

SAS Newsletter

Society for Archaeological Sciences

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From the Editor

This issue contains a report on the "1987 Membership Survey," a "Laboratory Profile" on the Minnesota-Duluth Archaeometry Laboratory, and an announcement of a position opening in the MIT Anthropology/Archaeology Program. We also have a brief "Research Report" on X-ray diffraction analysis written by Michael Ripinsky.

For the first time, our *Newsletter* contains an "electronic manuscript"; Rob Sternberg's "Meetings Calendar" was transmitted to me as a data file via BITNET. Our predictions about the utility of electronic communication and data transfer have proven to be true, at least to a limited extent. A good deal of the editorial correspondence is being accomplished by way of electronic mail, and I hope to see more transmission of manuscripts in the future, as more members become comfortable with this method of communication.

I am happy to report that Ms. Kathryn Lynn will be working as an Editorial Assistant on upcoming issues of

the *Newsletter*. Kathy is majoring in Scientific and Technical Communication at Michigan Tech, and will be assisting me as part of a senior project for this year. She brings a fresh outlook to both language usage and to the graphics/layout aspects of the publication. I look forward to her contributions during the next few months.

I am also pleased to announce that Joseph Lambert has agreed to serve as Associate Editor for Archaeological Chemistry. Joe will be accepting (and soliciting!) items of news, publication announcements, and meeting reports from persons working in this interest area. He can be reached at the Department of Chemistry, Northwestern University, Evanston, IL 60201.

Patrick E. Martin

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Laboratory Profile



Native copper artifacts examined by Archaeometry Laboratory.

The Archaeometry Laboratory, a research center of the University of Minnesota, is one of a handful in the U.S. dedicated to applying analytical techniques from natural science to the study of human and artifactual remains and the ecological environments that affected human lifeways. Dr. George Rapp, Jr. is the Director of the Archaeometry Laboratory. He is Dean of the University of Minnesota-Duluth's College of Science and Engineering, Professor of Geology and Archaeology, Professor of Ancient Studies, and former president of the SAS. Dr. Susan Mulholland serves as Associate Director.

Rapp founded the Archaeometry Laboratory in 1970 on UM's Minneapolis campus. The facility moved to its current Duluth location in 1976, a year after Rapp became Dean on the Duluth campus. The Archaeometry Laboratory provides services to the outside community for phytolith analysis, pollen analysis, sediment analysis, X-ray diffraction analysis, and neutron activation trace-element sourcing of North American native copper.

Archaeometry Laboratory facilities at UMD are used for many faculty and student research projects in the fields of archaeology, ancient studies, and archaeological geology. Doctoral candidates from the Center for Ancient Studies (CAS) in Minneapolis often pursue their research at the Archaeometry Laboratory. The facility also functions as a curatorial center for northeastern Minnesota, including the important Redepending Collection of early prehistoric artifacts from the Reservoir Lakes area.

The physical layout includes an office and research laboratory complex (1500 square feet) with space for five research personnel plus a secretary, a small library, and space for specialized pollen and phytolith microscopy. Artifacts,

microfauna, pollen, and phytolith samples are stored there. The Archaeometry Laboratory also includes an analytical research laboratory (750 square feet), with equipment for sediment analyses, pollen and phytolith extraction, artifact sampling and preparation, high temperature studies of ceramics and metal artifacts, and related archaeometric analyses. The laboratory also has an extensive storage area (1000 square feet) for maps, publications, and equipment, with facilities for sample curating.

Since the creation of the Archaeometry Laboratory, Rapp and his associates have undertaken several major projects. These research activities have included collaboration with interdisciplinary groups not only in the United States, but also in Greece, Israel, Egypt, Cyprus, Tunisia, Turkey, and India. Major projects past and present include:

Minnesota Messenia Expedition 1967-75: The Archaeometry Laboratory began as a component of this expedition, an interdisciplinary archaeological project that undertook a major excavation at the site of Nichoria, Greece, exploring the acropolis of the Mycenaean city. Resulting publications include both *The Minnesota Messenia Expedition: Reconstructing a Bronze Age Regional Environment*, eds. W.A. McDonald and G. Rapp, Jr., 1972, University of Minnesota Press and Oxford University Press, 338 pages; and *Excavations at Nichoria in Southwestern Greece, Volume I: Site Environments, Techniques*, eds. G. Rapp, Jr. and S. Aschenbrenner, 1978, University of Minnesota Press, 239 pages.

Tel Michal, Israel, Excavation 1977-80: This project was a collaborative effort with Tel Aviv University, the University of Pennsylvania, and Brigham Young University to recover evidence from the Bronze Age through the Roman period in the southern Sharon coastal plain. The University of Minnesota Press will publish the excavation report later this year.

Archaeological Geology of Ancient Troy: The landmark University of Cincinnati excavations at Troy during the 1930s recovered 356 samples from the archaeological strata. In 1974, these were given to the Archaeometry Laboratory to analyze and interpret. Two short field expeditions to Troy were under-

taken in 1977 and 1978 to study the site and to conduct a drilling program on the Plain of Troy. The dramatic results of this investigation showed that the Homeric battles at "the gates of Troy" could not have been fought on the modern plain, which was underwater at that time. A major publication resulted in 1982: *Troy: The Archaeological Geology*, Troy Supplementary Monograph #4, eds. G. Rapp, Jr. and J.A. Gifford, Princeton University Press, 209 pages.

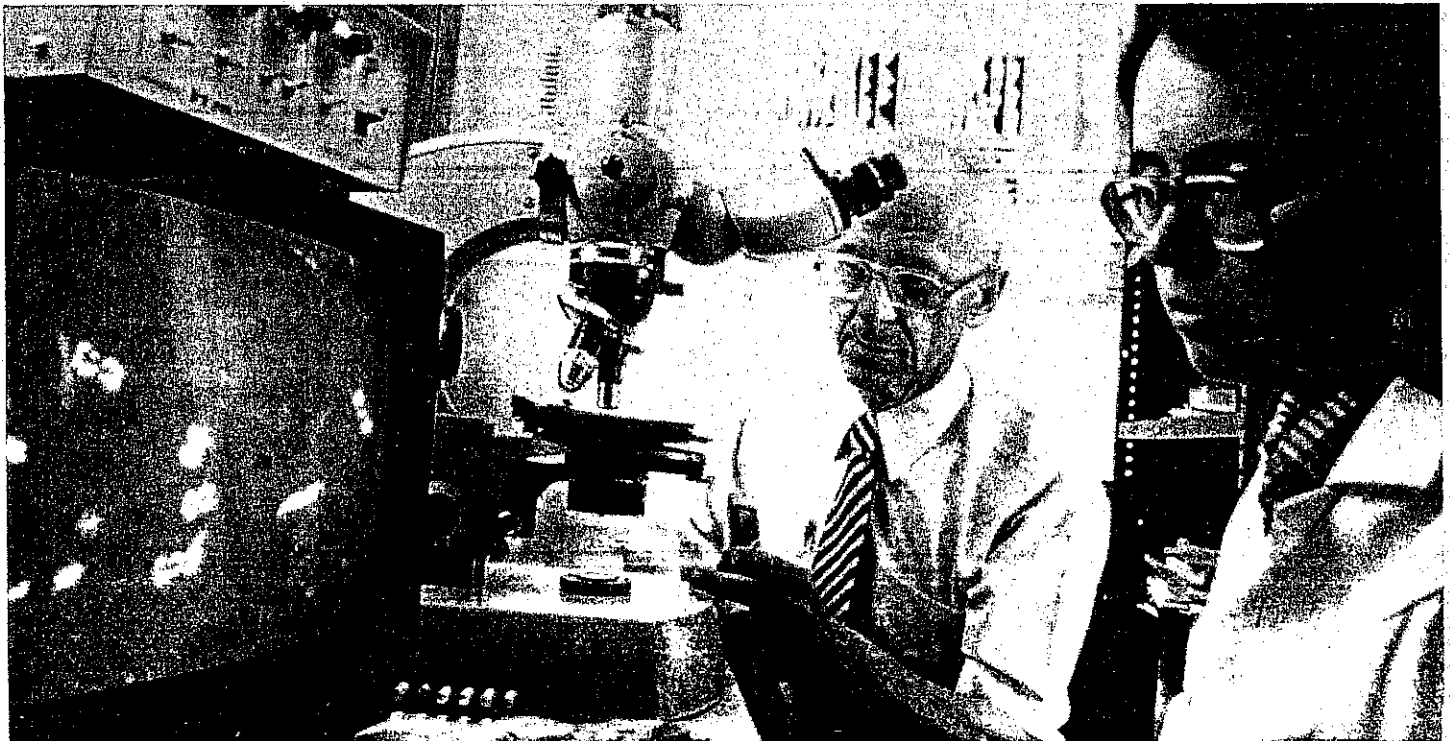
Coastal Changes: The Archaeometry Laboratory has been engaged since 1970 in an extensive geologic drilling program to locate the changing positions of coastlines around archaeological sites in the eastern Mediterranean. A whole range of publications has resulted from these efforts; more are in preparation.

Sotira Kaminoudhia, Cyprus, Excavation 1983: This was undertaken jointly with the Cyprus American Archaeological Research Institute. Results of this excavation have shown that gold was used on Cyprus at least 600 years earlier than previously believed.

"Fingerprinting" of Copper and Bronze: Metal studies are crucial components of the Archaeometry Laboratory's work. These include trace element "fingerprinting" of the geographic/geologic source of native copper and tin used in copper and bronze artifacts. A worldwide program has been underway since 1966 to determine ancient trade routes and the sources and composition of ancient copper and tin.

Lead in Ancient Bone: The Laboratory has been conducting studies of lead poisoning in ancient times, with a major study of Roman and Colonial American bones. Work so far has demonstrated toxic levels of lead in some bones. Research is continuing as more material becomes available.

Phytolith Studies in Archaeology: Phytoliths are opaline silica bodies that form in plants, particularly in the grass family. Although phytolith studies are still in their infancy, they promise far-ranging implications for archaeological studies, clues to ancient crops and diet. A small group of researchers in the United States—three at the Archaeometry Laboratory—is investigating the possibility of using phytoliths in a manner roughly analogous to pollen to aid reconstruction



Rapp and Mulholland studying phytoliths using a Zeiss petrographic microscope equipped with a Nomarski differential interference contrast unit and a video enhanced contrast unit.

of paleoenvironments and early agriculture. In April 1985, the Archaeometry Laboratory sponsored the Second Phytolith Conference.

Pollen Studies: Two researchers at the Archaeometry Laboratory have developed programs to plot computer generated pollen diagrams and to compute pollen statistics. Analyses of pollen from both archaeological and geologic contexts have been undertaken to determine the paleoecology of archaeological sites in Minnesota, Missouri, and the Mediterranean. Another project involves the analysis of pollen in fecal matter from naturally preserved Chilean mummies, dating from A.D. 600-1870. Some of the mummies are Inca.

Geologic Techniques in Archaeology: In 1985, Yale University Press published *Archaeological Geology* (435 pages), edited by G. Rapp, Jr. and J.A. Gifford (former associate director of the Archaeometry Laboratory). This 14-chapter volume, with an extensive bibliography, demonstrates the scope of research at the disciplinary boundary between geology and archaeology. It provides the first general reference work to illustrate the wide range of application of geologic techniques to archaeology.

Phoenician Harbors: Investigation of early Punic harbors at ancient Carthage (Tunisia), has been undertaken with a grant from the National Geographic Society. Rapp and his colleagues currently are involved in an effort to determine the nature and location of the harbors founded by the Phoenicians.

Future projects of the Archaeometry Laboratory include a research effort with the Deccan College, Department of Archaeology, of Pune, India in the areas of geoarchaeology and phytolith studies. A grant from the Smithsonian has enabled the Archaeometry Laboratory to institute cooperative projects with India, including combined field efforts, sharing



Rapp setting peel at excavation in Greece.

of laboratory facilities, exchange of data, exchange of scholars, and joint publication.

For further information concerning The Archaeometry Laboratory, contact George Rapp, Jr., Archaeometry Laboratory, College of Science and Engineering, University of Minnesota, Duluth, MN 55812-2496.

Report of 1987 Membership Survey

One hundred and four SAS members or about one quarter of the current SAS membership provided information concerning educational background, professional employment, areas of expertise or specialization and other information and opinions as part of the 1987 SAS Membership Survey. This survey was conducted to provide the Executive Board and officers in the tenth year of the SAS with information concerning the characteristics of our membership and suggestions for changes in the *Newsletter*, as well as to solicit opinions on several suggestions for future SAS initiatives.

Archaeology, archaeometry/archaeological science applications and environmental reconstruction/environmental archaeology represented the three core (ranked number 1) fields of professional activity listed by our members. These three areas of expertise were roughly equally represented, with 35% listing archaeology, 31% environmental reconstruction and 26% archaeometry as their primary field of activity. The most frequently cited areas of specialization of those listing archaeometry as their specialty were dating methods (34%), remote sensing (31%) and chemical analysis (25%). For those ranking environmental reconstruction number 1, 53% listed geoarchaeology and 35% listed zooarchaeology as their principal area of specialization.

Most of the members (89%) returning the survey have the Ph.D. degree. As would be expected, most of the SAS members listing archaeology as their field hold the degree in anthropology, while most of the members listing archaeometry/archaeological science hold degrees in chemistry, geography, geosciences, metallurgy, geophysics, or physics. Most of those listing environmental reconstruction had degrees in soil and analytical chemistry, geology, geochemistry, or physics.

A significant majority (74%) of our members hold appointments at a college or university. Of these, 41% are engaged

in both research and teaching, 24% are primarily engaged in teaching, and 9% have research positions. Other members hold research, editorial, or consulting positions in museums, private companies, or are self-employed. Only one member who returned the questionnaire is employed by a governmental agency.

Comments concerning the *SAS Newsletter* indicated that all members were impressed with general appearance and coverage. One member suggested that it is so good that it should be converted into a "mini" journal. Typical comments include the following. "Newsletter looks good." "The new format is great." "I like the new changes!" "The 'Laboratory Profiles' are excellent." "Ideas proposed in 'From the Editor' are good." Several members commented on the excellent reports of Martha Goodway in the area of metallurgy. One member noted that "Martha Goodway's concise notes on archaeological metallurgy are a model that should be emulated by other subfields." A number of respondents also commented on the helpfulness of the listing of forthcoming meetings now being reported by Associate Editor Robert Sternberg. Several members noted that most welcome in the *Newsletter* were current research summaries, the laboratory profiles and the cooperation column. There was also the suggestion made by two respondents that members should submit brief statements on current areas of research. The only negative comment was that the layout should allow wider margins for those who store *Newsletters* in folders. Finally, there was an almost unanimous expression of support for the suggestion that the SAS publish a directory that lists individuals and their areas of expertise as a means of facilitating interdisciplinary contacts and interaction.

R.E. Taylor, SAS General Secretary

Meetings Calendar

- September 21-23.** Pyrometallurgy. London. Institution of Mining & Metallurgy, 44 Portland Place, London, W1N 4BR U.K.
- September 21-25.** Natural Glasses. Prague. V. Bouska, Faculty of Science, Charles University, Albertov 6, 128 43 Prague 2, Czechoslovakia.
- September 23.** Symposium on the Use of Reference Materials in the Metals Analysis Laboratory. Savannah, GA. Norma Bottone, Union Carbide Corp., Parma Technical Center, 12900 Snow Rd., Parma, OH 44130 (216) 676-2313.
- September 23-October 1.** Rocks, Fossils & History Symposium. (International Commission on the History of Geological Sciences). Pisa, Italy. Nicoletta Morelio, Istituto di Storia Moderna e Contemporanea, Via Balbi 6, 16126 Genoa, Italy.
- September 26.** Ice Age Origins of America. Washington, DC. Herman Uiola, Quincentenary Program, Room 60A, National Museum of Natural History, Washington, DC 20560 (202)357-1976.
- September 26-27.** Thermal Analysis in Material Characterization; American Chemical Society Short Course. Department of Educational Materials, American Chemical Society, 1155 16th St., NW, Washington, DC 20036 (202) 872-4508. \$585, ACS members; \$665, nonmembers.
- September 27-October 2.** 5th International Flint Symposium. Bordeaux, France. Michel Lenoir, Institut du Quatenaire, Batiment de Geologie, Avenue des Facultex, Universite de Bordeaux I, 33405, Talence Cedex, France.
- September 27-30.** North American Thermal Analysis Society, 16th Annual Conference. Washington, DC. Benoy Chowdhury, M&T Chemicals, P.O. Box 1104, Rahway, NJ 07065 (201) 499-2474.
- September 28-October 1.** Symposium on Accuracy in Trace Analysis: Accomplishments, Goals, Challenges. Gaithersburg, MD. Kathy Stang, National Bureau of Standards, A353 Physics Building, Gaithersburg, MD 20899.
- September 28-October 2.** Aerial Photo Interpretation, Short Course. Washington, DC. Continuing Engineering Education Program, George Washington University, Washington, DC 20052 (800) 424-9773. Fee: \$985.
- September 29-October 2.** Fifth International Symposium on Data Analysis and Informatics. Versailles, France. Institut National de Recherche en Informatique et en Automatique, Service des Relations Enterieures, Bureau des Colloques, Domaine de Voluceau, Boite Postale 105, 78153 Le Chesnay Cedex, France (33 1 39 63 56 00).
- September 30-October 3.** International Union of Pure and Applied Physics, Meeting. Washington, DC. W.W. Havens, APS, 335 E. 45th St., New York, NY 10017 (212) 661-9404.
- October 1-2.** Use and Conservation of Paleontological Sites. London. Peter Crowther, City of Bristol Museum and Art Gallery, Queen's Road, Bristol, BS8.
- October 1-4.** 2nd International Muskox Symposium. Saskatoon, Canada. Jan Rowell, Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N OWO (303) 966-7416. Program includes archaeology.
- October 4-7.** Materials Conference. Albany. A'ndrea Elyse Messer, American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017 (212) 705-7740.
- October 7-8.** Grain Size Analysis; sponsored by International Union of Geological Sciences Commission of Stratigraphy. Heidelberg, W. Germany. Jiri Brezina, D-6903, Neckargemund-3, Federal Republic of Germany.
- October 10-11.** Annual Dumbarton Oaks Symposium on Pre-Columbian Art and Archaeology. Pre-Columbian Studies, Dumbarton Oaks, 1703 32nd St. NW, Washington, DC 20007 (202) 342-3265. Theme for this year's symposium is "Wealth and Hierarchy in the Intermediate Area."
- October 11-15.** Society of Exploration Geophysicists, Annual Meeting. New Orleans. Marvin R. Hewitt, Amoco Production Co., Box 591, Tulsa, OK 74102 (918) 660-3377.
- October 13-16.** ChemCon '87. New Orleans. Alvin Babkow, McGraw-Hill Publications, 1221 Avenue of the Americas, New York, NY 10020 (212) 512-2231.
- October 14-17.** American Institute of Professional Geologists. Lexington, KY. Larry R. Rhodes, Rhodes & Associates Inc., 2627 Regency Road, Lexington, KY 40503 (606) 278-9465.
- October 19-22.** Clay Minerals Society, Annual Meeting. Socorro, NM. George S. Austin, Bureau of Mines & Mineral Resources, New Mexico Institute of Mining & Technology, Campus Station, Socorro, NM 87801 (505) 835-5125.
- October 21-24.** Society of Vertebrate Paleontology, Annual Meeting. Tucson. Everett Lindsay, Gould-Simpson Building, Room 335, University of Arizona, Tucson, AZ 85721 (602) 621-6022.
- October 22-23.** Interface '87: 11th Annual Humanities and Technology Conference. Marietta, GA. Joan McCoy, Department of Humanities and Social Sciences, Southern College of Technology, Marietta, GA 30060.
- October 22-25.** 19th Algonquian Conference. Washington, DC. Ives Goddard, NHB Rm. 85, Smithsonian Institution, Washington, DC 20560. Twenty-minute papers on studies of Algonquian Indian culture, prehistory, etc.
- October 24-26.** Association of American Geographers, Fall Meeting. Washington, DC. Robert T. Aangeenbrug, AAG, 1710 16th St. NW, Washington, DC 20009 (202) 234-1450.
- October 25-26.** Fifth Annual Northeast Mesoamerican Conference. Philadelphia. Elin Danien, Museum Events Coordinator, University Museum, University of Pennsylvania, Philadelphia, PA 19104 (215) 898-3024. Designed to provide wide latitude for discussion with-in general topics of interest to archaeologists. Includes session on different aspects of research in the Valley of Oaxaca.
- October 26-29.** Geological Society of America, Annual Meeting. With associated societies, including Paleontological Society. Jean Kinney, GSA, Box 914044, Boulder, CO 80301 (303) 447-2020.
- October 28-30.** 1987 Pacific Congress on Chemistry and Spectroscopy; organized by American Chemical Society, Society for Applied Spectroscopy. Irvine, California. Howard J. Sloane, Savant, P.O. Box 3670, Fullerton, CA 92634 (714) 870-7880.
- October 28-30.** Mathematical Approaches to Environmental and Ecological Problems. Ithaca, NY. D. Pendell, Center for Applied Mathematics, 305 Sage Hall, Cornell University, Ithaca, NY 14853-6201 (607) 255-4335.
- October 30-November 1.** Mammals, Mastodons, and Human Interaction. Waco, Texas. Central Texas Archaeological Society, 4229 Mitchell Road, Waco, TX 76710.

- October 30-November 3. Geochemistry. Porto Alegre, Brazil. 1 Congresso Brasileiro de Geoquímica, Rua Banco da Provincia, 105, 90650, Porto Alegre, R.G. do Sul, Brazil (0512-33-7311).
- November 1.** Abstract deadline for 1988 Conference of the Society for Industrial Archaeology. Wheeling, WV. Emory L. Kemp, Program for the History of Science and Technology, G-14 Woodburn Hall, West Virginia University, Morgantown, WV 26506. Submit a one-page abstract to be considered for presentation.
- November 1-6. 32nd International Geophysical Symposium. Dresden, E. Germany. Organizing Committee, 32nd IGS, VEB Geophysik Postfach, 7024 Leipzig, German Democratic Republic (Telex 051341 GEOBTZ).
- November 5-7. American Society for Ethnohistory Annual Meeting. Berkeley, California. George Collier, Program Chairperson, AES 1987, Center for Latin American Studies, 582 Alvarado Row, Stanford University, Stanford, CA 94305 (415) 723-4444.
- November 8-12. Applications of Lasers and Electrooptics, 6th International Congress. San Diego. Laser Institute of America, 5151 Monroe St., Suite 102W, Toledo, OH 43623 (419) 882-8706.
- November 8-13. American Nuclear Society, Winter Meeting. San Francisco. A.N.S. Headquarters, 555 N. Kensington Ave., LaGrange Park, IL 60525 (312) 352-6611.
- November 11-14. 44th Southeastern Archaeological Conference; joint meeting with the Eastern States Archaeological Federation. Charleston, SC. Albert C. Goodyear, SEAC Local Arrangements, South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia, SC 29208 (803) 799-1963.
- November 15-18. International Geographic Information Systems Symposium. Arlington, VA. E.H. Pechan & Associates, 5537 Hempstead Way, Springfield, VA 22151. Topics: global systems, data acquisition, environmental analysis, database management, remote sensing.
- November 18-22. American Anthropological Association, 86th Annual Meeting. Chicago. AAA, 1703 New Hampshire Ave. NW, Washington, DC 20009 (202) 232-8800. Deadline for submissions was April 1. Preliminary program in September issue of *Anthropology Newsletter*.
- November 20-21. Forum '87: Students and Science Learning; American Association for the Advancement of Science. Arlington, Virginia. Leslie E. Hornig, Office of Science and Technology Education, AAAS, 1333 H St. NW, Washington, DC 20005 (202) 326-6629.
- November 30-December 5. Materials Research Society, 1987 Fall Meeting. Boston. Materials Research Society, 9800 McKnight Rd., Suite 327, Pittsburgh, PA 15237 (412) 367-3003.
- December 5-8.** American School for Oriental Research, Annual Meeting. Boston. ASOR, 423 Spruce St., Philadelphia, PA 19104 (215) 222-4643.
- December 7-9. 42nd Annual Conference on Applied Statistics. Newark, New Jersey. W. Young, Medical Research Division, American Cyanimid, Building 60, Room 2093, Pearl River, NY 10965 (914) 735-5000, x3224.
- December 7-11. American Geophysical Union, Fall Meeting. San Francisco. AGU Meetings, 2000 Florida Ave. NW, Washington, DC 20009 (202) 462-6903.
- December 8-12. Paleobotanists and Palynologists Meeting. Sao Paulo, Brazil. Thomas R. Fairchild, Instituto de Geociencias, USP, Caixa Postal 20.899, Sao Paulo, SP, CEP 01498, Brazil.
- December 14-15. Geological Society, Annual Meeting. Newcastle-upon-Tyne, U.K. D.A.C. Manning, Department of Geology, The University, Newcastle-upon-Tyne, NE17RU United Kingdom (091-232-8511, x3106).
- December 14-16. Winter Simulation Conference. Atlanta. W. David Kelton, Department of Management Sciences, Carlson School of Management, University of Minnesota, Minneapolis, MN 55455 (612) 624-8503.
- December 27-30. Archaeological Institute of America, 89th General Meeting. New York. AIA, P.O. Box 1901, Kenmore Station, Boston, MA 02215.
- December 27-30. 1987 Meeting of the American Society of Zoologists (along with American Microscopical Society; Crustacean Society; Society of Systematic Zoology). New Orleans. Mary Adams-Wiley, Executive Officer, American Society of Zoologists, Box 2739, California Lutheran University, Thousand Oaks, CA 91360 (805) 492-3585. Abstract deadline: 8/10/87.

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January 10-14, 1988. 171st Meeting of the American Astronomical Society. Austin, TX. David Evans, University of Texas.

February 3-5. Society for Computer Simulation, Conference. San Diego. SCS, P.O. Box 17900, San Diego, CA 92117.

February 11-16. American Association for the Advancement of Science, 154th Annual Meeting. Boston. AAAS Meetings Office, 1333 H St. NW, Washington, DC 20005 (202) 326-6450.

March 17-20. Northeast Anthropological Association, Annual Meeting. Albany, NY. Dean R. Snow, Department of Anthropology, State University of New York at Albany, Albany, NY 12222. Proposals for organized symposia and paper abstracts are due by December 31.

March 8-21. American Physical Society, Spring Meeting. Washington, DC. W.W. Havens, 335 E. 45th St., New York, NY 10017 (212) 661-9404.

March 24-27. Central States Anthropological Society. St. Louis. Alice Kehoe, Department of Anthropology, Marquette University, Milwaukee, WI 53233. Send suggestions and requests for help in forming symposia. Plans include a tour of Cahokia Mounds.

April 27-May 1. Society for American Archaeology, 53rd Annual Meeting. Phoenix. Sylvia W. Gaines, Arizona State University, Tempe, AZ 85287. Submission deadline is Oct. 1.

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.

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

May 16-22. 26th International Symposium on Archaeometry. Toronto. Ursula Franklin, Department of Metallurgy, University of Toronto, Toronto, Ontario M5S 1A7 Canada (416) 978-3012.

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.

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

July 10-15. International Working Meeting on Soil Micromorphology; sponsored by Sub-commission B of the International Society of Soil Science. Dr. Richard Drees, Department of Soil and Crop Sciences, Texas A & M University, College Station, TX 77843-2474. See *SAS Newsletter*, 10:3.

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.

August 2-11. International Astronomical Union, 20th General Assembly. Baltimore. IAU-UAI Secretariat, 61 Avenue de l'Observatoire, F-75014 Paris, France (1-4325-8358).

August 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.

August 21-26. 9th International Congress on Thermal Analysis; sponsored by International Confederation for Thermal Analysis. Jerusalem. S. Shoval, Everyman's University, P.O. Box 39328, Tel Aviv 61392, Israel.

August 29-September 2. 1st Congress of the Australian Rock Art Research Association. Darwin, Australia. Australian Rock Art Research Association, P.O. Box 216, Caulfield South, 3162, Victoria, Australia.

September 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.

September 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, P.O. Box 19140, GR-117 10 Athens, Greece; Telex:45-4312 POLX (c/o Marinos).

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Position Available

Massachusetts Institute of Technology

The Anthropology/Archaeology Program and the Center for Materials Research in Archaeology & Ethnology invite applications for a joint position in archaeology, at the rank of Assistant Professor, to begin Fall 1988. We seek an archaeologist with a strong research background in materials science of archaeological materials (e.g. metals, ceramics, lithics, biological materials). Primary research must include technology of artifact production. Must have extensive experience in the technical analysis of archaeological materials, be able to supervise Ph.D. level student research in some area of materials analysis, and co-direct the Center's materials research facility. Teaching includes a graduate seminar/lab course in materials analysis of archaeological materials and undergraduate courses in archaeology and laboratory techniques in archaeology. Ph.D. required. Women and minority candidates strongly encouraged. Send only a vita, letter of application, and names of three referees to Heather Lechtman, Room 8-138, MIT, Cambridge, MA 02139.

Equal Opportunity/Affirmative Action Employer

Research Summary

X-Ray Diffraction Analysis of Ancient Glass

X-ray diffraction has not been seriously considered as a tool for the characterization of ancient glass, since it has traditionally been regarded as best suited for materials which embody crystalline structures. Glass, a structurally disordered solid, is amorphous and behaves like a supercooled liquid. Thus, it has no crystal lattice, and lacks a long-range crystal order.

In order to find out whether X-ray diffraction could prove useful in the examination of ancient glass, we had to create an experimental strategy which could suggest answers to some specific questions. To an archaeologist interested in the chemical properties of ancient materials, the noncrystalline character of glass raised a number of intriguing questions regarding the long-term behavior of this material. To wit, (1) can X-ray diffraction technique be useful in detecting changes in a glass object that took place over a long period of time, and (2) is there a sufficient release of kinetic energy in the course of many centuries to devitrify a glassy phase, thus allowing the glass to approach a state of thermodynamic equilibrium? In other words, does the passage of time have any effect on the structural properties of glass, and, if yes, can this effect be understood in terms of atomic or molecular rearrangement and/or new formations discernible as a crystal order of the unit cells?

In our experiment with X-ray diffraction analysis of ancient Roman glass (circa third century A.D.) from an archaeological site in Ashkelon, Israel, we found that the surface patina, or metallic oxide, that formed naturally after the artifact had been buried contained a crystalline substance. This substance was principally made up of calcite (CaCO_3) and, in lesser quantities, quartz (SiO_2). Thus, these glass samples had undergone a partial devitrification. In contrast, other specimens derived from the same excavation, but belonging to a later Islamic period (circa tenth through twelfth centuries A.D.), exhibited hardly any crystalline oxide measurable by X-ray diffraction. Evidently, the combination of time, the local environment, and the chemical properties of these glasses created factors that were accessible by this analytical technique.

The actual mechanism responsible for this process has not yet been determined, but one possible explanation suggests that a key role may be played by a type of ionic diffusion activity between the environment (soil rich in limestone) and the glass surface. The active ions in the glass may either originate at the surface, where there is greater free energy available, or they may be transported to the surface from within the bulk of the material. The free surface energy, in conjunction with other environmental factors, such as atmospheric radiation and moisture, may provide the activation energy necessary for the initiation of this physicochemical process.

The data obtained by this technique have potentially significant applications in archaeological research, and may be invaluable in the forensic study of glass, ancient and modern alike. Such observations can be instrumental in the development of an indexing system for the temporal, environmental, and technological histories of the glass artifact. Their use in archaeometry can develop into a vital tool for the characterization of ancient glasses, revealing information about source origins and material properties. In addition, X-ray diffraction might be used to develop relative and absolute chronologies based upon the degree of crystallization measured. Finally, the observation of crystalline formations on the glass allows interesting speculations regarding the behavior and long-range properties of this material.

Michael Ripinsky
International Consultants (USA)
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- American members of the Historical Metallurgy Society and others interested in archaeometallurgy held an organizational meeting of the American Group for Historical Metallurgy at the Smithsonian's Museum of American History in Washington, DC on September 10th. For a copy of the proposed bylaws and further information, call Martha Goodway at (202) 287-3733.
 - The Iron Masters' Symposium will be held this year on Saturday, October 10th at Furnacetown, near Snow Hill, Maryland. Furnacetown was the site of Nassawango Iron Furnace, Maryland's only bog iron furnace. In addition to a tour of the site, there will be a reception and dinner included in the registration fee of \$45. Checks should be made payable to "Furnacetown Foundation: Symposium Account" and sent to Box 207, Snow Hill MD 21863. For further information, write Kathy Fisher, Executive Director, Furnacetown Foundation, Route 12, Old Furnace Road, P.O. Box 207, Snow Hill, MD 21863, or phone (301) 632-2032.
 - In Belgium, Le Groupe de contact cree sous les auspices de FNRS "Arts et Techniques metallurgiques du Moyen Age et des Temps Modernes/Kunst en Metaaltechnieken van der Middeleeuwen en de Moderne Tijden" sponsored a lecture by Professor Jean Marechal this spring on the metallurgy of brass. For more information about this group write Monique de Ruette, Schermersstraat 31, B-2000 Antwerp, Belgium.
 - A new book on "La Metallurgie du Fer dans les Ardennes (XVI^e-XIX^e siecles)", edited by Isabelle Balsamo, contains papers on sites and on methods by Louis Andre, Jean-Francois Belhoste and Patrice Bertrand and is illustrated with photos. Before October 1st it is available for 100 francs, 20 francs shipping, sent to la Conservation regionale de l'Inventaire, Direction regionale des Affaires culturelles, 5 rue de Jericho, 51022 Chalons-sur-Marne, France. Checks in francs should be made out to l'Association pour la Generalisation de l'Inventaire Regional (A.G.I.R.). After September 30th the price will be 120 francs.
 - Dr. David A. Scott, formerly of the Institute of Archaeology of London University, joins the staff of the Getty Conservation Institute this fall.
 - Dr. K. N. P. Rao, Project Director of the Centre for History and Philosophy of Science, Bangalore, India, visited the United States this summer to report on recent archaeometallurgical excavations, including those of traditional iron making sites.
 - Lee Horne of MASCA did ethnoarchaeological field work in the brasscasters' village of Dariapur, West Bengal, in 1986. The project began in the spring of 1986 when, as part of the Festival of India, a brasscaster from this village, Haradhan Karmakar, used the lower courtyard of the University Museum in Philadelphia as a casting site. The Museum accessioned examples of every stage in the process; raw materials, tools, fired molds, castings, and even casting debris. The firing area was recorded as if it were an archaeological site, and examined again after it had weathered, all in the effort to interpret archaeological finds at metalworking sites. A more developed project is planned for the future.
 - Dr. John F. Merkel of the CARD Laboratory, Peabody Museum, Harvard, took part in an archaeological field project this summer which focused on the effects of Roman colonization in the Mt. Kosmaj region of Yugoslavia. The project was led by Dr. Vladimir Kondic of the Archaeological Institute, Belgrade, and other members included Dr. Michael R. Werner of SUNY Albany and Dr. Paul T. Craddock of the British Museum. The site, which is in the environs of the village of Stojnik in Serbia, is located near the border of the late Roman empire in an area that the Romans mined for silver and lead ores.
- 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.