, and 1H and 13C nuclear magnetic resonance spectrometer. The ARL also relies heavily on departmental and college computer facilities.

As the name still indicates, the initial impetus of the ARL was the search for a valid provenience analysis for archaeological amber artifacts. The problem was one of long standing: in 1876, when Heinrich Schliemann found thousands of amber beads in the shaft graves of Mycenae, he knew that amber-like fossil resins occur in virtually every European country and wrote, with quite uncharacteristic pessimism, "It will, of course, forever remain a secret to us whether this amber is derived from the coast of the Baltic Sea or from Italy". That is the sort of secret to intrigue scientists. An early attempt to unravel it was based on the quantitative determination of succinic acid released from amber by pyrolysis or hydrolysis. That work remains an important chapter in the history of archaeological chemistry, but it failed to solve the problem: amber from Italy, Portugal, France, and Rumania have been found to contain just as much succinic acid as does the Baltic amber or succinite of northern Europe. In addition, the analysis destroyed as much as a gram of material, a loss quite properly unacceptable to archaeologists.

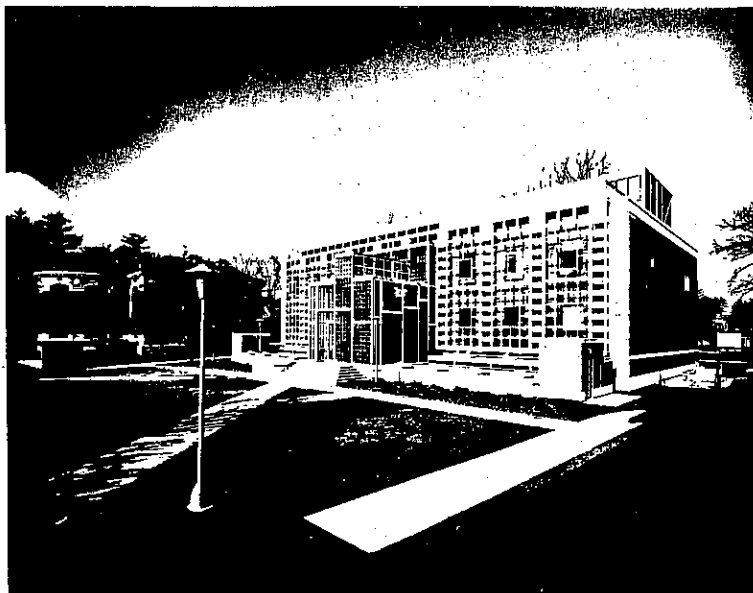


Fig. 1. The Amber Research Laboratory is housed in the Seeley G. Mudd Chemistry Building at Vassar College. (Photo: Peter Vanderwarker)

The ARL there-

fore sought to find a method of provenience analysis that is as non-destructive as possible. Infrared spectroscopy, with a sample requirement of about a milligram, was found to meet that need. To avoid the fallacy of the excluded middle that is so troublesome in many archaeometric studies, fossil resins from all over the world were obtained from the mineralogical departments of major museums. Samples were obtained from the Smithsonian Institution, the American Museum of Natural History, the British Museum, the Musée National d'Histoire Naturelle in Paris, the Hofmuseum in Vienna, the National Museum in Budapest, the Muzeum Ziemi in Warsaw, and from many smaller municipal or university collections. As a result of these friendly raids, the ARL now has the world's most extensive collection of fossil resins. The roughly 2,500 infrared spectra of these reference samples constitute the data base against which the spectra of archaeological artifacts are matched, since 1970 by means of a computer program based on pattern recognition. This comprehensive approach showed that of all of the hundreds

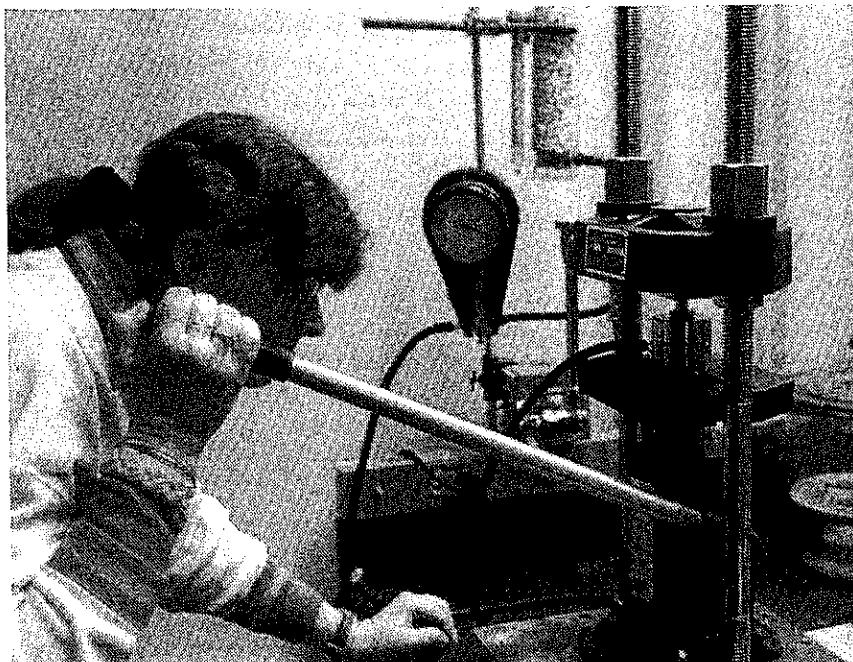


Fig. 2. Vassar Sophomore Hilairy Hartnett preparing Sicilian amber sample for analysis. (Photo: Jonathan Murdock)

of known varieties of European fossil resins, Baltic amber, and only Baltic amber, has a highly characteristic absorption pattern in the carbon-oxygen single-bond region. This spectral feature identifies even extensively deteriorated (weathered) finds of Baltic amber with certainty.

Infrared analysis has since been applied to about 4,000 archaeological amber objects that were excavated outside the area where Baltic amber occurs naturally. The majority of them have been identified as Baltic amber, and the mapping of these reliably sourced finds now makes it possible to reconstruct the pathways ('amber routes') and the mechanisms of exchange ('amber trade') by which this highly valued material found its way to the farthest corners of Europe. But the exceptions are as significant as the rule. Non-Baltic amber has been identified in Mycenaean Greece in the Vayenas tholos at Pylos, showing that local resin deposits were exploited at the same time that Baltic amber was imported from the north. Amber finds from the aeneolithic necropolis at Laterza in southeastern Italy are also of local origin, and more work needs to be done to pinpoint the terminus post quem of the importation of Baltic amber to the Italian peninsula. Paleolithic finds from the cave at Aurensan in the French Pyrenees that had been thought to be of Baltic amber since their excavation in 1913 have also been proven to be local, although Baltic amber has been identified at a Paleolithic hunters' station on the Moosbuhl mountain in Switzerland. An 'amber' find from Eshnunna (Tell Asmar) in Iraq is in fact East African copal.

The provenience analysis of amber has proved to be useful in elucidating the commercial and the cultural contacts in prehistoric Europe. In recognition of that significance, in 1978 the Union Internationale des Sciences Préhistoriques et Protohistoriques established a new "Committee on the Study of Amber" under Beck's direction. The committee, with members from Denmark, Sweden,

England, Holland, Switzerland, Italy, Hungary, Czechoslovakia, and Poland, is charged with the task of producing a comprehensive inventory and analysis of prehistoric amber artifacts. The work is complete for Britain, Greece, and Hungary and is well under way for Italy, Czechoslovakia, Yugoslavia, Germany, Switzerland, Holland, and France. Most of the spectroscopic analyses have been done at the ARL, but the infrared provenience analysis developed there is applied to amber artifacts in archaeometric laboratories in Germany, Italy, Poland, Yugoslavia, Greece, and the Soviet Union.

While the focus of amber research at the ARL is on archaeology, the results have benefitted other disciplines, as well. It soon became apparent that infrared spectra are useful in elucidating the botanical origin of fossil resins. The infrared spectra of Baltic amber showed as early as 1965 that the extinct and thus hypothetical *Pinus succinifera*, posited by palaeobotanists since the 1830's as the source of Baltic amber in the Early Tertiary, has no structural affinities with modern European pines. The chemical structure of Baltic amber cannot have been derived from abietic acid, the principal resin acids of living pines, but is instead based on the labdane skeleton characteristic of pine-related genera like *Araucariaceae* which survive today in Southeast Asia. Subsequent work by John S. Mills and coworkers at the National Gallery in London has confirmed that view by demonstrating a close correspondence between the chemistry of Baltic amber and of kauri resin.

Infrared spectroscopy has also opened new avenues to the mineralogical classification of fossil resins which are not usefully distinguished by the criteria appropriate to inorganic materials, such as elemental composition, hardness, density, or refractive index. The fossil resin beckerite has been identified as an impure variety of succinite, pigotite from Cornwall as an amorphous mellite,

Cretaceous amber from New Jersey as a variety of sigbur-gite from the Rhineland. The archaeological, palaeobotanical, and mineralogical results of 25 years of amber research have been summarized in a review paper (C. W. Beck, "Spectroscopic Studies of Amber", *Applied Spectroscopy Reviews* 22:55-110, 1986).

Amber is not the only resinous material of interest to archaeologists. Plant resins and pitches prepared from them are widely found as the contents or as a lining of ceramic vessels, particularly in transport amphoras. Other uses of resins and resin-derived products include adhesives for hafting tools, caulks for baskets, barrels, and vats, and protective coatings on structural wood, especially in shipbuilding. An increasing portion of ARL work has been devoted to these geologically recent resins. Among recent studies have been the examination of resins on sherds from North Africa (Quseir al-qadim and Carthage) collected by

Oriental Institute of the University of Chicago and in transport vessels from Mediterranean sunken ships (the Kyrenia and Kas wrecks) explored by the Institute of Nautical Archaeology at Texas A&M University. Unlike amber, these resins are not polymeric. They are soluble in organic solvents and, after volatilization by conversion to the methyl esters, their constituent resin acids can be separated by gas chromatography and identified by mass spectrometry. GC/MS analysis of samples recovered from the Hellenistic Kyrenia wreck shows striking differences in the composition of the pine pitches used for amphora linings from those used for the preservation of the ship's hull. Since all samples have the same depositional history, more than two millenia in the anaerobic environment of the Mediterranean bottomland off Cyprus, these differences must reflect different techniques used in the manufacture of pitches for different purposes, and perhaps also differences in the species of pine from which the pitches were

made. Current work at the ARL explores the relationship between composition and manufacturing techniques (i.e. differences in temperature and access of air in pitch-making) for a number of pine species known to have been available in the Eastern Mediterranean in antiquity.

Curt W. Beck, Director
Amber Research Laboratory
Vassar College
Poughkeepsie, NY 12601

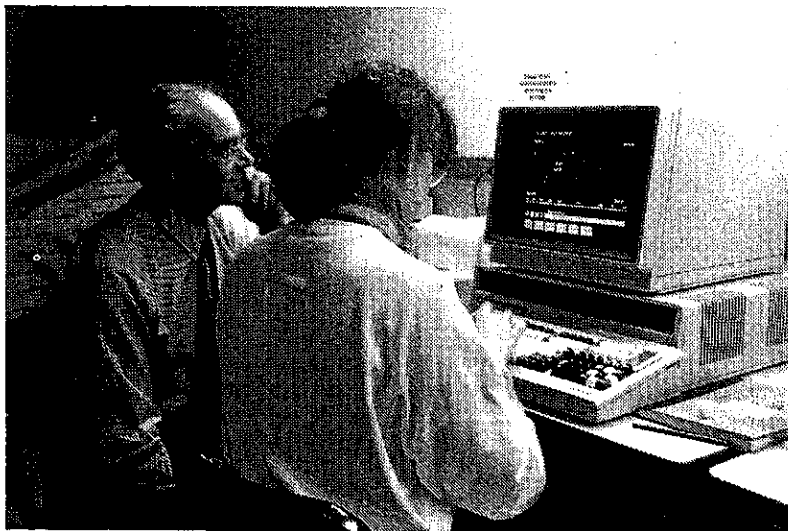


Fig. 3. Beck and Hartnett at the ARL's Fourier-Transform Infrared Spectrophotometer. (Photo: Jonathan Murdock)

Miscellaneous Announcements

Soils Laboratory Services

Despite the tragic death of Professor Robert Eidt, the University of Wisconsin-Milwaukee State Soils Laboratory will continue its research-oriented activities focused on geoarchaeological topics. The Laboratory has analyzed anthrosols from all parts of North America, as well as Columbia, Argentina, the Bahamas, Bolivia, Peru, Germany, Spain, Iraq, Egypt, the Yemen Arab Republic, Israel, South Africa, India, and Japan. These investigations have facilitated the development of a large data bank for com-

parison of results, allowing a more complete interpretation. A wide range of analyses are available, including cation exchange capacity, water soluble nitrate, total carbonate, % organic matter, atomic absorption analysis for several elements, phosphate fractionation, and others.

For a current price list, contact Robert Brinkman, Laboratory Manager, UWM Geography Department Soils Laboratory, University of Wisconsin-Milwaukee, P.O. Box 413, Milwaukee, WI 53201.

Archaeomaterials

The new journal *Archaeomaterials*, reviewed in Volume 10, Number 2 of the SAS Newsletter, is entering its second year of publication. Edited by Tamara Stech, is dedicated to the publication of studies on a broad range of preindustrial materials and processes. Topics covered include all ancient materials altered by human action—lithics, metals, plant and animal products, clays, etc.—and the ways in which they were manipulated.

Manuscripts are invited by the editor in the American Antiquity style. Submissions are refereed. Subscription rates are: \$35/year for individuals, \$45/year for institutions. The two issues of Volume I are still available at \$50. Contact: Tamara Stech, Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA 19104.

News of Archaeometallurgy

The *Journal of Metals* has begun publishing a monthly series on archaeometallurgy. It is coordinated by Dr. Vincent C. Pigott of MASCA, who is also author of the first feature, "The Thailand Archaeometallurgy Project", in the January 1988 issue. Dr. Tamara Stech reports on the archaeometallurgy meeting in Heidelberg in the February issue, and Martha Goodway summarizes her paper on gongs (see Figure 1) in March. The *Journal of Metals* is published by the Metals Society of the A.I.M.E., 420 Commonwealth Drive, Warrendale PA 15086.

Professor James Muhly of the University of Pennsylvania is spending this academic year in Cyprus examining 6000 trays of tuyeres, crucibles, slags, and other metallurgical materials in the Nicosia Museum.

The 2nd International Conference on Nondestructive Testing: Microanalytical Methods and Environmental Evaluation for Study and Conservation of Works of Art is scheduled for April 17-20 in Perugia, Italy. The working languages are English, French and Italian, and the registration fee is 180.00 Italian lire. For more information write Giuseppe Nardoni, Associazione Italiana Prove Non Distruttive, via Foresti 5, 25126 Brescia, Italy.

A course on Ancient Jewellery will be given at the Conservation Analytical Laboratory of the Smithsonian Institution April 25-29. The instructor will be Jack Ogden, the author of *Jewellery of the Ancient World* (Trefoil Books, London 1982), a founder of the Society of Jewellery Historians, and an editor of that Society's journal, *Jewellery Studies*. For further information write Eleanor MacMillan, Director of Training, Conservation Analytical Laboratory, Smithsonian Institution, Washington DC 20560, or telephone (202) 287-3700.

The Ironbridge Institute is sponsoring the Ironbridge Training Excavation in Industrial Archaeology September 19-30 at a site in the Ironbridge Gorge, as part of its program of short courses. For a course brochure or a list of the short courses, write the Ironbridge Institute, Ironbridge Gorge Museum, Ironbridge, Telford, Shropshire TF8 7AW England.

An International Colloquium on Archaeometallurgy will be held October 18-21 in Bologna, at the University and the Castle of Dozza Imolese, as part of the University's Ninth Centenary celebration. Session chairmen include Professor Ronald Tylecote, Dr. Gerhard Sperl, Professor Robert Maddin, and W. Andrew Oddy. Several excursions are planned. Registration forms can be obtained from the Segreteria "International Colloquium on Archaeometallurgy", Centro per lo Studio e la Conservazione di Manufatti di Interesse Archeologico e Artistico, Facolta di Chim-

ica Industriale, Viale Risorgimento 4, I-40136 Bologna BO, Italy.

The Department of Conservation of the British Museum is planning a conference on Former Methods of Conservation and Restoration in November, 1988, with a publication to follow. Address inquiries to Mrs. H. Lane, Department of Conservation, British Museum, Great Russel Street, London WC1B 3DG England.

A beautifully illustrated book on the traditional Swedish iron industry, *Forsmark och Vallonjärnet*, was published in 1987 in Swedish by Forsmark Kraftgrupp AB, with contributions by Artur Attman, K.C. Barraclough, Bo Mollander,



Fig 1. Microstructure at 500x of the massive transformation in 23% tin bronze gong sample collected by Professor Harold C. Conklin of Yale as part of his study of the Ifugao. See Goodway and Conklin, "Quenched High-tin bronzes in the Philippines," *Archeomaterials* 2, (1987) 1-27, for first publication of the occurrence of the massive transformation in tin bronze

Marie Nisser, Jonas Norrby, Kurt Samuelson, and the late Wilhelm Ekman (who died in August 1986). The ISBN number is 91-970987-0-1.

An exhibit at the Museum für Vor- und Frühgeschichte in Berlin on the Restoration of archaeological bronzes resulted in another well-illustrated book, *Archaeologische Bronzen - Antike Kunst - Moderne Technik*, edited by Hermann Born, and published in Berlin in 1985 (Dietrich Reimer Verlag, Dr. Friedrich Kaufmann, Unter den Eichen 57, 1000 Berlin 45; ISBN 3-496-01029-0). The book is in German with English synopses. Sections on early technol-

ogy such as early mines, furnaces and casting techniques introduce other sections on corrosion, examination and documentation, conservation and replication.

The results of the Smithsonian's harpsichord wire project have appeared as the second volume of The Historical Harpsichord, a monograph series in honor of Frank Hubbard, and several subsequent papers. The book, *The Metallurgy of 17th and 18th Century Music Wire* by Martha Goodway and Jay Scott Odell was published in 1987 by Pendragon Press (RR#1, Box 159, Stuyvesant NY 12173-

9720, ISBN 0-918728-54-1, \$32.00). The papers include "Phosphorus in Antique Iron Wire" published in *Science* May 22, 1987, and "Phosphorus in low-carbon iron: its beneficial properties", to be published in the next issue of *Historical Metallurgy*.

If you have any archaeometallurgical news to contribute, please call Martha Goodway at (202) 287-3733, or write her at CAL MSC, Smithsonian Institution, Washington DC 20560.

Position Available

Thermoluminescence Dating Laboratory

The UNIVERSITY OF WASHINGTON seeks a research associate for a 2-3 year appointment in its thermoluminescence dating facility, operated jointly by the Departments of Materials Science and Engineering and Anthropology. Duties of this research associate will include conducting research in TL dating techniques, managing the overall operation of the laboratory, and supervising graduate students, along with occasional teaching. Principal research objectives include technique development in signal characterization and discrimination, autoregenerative zircon inclusion dating, bone and shell dating and optically stimulated luminescence. The starting date for this ap-

pointment has not yet been determined but is expected to be between July 1988 and January 1989. The appointment is contingent upon renewal of current National Science Foundation funding; the appointee is expected to develop additional outside funding by the second year of appointment. Candidates should have a Ph.D. and a minimum of 2 years' experience in TL dating. Interested parties should address a current resume and statement of interest to: Drs. R. C. Dunnell and T. G. Stoebe, FB-10, University of Washington, Seattle, WA 98195.

An affirmative action/equal opportunity employer.

International Congress

Sixth Meeting, Working Group 1, "Unspecialized Bone Industries" and International Congress: "Early Man in Island Environments"

Sardina, Italy

September 25-October 2, 1988

Statement of the developments achieved in 1987-1988.
Topics to be discussed at the meeting:

- 1) The recognition, within a collection of archaeological materials, of tools made from bone which has been little elaborated: analytical and experimental approaches.
- 2) Modifications of bone surfaces due to non-human agents, as distinguished from those of anthropogenic origin.
- 3) The establishment of a common detailed description of bone tools showing little elaboration.

- 4) The establishment of a map showing the geographical distribution in Eurasia of bone tools showing little elaboration from Lower and Middle Palaeolithic sites.
- 5) The establishment of a multilingual index.

Potential participants should make contact as soon as possible with:

Dr. Marylene Patou
Institut de Paleontologie Humaine
1 rue Rene Panhard
75013 Paris, FRANCE
Telephone: 1/43-31-62-9

Meetings Calendar

April 17-21. 29th Experimental Nuclear Magnetic Resonance Conference. Rochester, NY. Judith Watson, ENC, 750 Audubon, East Lansing, MI 48823 (517-

332-3667).

April 18-21. American Physical Society, Spring Meeting. Washington, DC. W.W. Havens, 335 E. 45th St., New

York, NY 10017 (212-661-9404).

April 21-22. North-Central Section, Geological Society of America. Akron, Ohio. Edna Collis, GSA, 3300 Penrose Place, Box 9140, Boulder, CO 80301 (303-447-2020).

April 25-28. 2nd International Conference on Expert Database Systems. Tysons Corner, VA. E.H. Sibley, George Mason University, ICSE Department, 4400 University Drive, Fairfax, VA 22030.

April 27-29. 10th Symposium on Applied Surface Analysis. Denver. L.D. Czanderna, American Vacuum Society, Rocky Mountain Chapter, PO Box 27209, Denver, CO 80227.

April 27-29. Handling of Environmental and Biological Samples in Chromatography. Basel, Switzerland. R. Frei, Department of Analytical Chemistry, De Boelelaan 1083, Vrije Universiteit, 1081 HV Amsterdam, The Netherlands.

April 27-30. Association for Arid Land Studies, Annual Meeting, in conjunction with the 30th Annual Meeting of the Western Social Science Association. Denver. F. Andrew Schoolmaster, AALS Program Chair, Department of Geography/Anthropology, N. Texas State University, Denton, TX 76203.

April 27-May 1. Society for American Archaeology. Phoenix. Gerome Miller, SAA, 1511 K Street NW, Suite 716, Washington, DC 20005 (202-638-6079). Includes Symposium on Soils, landscape evolution, and human occupation.

April 28 Society for Archaeological Sciences Annual Meeting, Sheraton Phoenix, in conjunction with Society for American Archaeology.

May 5-6. 19th Annual Pittsburgh Conference on Modeling and Simulation. Pittsburgh. W. Vogt, Modeling and Simulation Conference, 348 Benedum Engineering Hall, University of Pittsburgh, Pittsburgh, PA 15261. Abstract deadline: 1/31/88.

May 8-15. Four-Yearly National Soils Conference; sponsored by Australian Society of Soil Science. Canberra. Australian convention and Travel Service, GPO Box 1929, Canberra, ACT 2601, Australia (062-496440).

May 9-13. Hydrology of Wetlands in Semiarid and Arid Regions, International Symposium. Seville, Spain. Pablo Arambarri, Instituto Recursos Naturales, Apartado 1.052, 41080, Sevilla, Spain.

May 9-13. Marble in Ancient Greece and Rome: Geology, Sources, Commerce, and Artifacts; NATO Advanced Research Workshop. Tuscany, Italy. Norman Herz, Department of Geology, University of Georgia, Athens, GA 30602 (404-542-7765). Topics include: determination of sources, quarry technology, tracing of trade patterns, understanding changing aesthetic tastes, restoration, authenticity analysis. Field trip to Carrara marble quarries.

May 11-13. V.M. Goldschmidt Conference; organized by The Geochemical Society. Baltimore. Goldschmidt Conference Coordinator, 410 Keller Building, The Pennsylvania State University, University Park, PA 16802. Includes symposium on Environmental Geochemistry.

May 16-18. Rocky Mountain Section, Geological Society of America. Sun Valley, Idaho. Edna Collis, GSA, 3300 Penrose Place, Box 9140, Boulder, CO 80301 (303-447-2020). Symposium on Late Quaternary History of the Great Salt Lake, Its Predecessors, and Other Intermountain Lakes.

May 16-20. American Geophysical Union, Spring Meeting. Baltimore. AGU Meetings, 2000 Florida Ave. NW, Washington, DC 20009 (202-462-6903).

MAY 16-20. 26th International Symposium on Archaeometry. Toronto. Professor U.M. Franklin, Department of Metallurgy and Materials Science, University of Toronto, Toronto, Ontario, Canada M5S 1A4 (416-978-3012); BITNET: VandaV@UToronto. One-day session on "Archaeometry has the answers, but what are the questions?" Symposium topics include: dating of organic and inorganic materials, prospecting, provenance studies, technology (metals and non-metals), mathematical and statistical methods. See Meeting Announcement in this issue.

May 22-25. Geological Association of Canada, Annual Meeting. St. John's, Newfoundland. John Fleming, Newfoundland Department of Mines & Energy, Box 4750, St. John's, A1C 5T7 (709-576-2768).

May 22-27. Society for Imaging Science and Technology, Annual Meeting. Washington, DC. P.J. Forness, SPSE, 7003 Kilworth Lane, Springfield, VA 22151.

May 24-26. Ground-probing Radar Workshop. Ottawa. Leonard S. Collett, Geological Survey of Canada, 601 Booth St., Ottawa K1A 0E6, Canada (613-993-5964).

May 24-27. Computer Graphics International 88. Geneva, Switzerland. N. Magnenat-Thalmann, General Chairperson, CG International '88, MIRALab, HEC, 5255 Decelles, Montreal, Canada H3T 1V6.

May 25-29. Geological Society of Greece, 4th Congress. Athens. Prof. D. Papanikolaou, Department of Geology, University of Athens, Panepistimioupoli Zografou, 157 84 Athens, Greece. Languages: Greek, English, and French.

May 30-June 3. Society for the Preservation of Natural History Collections, Annual Meeting. Pittsburgh. Duane A. Schlitter, Carnegie Museum of Natural History, 5800 Baum Boulevard, Pittsburgh, PA 15206 (412-665-2611).

June 5-9. American Astronomical Society, 172nd Meeting. Kansas City. AAS 2000 Florida Ave. NW, Suite 230, Washington, DC 20009.

June 5-9. Institute of Electrical and Electronics Engineers Computer Society's Conference on Computer Vision and Pattern Recognition. Ann Arbor. R. Jain, Department of EECS, 3215 EECS Building, University of Michigan, Ann Arbor, MI 48109-2122 (313-763-0387).

June 5-10. The Age of David and Solomon: Archaeology and the World of the Bible. Baltimore. Johns Hopkins University, Baltimore, MD 21218 (301-338-8490).

June 5-10. 36th American Society for Materials Science Conference on Mass Spectrometry and Allied Topics. San Francisco. Judith Watson, ASMS, PO Box 1508, East Lansing, MI 48823 (517-337-2548).

June 5-10. 195th American Chemical Society National

- Meeting and 3rd Chemical Congress of North America. Toronto, Canada. B. Hodson, 1155 16th St. NW, Washington, DC 20036.
- June 6-8. American Quaternary Association, 10th Biennial Meeting. Amherst, Massachusetts. AMQUA Local Program Committee, Department of Geology and Geography, University of Massachusetts, Amherst, MA 01003-0026 (413-545-2286). Theme: Land-sea interactions in the North Atlantic region between 14,000 and 6,000 years ago. Field trips. See *Meeting Announcement* this issue.
- June 12-16. American Nuclear Society. San Diego. ANS Headquarters, 555 N. Kensington Ave., La Grange Park, IL 60525 (312-352-6611)
- June 12-17. American Society of Limnology and Oceanography; sponsored by U.S. Geological Survey Water Resources Division. Boulder, Colorado. Diane McKnight, U.S. Geological Survey, Box 25046, MS 407, Denver Federal Center, Denver, CO 80225.
- June 15-17. 7th Pacific Coast Resource Modeling Conference. Ensenada, Mexico. H. Heras, Ecologia Marina, CICESE, PO Box 4844, San Ysidro, CA 92073. Abstract deadline: 5/1/88.
- June 17-22. Geology and the Bahamas, 4th Symposium. San Salvador Island, Bahamas. Donald T. Gerace, CCFL Bahamian Field Station, 270 Southwest 34th St., Fort Lauderdale, FL 33325.
- June 18-22. 12th IMACS World Congress on Scientific Computation. Paris. IMACS Secretariat, Department of Computer Science, Rutgers University, New Brunswick, NJ 08903.
- June 19-23. American Society of Mammologists, 68th Annual Meeting. Clemson, SC. Dr. Edward B. Pivorun, Department of Biological Sciences, Clemson University, Clemson, SC 29631 (803-656-2328).
- June 20-23. 10th Symposium on Thermophysical Properties. Gaithersburg, Maryland. J.V. Sengers, Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742 (301-454-4117).
- June 20-25. Geoffrey J. Butler Memorial Conference on Differential Equations and Population Biology. Edmonton, Canada. Differential Equations, Department of Mathematics, University of Alberta, Edmonton, Alberta, Canada T6G 2G1.
- June 26-July 1. Shelf Sedimentation: Events and Rhythms; sponsored by Society of Economic Paleontologists and Mineralogists. Santa Cruz, California. M. Field, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, CA 94025 (415-354-3088).
- June 29-July 1. 4th Biennial National Atomic Spectroscopy Symposium. York, United Kingdom. N.W. Barnett, Department of Environmental Sciences, Plymouth Polytechnic, Drake Circus, Plymouth PL4 8AA UK.
- July 10-15. International Working Meeting on Soil Micromorphology; sponsored by Sub-commission B of the International Society of Soil Science. San Antonio. Dr. Richard Drees, Department of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843-2474. See *SAS Newsletter*, 10:3.
- July 18-21. 4th International Conference on Structure of Noncrystalline Materials. Oxnard, CA. C.N.J. Wagner, UCLA, Los Angeles, CA 90024-1595 (213-825-6265).
- July 24-31. 12th International Congress of Anthropological and Ethnological Sciences. Zagreb, Yugoslavia. World anthropology: education, research, and application.
- July 26-30. Symposium on Asian Pacific Mammalogy; sponsored by American Society of Mammalogy and the Mammalogical Society of China. Kunming, Yunnan Province, People's Republic of China. Dr. Andrew T. Smith, Department of Zoology, Arizona State University, Tempe, AZ 85287. Primary focus will be the mammalogy of eastern Asia and the Pacific basin; includes a session on systematics and faunistics of Recent and fossil mammals.
- July 27-30. The Teaching of Astronomy; International Astronomical Union Colloquium No. 105. Williamstown, MA. J.R. Percy, University of Toronto, Canada.
- July 31-Aug. 5. 11th Annual Electron Paramagnetic Resonance Conference. Denver. Gareth Eaton, Department of Chemistry, University of Denver, Denver, CO 80208 (303-871-2980).
- July 31-Aug. 5. Nuclear Magnetic Resonance Symposium. Denver. James Haw, Department of Chemistry, Texas A&M University, College Station, TX 77843.
- July 31-Aug. 5. Symposium for Innovation in Measurement Science. Geneva, NY. Marie Long, ISA, 67 Alexander Dr., Research Triangle, NC 27709 (919-549-8411).
- Aug. 1-5. 15th Annual Conference and Exhibition on Computer Graphics and Interactive Techniques. Atlanta. A. Newton, University of Waterloo, Department of Computer Science, Waterloo, Ontario, Canada N2L 3G1 (519-888-4534).
- Aug. 1-9. 18th International Conference of the History of Science. Hamburg (Aug. 1-5) and Munich (Aug. 6-9). C.J. Scriba, Institut für Geschichte der Naturwissenschaften der Universität Hamburg, Bundesstr. 55, D-2000 Hamburg 13, Federal Republic of Germany.
- Aug. 2-5. Permafrost, 5th International Conference. Trondheim, Norway. International Conference on Permafrost, Studies Administration, Norwegian Institute of Technology, N-7034, Trondheim-NTH Norway (47-2-466960).
- Aug. 2-11. International Astronomical Union, 20th General Assembly. Baltimore. IAU-UAI Secretariat, 61 Avenue de l'Observatoire, F-75014 Paris, France (1-4325-8358).
- Aug. 8-12. American Mathematical Society Centennial Conference. Providence. H. Daly, American Mathematical Society, Meetings Department, PO Box 6248, Providence, RI 02940.
- Aug. 12-14. International Conference on Mathematical Modelling in Science and Technology. Madras, India. S. Majhi, International Conference in Science and Technology-88, Department of Mathematics, Indian Institute of Technology, Madras-600 036, India.
- Aug. 14-18. Conference on New Horizons in Analytical Science. Nedlands, Australia. I. Watson, Australian X-Ray Analytical Associates, Conference and Devel-

- opment Office, University of Western Australia, Nedlands, Western Australia 6009, Australia.
- Aug. 14-18.** American Institute of Biological Sciences, 39th Annual Meeting. Davis, Ca. Meetings Department, AIBS, 730 11th St. NW, Washington DC 20001-4584 (202-628-1500).
- Aug. 14-21.** Natural and Man-Made Hazards in Coastal Zones. San Diego and Ensenada, Mexico. International Organizing Committee, The Tsunami Society/Hazards Conference, Suite 6, 2919 Kapiolani Boulevard, Honolulu, HI 96826.
- Aug. 21-23.** 7th York Quaternary Symposium. Lethbridge, Alberta, Canada. Dr. R. W. Barendregt, Quaternary Symposium, Department of Geography, University of Lethbridge, 4401 University Drive, Lethbridge, Alberta T1K 3M4 Canada.
- Aug. 21-26.** 9th International Congress on Thermal Analysis; sponsored by International Confederation for Thermal Analysis. Jerusalem. S. Shoval, Everyman's University, PO Box 39328, Tel Aviv 61392, Israel.
- Aug. 22-25.** 1988 Joint Statistical Meetings. New Orleans. American Statistical Association, 806 15th Street NW, Washington, DC 20005 (202-393-3253).
- Aug. 22-26.** 26th International Geographical Congress. Sydney, Australia. Prof. Bruce Thom, Department of Geography, University of Sydney, N.S.W. 2006, Australia.
- Aug. 23-31.** Joint Oceanographic Assembly. Acapulco, Mexico. W.S. Wooster, JOA HF-05, University of Washington, Seattle, WA 98195. Special symposia include Global Sea Level Change; Ocean Variability and Biological Change; Tropical Coastal Systems. Abstract deadline: 11/30/87.
- Aug. 28-Sept. 2.** Clay; Association Internationale pour L'etude des Argiles, 9th International Conference. Strasbourg, France. Dr. Helene Paquet, 9th International Clay Conference, Institut de Geologie, 1 rue Blessig, F-67084 Strasbourg Cedex, France.
- Aug. 28-Sept. 3.** Palynological Congress. Brisbane, Australia. John Rigby, 7IPC, UniQuest Ltd., University of Queensland, St. Lucia, Queensland, 4067, Australia (61-7-3772733).
- Aug. 29-Sept. 1.** Australian Archaeometry Conference. Adelaide, Australia. Prof. J.R. Prescott, Secretariat, Third Australian Archaeometry Conference, Physics Department, University of Adelaide, GPO Box 498, Adelaide, S. Australia 5001, Australia. Topics will include technology, chronology, environment, project reports, and analytical techniques.
- Aug. 29-Sept. 1.** 14th International Congress on Very Large Databases. Long Beach, CA. J.E. Sherner, Teradata Corporation, 12945 Jefferson Boulevard, Los Angeles, CA (213-827-8777).
- Aug. 29-Sept. 2.** 1st Congress of the Australian Rock Art Research Association. Darwin, Australia. Australian Rock Art Research Association, PO Box 216, Caulfield South, 3162, Victoria, Australia.
- Aug. 29-Sept. 2.** 11th International Mass Spectrometry Conference. Bordeaux, France. Conference Secretary, 11th International MS Conference, Ecole Polytechnique, F-91128 Palaiseau, France.
- Sept. 3-7.** 8th Annual American-Eastern European Colloquium and Symposium on Liquid Chromatography. Szeged, Hungary. Huba Kalasz, Department of Pharmacology, Semmelweis University of Medicine, Budapest, Nagyvarad ter-4, 1089 Hungary.
- Sept. 4-9.** 9th European Congress on Electron Microscopy. York, United Kingdom. Congress Secretariat, The Royal Microscopical Society, 37/38 St. Clements, Oxford, OX4 1AJ, United Kingdom.
- Sept. 5-8.** Computer Applications in Analytical Chemistry. Jena, German Democratic Republic. K. Danzer, c/o Friedrich Schiller University Jena, Department of Chemistry, Steiger 3, Jena, DDR-6900, German Democratic Republic.
- Sept. 5-9.** Fission Track Dating, 6th International Workshop. Besancon, France. J.-L. Janier-Dubry, Laboratoire de Microanalyses Nucleaires, UFR des Sciences et Techniques, 16 Route de Gray, 25030 Besancon Cedex, France.
- Sept. 5-9.** 10th Conference on Analytical Atomic Spectroscopy and 7th Polish Spectroanalytical Conference. Torun, Poland. J. Fijalkowski, Institute for Nuclear Chemistry and Technology, ul. Dorodna 16, 03-195 Warszawa, Poland.
- Sept. 12-16.** Eurographics '88: Research, Practice and Experience. Nice, France. INRIA, Service des Relations Exterieures, Domaine de Voluceau-Rocquencourt-B.P. 105, F-78153 Le Chesnay Cedex, France.
- Sept. 14-17.** Geological Society of Italy. Campania and Lucania, Italy. S.G.I. Secretariat, Dipartimento di Scienze della Terra, Universita di Napoli, largo S. Marcellino 10, 80138 Napoli, Italy (telex: 720634 UNGFVG). Field trips include volcanoes and archaeological geology.
- Sept. 19-23.** International Symposium on Engineering Geology as Related to the Study, Preservation, and Protection of Ancient Works, Monuments, and Historic Sites; organized by the International Association of Engineering Geology. Athens, Greece. Paul G. Marinos, Greek Committee of Engineering Geology, 1988 Symposium Secretariat, PO Box 19140, GR-117 10 Athens, Greece; Telex:45 4312 POLX (c/o Marinos).
- Sept. 21-23.** Geological Societies of the British Isles. London. Dave Cook, Esso UK, Bwater House, Portsmouth Road, Esher, Surrey KT10 9SJ, United Kingdom.
- Sept. 23-25.** 19th Annual Binghampton Geomorphology Symposium. St. Catherines, Ontario, Canada. K.J. Tinkler, Brock University, St. Catherines, Ontario, L2S 3A1, Canada (416-688-5550, x3486).
- Sept. 25-28.** European Geological Conference. Nice, France. American Association of Petroleum Geologists, Box 979, Tulsa, OK 74101 (918-584-2555).
- Sept. 25-30.** 17th International Symposium on Chromatography. Vienna. Gerhard Schomburg, Max Planck Institut fur Kohlenforschung, PO Box 101353, D-4330 Mulheim/Ruhr, Federal Republic of Germany. Lectures, posters, and discussions on all aspects of chromatography and related techniques.
- Sept. 28-30.** Avian Paleontology and Evolution. Los Angeles. Kenneth E. Campbell, Natural History Museum,

900 Exposition Boulevard, Los Angeles, CA 90007
(213-744-3414).

- Oct. 3-7.** International Symposium on the Biological Diversity of Mexico. Mexico City. T.P. Ramamoorthy, Biological Diversity, Apartado Postal 70-233, Universidad Nacional Autonoma de Mexico, Delegacion Coyoacan, Mexico D.F. 04510, Mexico.
- Oct. 30-Nov. 3.** Society of Exploration Geophysicists, 58th Annual International Meeting. Anaheim, CA. SEG Headquarters, PO Box 702740, Tulsa, OK 74170-2740 (918-493-3516).
- Oct. 31-Nov. 3.** Geological Society of America, Annual Meeting. Denver. Edna Collis, GSA, 3300 Penrose Place, Box 9140, Boulder, CO 80301 (303-447-2020). Archaeological Geology Division will organize a symposium and field trip.
- Oct. 31-Nov. 18.** Workshop in Mathematical Ecology. Trieste, Italy. International Centre for Theoretical Physics, PO Box 586, Miramare, Strada Costiera 11, 34100 Trieste, Italy (2240-1).
- Nov. 6-13.** 7th Latin American Geology Conference; 35th Brazilian Geological Congress (sponsor: Departamento Nacional de Producao Mineral). Belem, Brazil. Carlos Oiti Berbert, Organizing Committee, Departamento Nacional de Producao Mineral, SAN Q 01, B1 "B", 70040 Brasilia DF, Brazil.
- Nov. 16-20.** American Anthropological Association. Phoenix. AAA, 1703 New Hampshire Ave. NW, Washington, DC 20009 (202-232-8800).
- Nov. 21-26.** International Symposium on the Holocene of South America; sponsored by INQUA and CADINQUA. Parana, Argentina. Dr. Martin Iriondo, Casilla de Correo 487, 3100 Parana, Argentina.
- Nov. 29-Dec. 4.** Soil Science Society of America. Atlanta. SSSA, 677 S. Segoe Road, Madison, WI 53711 (608-273-8080).
- Dec. 5-9.** American Geophysical Union, Fall Meeting. San Francisco. AGU Meetings, 2000 Florida Ave. NW, Washington, DC 20009 (202-462-6903).
- Dec. 27-30.** American Society of Zoologists; American Microscopical Society. San Francisco. Mary Adams-Wiley, Executive Officer, American Society of Zoologists, 104 Sirius Circle, Thousand Oaks, CA 91360 (805-492-3585).
- Jan. 4-6, 1989.** American Statistical Association Winter Conference. San Diego. American Statistical Association, 1429 Duke Street, Alexandria, VA 22314-3402 (703-684-1221).
- Jan. 5-9.** Society for Historical Archaeology, Annual Meeting. Baltimore. Elizabeth Comer, Program Chair for SHA, Baltimore Center for Urban Archaeology, Baltimore, MD 21202. Abstract deadline: 2/1/88.
- Jan. 11-14.** Joint Mathematics Meetings. Phoenix. H. Daly, American Mathematical Society, Meetings Department, PO Box 6248, Providence, RI 02940.
- July 9-19.** 28th International Geological Congress. Washington, D.C. Dr. Bruce R. Hanshaw, Secretary Gen-

eral, 28th IGC, PO Box 1001, Herndon, VA 22070-1001 (703-648-6053). Symposia include: Geologic phenomena and archaeology; Archaeological geology - geologic controls on human habitation; Global change - impact on the earth, natural hazards, and human activities; Clovis origins and the Bering Land Bridge. Short courses include: Quaternary dating methods; Digital geologic and geographic information systems; Paleoenvironmental interpretation of paleosols. Field trips include: Quaternary geology of the Great Basin; Geology of the Colorado Plateau. Abstract deadline: 10/1/88.

Centre de Recherches Archeologiques du CNRS
1988 Workshop Program

application deadline: 15 November 1987
address: CNRS-CRA (Formation)
250 ave. Antipolis
06565 Valbonne Cedex
France

- 1) Laboratory Study of Archaeological Ceramics. General ceramics, geochemical methods, petrographic and mineralogic methods. Five days, May/June or Autumn 1988. M. Pichon, M. Ricq-de Bouard.
- 2) Osteology, Workshop A. Introduction to study of bones and shells; field and lab techniques; exploitation of materials. Two times, 10 days. September to November, 1988. J. Desse and Luc Buchet.
- 3) Osteology, Workshops B1 (archaeozoology) and B2 (anthropology). Advanced study and applications. Six weeks. J. Desse and L. Buchet.
- 4) Cartography and Photo-interpretation in Archaeology. Familiarization with different types of maps, and data presentation relating to maps. Five days. April, 1988. M. Sintès-Aloutz.
- 5) Information for Archaeologists - Data and Text. Introduction to word processing and data analysis on microcomputers, including the IBM PC and Macintosh. Five days. October, 1988. H. Ducasse.
- 6) Introduction to Lithic Technology by Experimentation. Theory; practical experience in the production of lithics; analysis of lithics. Two times, 5 days. P.-J. Texler.

Centro Universitario Europeo Per I Beni Culturali
Activities Program 1988

Prof. Francois Widemann
Villa Rufolo
I 84010
Ravello, Italy
tel.: 39-(0)89-857096
telex: 770029 EURCEN I

- 1) The alimentary preparation of cereals: April 11-14. Round table. F. Sigaut and D. Fournier
- 2) Cultural tourism. Spring. Round table. P. Barbieri
- 3) Landscape and planning. Spring. Round table. P. Barbieri.
- 4) Merchant marines and commerce of the Greeks,

- Carthaginians, and Etruscans in the Tyrrhenian Sea-II-Hellenistic period. Symposium. June 5-13. A. Stazio and T. Hackens
- 5) Archaeological reading of architecture. Workshop. June-September. P. Peduto and F. Widemann
 - 6) Vulnerability and diagnosis of the architectural heritage in seismic risk zones. Seminar. June. M. DeCunzo, P. de Maisonneuve, E. Giangreco, and P. Barbieri
 - 7) Remote sensing and archaeology. Postgraduate course. May. L. Beckel.
 - 8) Archives of archaeologically interesting images. Round table. September. B. Helly
 - 9) Archaeological sites within the landscape. Workshop. October. M. Guy
 - 10) Ancient mortars and mortars for restoration. Workshop. October. Mme P. Rossi-Doria.

- 11) Vocanology, neotectonics, and variations of coast lines: applications to the Campanian zone. Round table. November. C. Albore-Livadie and F. Widemann.

Proposed activities for 1989: Palinuro II, Phytoliths, Archaeological dating, Highways and cultural movement, Interaction between Central Europe and the Mediterranean during the neolithic Iron Age, and Ancient ceramics. Write for information.

Rob Sternberg, Department of Geology, Franklin and Marshall College, PO Box 3003, Lancaster, PA 17604-3003 (717-291-4134), BITNET: R_STERNBERG@FANDM

Symposia

Quaternary Landscapes

The University of Minnesota cordially invites you to attend a symposium honoring Regent's Professor Herbert E. Wright, Jr., May 6 and 7, 1988. As director of the Limnological Research Center, he initiated research in the fields of glacial geology, paleoecology, paleoclimatology, paleolimnology, archaeology (Old and New World), and peatland and boreal ecology over a career spanning more than 40 years. Featured speakers include Patty Jo Watson (Wash Univ.), James E. Kutzbach (Univ. Of Wis./Mad.), Jan Mangerud (Univ. of Bergen, Nor.), Richard W. Battarbee (Univ. of London, UK), William A. Watts (Trinity Coll., Dublin), James C. Ritchie (Univ. of Toronto, Can.), and Thompson Webb III (Brown Univ.).

Registration fee for the conference is \$30 and includes sym-

posium, materials, reception on Friday, lunch on Saturday, and all refreshment breaks. A separate fee for the Saturday night banquet is \$25. Accomodations may be arranged through the Radisson University Hotel or the Days Inn (University Ave, SE).

Registration should be received by April 29, 1988. Mail to: Registrar, Professional Development and Conference Services, University of Minnesota, 338 Nolte Center, 315 Pillsbury Dr. SE, Minneapolis, MN 55455-0139.

For further information, contact Anne Dickason, Program Director, Professional Development and Conference Services, University of Minnesota, 209 Nolte Center, 315 Pillsbury Dr. SE, Minneapolis MN 55455 (616) 625-7837.

The Changing Roles and Functions of Ceramics in Society

Symposium at Annual Meeting, American Ceramic Society
Organized by the Committee on Ceramic History and
Archaeology

May 3, 8:50 AM - 5:00 PM

Room 302, Cincinnati Convention Center

From the very beginning, ceramics have had social and symbolic functions as well as utilitarian roles. For each of these purposes, aesthetic concerns have been important and, in some cases, have been the primary reason for manufacture. Over time that utilitarian role increasingly evolved into the use of ceramics in more complex objects and devices, having a variety of functions, and ultimately as components of multi-device systems. These changes have been triggered by changing requirements of society and, in turn, affected the way in which society perceives ceramics, organizes education and manufacturing facilities, and structures the industry.

The seminar will focus on the way that society perceives ceramics now and has perceived ceramics in the ancient and more recent past, and how this has influenced ceramic education, manufacture and use.

Accepted speakers include Prudence Rice, University of Florida; Michael Schiffer, University of Arizona; Flora Kaplan, New York University; Elizabeth Hendrickson, Royal Ontario Museum; Robert Hendrickson, Royal Ontario Museum; Gloria London, Hebrew Union College; Tracy Cullen, *American Journal of Archaeology*; Steve Reber, Massachusetts Institute of Technology; Robert MacMurray, Bloomsburg State College; Regina Blaszczyk, National Museum of American History; Donald R. Uhlmann and N. J. Kreidl, University of Arizona; Pamela Vandiver, Smithsonian Institution; W. David Kingery, Massachusetts Institute of Technology; Rustum Roy, Pennsylvania State University; O. J. Whittemore, University of Washington; and Dennis Readey, Ohio State University.

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SAS Newsletter

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Deadlines for Submissions:

No. 1 November 15 No. 3 May 15
No. 2 February 15 No. 4 August 15

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**26th International Symposium on Archaeometry
May 16-20, 1988
University of Toronto, Toronto, Ontario, Canada**

Accommodation: 1. University Residences
Single - \$35.00 per night including breakfast
Twin - \$23.00 per night including breakfast

2. Local Hotels - at current rates

Registration Fees: Full fee, before May 19, 1988 \$150.00 Cdn
Full fee, after May 19, 1988 \$170.00 Cdn
Student, without reception or banquet \$50.00 Cdn
Day, without reception or banquet \$25.00 Cdn

General Topics (and a sampling of papers):

Dating of organic and inorganic materials (Thursday AM)

Geomagnetic intensity as a dating tool

Prospection (Tuesday PM)

Prospecting a Roman castrum

Provenance studies of lithics, ceramics, and other materials (Tuesday AM and Friday PM)

Minoan clay figurines

Stone ware from the 3rd millennium BCE

Numismatics

Augustan asses

Chert, ceramics, marble, and jade studies

Technological studies of metals and non-metals (Metals Monday PM and Friday AM, Non-Metals Wednesday AM)

Coptic textile chronology

Ancient solders

Neutron activation autoradiography

Trace impurities in ancient glasses

Roman casting molds

Ancient carburization of iron

Applications of mathematical and statistical methods (Tuesday AM)

Ancient mensuration

Expert systems

Organic materials analyses (Friday AM)

Bone chemistry and dietary reconstruction

Physical characteristics of amber

Stable isotope analysis of food residues

The tentative schedule also includes Poster Sessions Tuesday and Thursday afternoons, a session on Archaeometric Techniques on Thursday afternoon, and a visit to the Isotracer Laboratory on Tuesday evening.

Social Events: Civic reception Monday evening
Tour to Niagara Falls Wednesday afternoon
Banquet Thursday evening

Contact: Archaeometry 88, c/o Professor U.M. Franklin, Department of Metallurgy and Materials Science, University of Toronto, Toronto, Canada, M5S 1A4