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From the Editor

I am happy to offer several book reviews in this issue, due in large part to the work of our Review Editor, Prudence Rice. Pru has been successful in finding excellent reviewers to digest important new works in archaeological science. I must add that Pru did not solicit Fred Matson's review of her own book: I am responsible for that one! You should expect to see more reviews in upcoming issues of the *Bulletin*, and we ask that you continue to offer suggestions of titles, as well as offering your services as reviewers in your special fields.

This issue also contains a "Laboratory Profile" on the Smithsonian's Conservation Analytical Lab, while Number 4 will cover the Archaeometric Lab at the University of Missouri. These reports are designed to keep our members abreast of current activities and capabilities of laboratories around the world, a necessary point of contact and information for researchers who might have only limited direct contact with their colleagues. We welcome contributions from other labs not recently profiled in this feature.

In recent months I have had several contacts with organizations that have overlapping interests with SAS. In particular, I've corresponded with Loic Langouet of the Groupe des Methodes Pluridisciplinaires Contribuant a L'Archeologie, and Ian Bailiff, editor of *Ancient TL*. The GMPCA is an organization centered in France and publishes a high-quality bulletin titled *Revue D'Archeometrie*. A recent issue included articles on radio magneto-telluric prospecting, gas chromatographic analysis of food residues in pottery, microscopic examination of an early steel

sword, elemental analyses of obsidian, and several other excellent papers. I have reproduced a membership application form in this issue and will be happy to forward publication lists from the GMPCA to anyone who requests them. *Ancient TL* is published 3 or 4 times a year at the University of Durham. This elegant journal includes articles on thermoluminescence and electron spin resonance, as well as editorials and a column on computer methods. Papers are published with reviewers' comments, and emphasis is placed on rapid turnaround. In addition, *Ancient TL* produces a "Date List", providing detailed information and technical specifications on recent TL age estimates. This impressive journal is offered at £6 per year, payable in Sterling, through Bailiff at the University of Durham. His electronic mail address is RKM2@MTS.DURHAM.AC.UK. Both of these publications bear examination by our members, and certainly belong on the bookshelves of laboratories and libraries serving archaeological science around the world.

The expansion and development of computer network use and access for SAS members continues, now through the efforts of Jim Burton at the University of Wisconsin, Madison, WI 53706. Jim expressed interest in the E-mail addresses of a number of members (and non-members who should be members!) Upon learning that there was no inclusive listing, Jim offered to compile the addresses. Individuals who wish to facilitate contact with colleagues via E-mail should contact Jim at JHBURTON@WISCMACC or Department of Anthropology. You should include a note that you are willing to have your address distributed.

1989 Fryxell Award to Joseph Lambert

The Society for American Archaeology presented the 1989 Fryxell Award to Joseph Lambert of Northwestern University at the annual meeting in April. Lambert's contributions to archaeological chemistry were recognized by this award, particularly his work in trace element studies and oxidation states in inorganic elements. Past President

of the SAS, Lambert has served as Chair of the ACS Archaeological Chemistry group, and is Associate Editor for Archaeological Chemistry for the *SAS Bulletin*. We are especially pleased to congratulate Joe on this recognition of his significant contributions to the field.

THOMAS R. LYONS
[1920-1989]

Dr. Thomas R. Lyons, one of the foremost developers and advocates of the use of aerial and satellite remote sensing and photogrammetry in archaeology and anthropology in the United States, died March 19, 1989.

Tom Lyons can perhaps best be remembered as a devotee of the science of geology at heart, largely because of its well-founded, logical underpinnings, but he was also a student and practitioner of anthropology and archaeology, which are considerably more humanistic areas of study. To these disciplines he brought his love of science and scientific procedure, but also a deep understanding of human nature and human destiny, expressed in terms not only of the more mechanistic side, but also the more human and spiritual aspects of evolution. He studied the earliest beginnings of human society, the Palaeoindians, in New Mexico, writing his doctoral dissertation at the University of New Mexico's Department of Anthropology on their adaptation to conditions prevailing as much as 10,000 years ago around the shores of the now-dried Lake Estancia, just east of present-day Albuquerque. Much of his subsequent research focused on the lives of New Mexico's later Archaic, Pueblo, and historic inhabitants, including a focus on the Penitentes of the Southwest. Always based on unifying principles, his work emphasized the similarities in the lifestyles of these people, and the likenesses of their goals and aspirations.

One of Dr. Lyons' greatest contributions to the sciences of anthropology and archaeology, however, was of a methodological nature. In 1972, he was chosen to supervise a program under what was then the Chaco Project, a National Park Service program based at the University of New Mexico. The focus of the Chaco Project was to study prehistoric adaptations at and around Chaco Canyon, in the northwestern corner of the state. Dr. Lyons' mandate was to apply what was then a new technology, remote sensing, to further the understanding of these past peoples' lives. Since that time, remote sensing has become a very familiar term, particularly in the jargon of New Mexico's high-technology businesses, but it wasn't then. Tom Lyons helped to make it so.

Remote sensing is the use of photographic and electromagnetic recording, including aerial photographs and pictures sent from satellites, to depict phenomena on the ground. At first, the Chaco Project's focus was simply the recording of the many ancient ruins that occurred in Chaco Canyon and its environs, and to map them using aerial photographs. The object was to tell how many people had lived

there, and whether the ruins were deteriorating. When Dr. Lyons and his students began studying such aerial photos and the then-new LANDSAT satellite data, however, many more interesting things, not even imagined before then, began appearing.

Shortly after the inception of the Chaco Project, he had discovered and mapped hundreds of miles of ancient Anasazi roadways, dating to between AD 900 and AD 1200; the existence of these roadways implied a complex social and political organization at Chaco Canyon during that time. Today, the existence of these ancient roadways serve as the basic underpinnings for archaeologist's views about how the ancient Anasazis lived, communicated with their fellows, and carried out their political processes. Dr. Lyons spent three painstaking seasons in the field, checking out the results of these interpretations, and they were borne out. Other archaeological researchers, building upon his work, have found additional segments of Anasazi roadways.

In recognition of these remote sensing-based advances in Southwestern archaeology, National Park Service offices around the country began to seek Dr. Lyons' advice in using aerial photographs and satellite pictures and data in their areas, and soon this interest spread to other archaeologists in both the government and private sectors. A new technology was born. Based upon archaeological remote sensing work done around the country, Dr. Lyons instituted and edited a publication series of eight volumes on the subject of archaeological remote sensing. He is internationally known as one of the founders of this important subdiscipline of archaeology in the United States, and in fact around the World.

Today, remote sensing helps archaeologists see their sites and the environments inhabited by past people with a perspective that they never had before, due in large measure to the dedicated work, research and publications of Dr. Thomas R. Lyons.

A Festschrift volume in honor of Dr. Lyons is currently being planned. Those contributing to it need not have been his direct colleagues or friends, but it would be appropriate if their work has been based upon, or builds upon, his. Those who are interested in contributing to this volume, which we intend to submit to the University of New Mexico Press, should respond by sending a description of the paper they wish to submit to James I. Ebert and Robert K. Hitchcock by August 1, 1989.

James I. Ebert, Ebert & Associates, 3100 Ninth Street NW, Albuquerque, NM 87107.

Marble Study Group

At the conclusion of the NATO Advance Research Workshop, "Marble in Ancient Greece and Rome," May 9-13, 1988, held at Il Ciocco, Lucca Italy, the participants voted to form an "Association for the Study of Marble and Other Stones in Antiquity." This was proposed as a spiritual heir for the long moribund Committee for the Study of Marble and Other Stones in Antiquity of the International Association for Classical Archaeology, organized in 1965 by John Ward-Perkins of the British School in Rome. The newly elected officers are: Norman Herz, University of Georgia, president; Amanda Claridge, British School in Rome, secretary; and Marc Waelkens, Leuven, councilor.

Papers presented at the ARW were published in 1988 in the NATO ASI Series, vol. 153, by Kluwer Academic Publishers as *Classical Marble: Geochemistry, Technology, Trade*, edited by N. Herz and M. Waelkens, 482 p.



Zuni jar, Florida State Museum

Rinita Dalan Receives Scholarship

SAS member Rinita Dalan has been named the recipient of the William A. Fischer Award from the American Society for Photogrammetry and Remote Sensing. The scholarship is given to a worthy student adjudged to address new and innovative uses of remote sensing related to the natural, cultural, or agricultural resources of the Earth. Ms. Dalan received her B.S. in Anthropology from the University of Washington in 1979, recently completed a Master's degree at Southern Illinois University at Edwardsville, and will pursue a Ph.D. at the University of Minnesota, concentrating on the application of geophysical remote sensing methods to archaeological problems.

Book Reviews

Radiocarbon Dating Literature, The First 21 Years. DILETTE POLACH, compiler. Academic Press, London, 1987. x + 370 pp., 3 indexes. \$24.00 (cloth).

Radiocarbon Dating, An Archaeological Perspective. R.E. TAYLOR. Academic Press, Orlando, 1987. xii + 212 pp., illus., biblio., index. \$39.50 (cloth).

Reviewed by Renee Kra, Managing Editor, *Radiocarbon*, Department of Geosciences, The University of Arizona

Although these two books are widely disparate in terms of organization and objectives, they share striking similarities, not only in subject matter but also in importance and effectiveness. Each book, in its own right, is awesome.

Dilette Polach has painstakingly pieced together an annotated bibliography of all literature pertaining to radiocarbon dating for the first 22 (not 21) years since Willard Libby's discovery of this revolutionary interdisciplinary research tool. Her work was at least ten years in the making. What is even more mind-boggling than the 2800 entries, practically all of which Polach has read and succinctly summarized, is that these are only the English language publications. She does qualify this in her Preface, however, by saying that most non-English papers are eventually translated into English. Be that as it may, her achievement is monumental.

Polach efficiently divides her book into 14 chapters which consist of bibliographic and theoretical works, techniques and instrumentation, general geology, glacial geology (a surprisingly large chapter), ocean studies, Pleistocene, the archaeology of Africa, America, Asia, Europe, and Oceania, conferences, and date lists. In addition to this comprehensive array three indexes of authors, subjects, and geographical locations. The author/compiler's organizational skills leave the reader with very little to do in making a search of the literature. The book's major shortcoming, obviously, is that it represents only the half-life of radiocarbon dating. Several points occurred to me on going through this fascinating volume - first, the enormity of the field and its far-flung applications; second, the increasing fragmentation in the dissemination of the data (which Taylor underscores in his book); and third, the immense strides that the field has taken since 1947.

As I scrutinized the pages of both books, I found myself immersed in a sense of living history and rediscovery of the thrilling events that developed into the revolution of radio-

carbon dating. Erv Taylor's *Archaeological Perspective* is heavily pervaded with an historical perspective in the Preface, Chapter 6, and in the ever-present historical "vignettes." He describes Libby's experiments with methane during World War II, which ultimately led to his Nobel Prize for Chemistry. Whereas Taylor's history lesson is sparked with reminiscences of transactions, triumphs, and tribulations (and even some of the history of the journal, *Radiocarbon*), Polach's seemingly straightforward list subtly suggests the network of events that had such an enormous and lasting impact on science. For example, she includes a section that deals with literature of the 1950s based on the atomic bomb effects on global atmospheric radioactivity. For somebody who takes ten-hour daily doses of radiocarbon literature, I admit to becoming mesmerized into complacency about all those low-level activities. I owe these authors much gratitude and respect for jolting me back into appreciation of both the achievements in radiocarbon dating and their dedication to the field.

Taylor has given us the quintessential text on radiocarbon dating. And he has given it to more than just archaeologists, for he includes sections on methods, underlying principles of nuclear physics, statistical constraints, secular variations, contamination and fractionation effects, and descriptions of various counting systems, to mention but a few. It behooves every archaeologist who submits samples for radiocarbon dating to read this book. The explanations are scaled down to make the basics understandable, but at the same time, not overly simplified. What Taylor is attempting to do here, more than anything else, is address basic misconceptions that archaeologists may have and fill in gaps that exist in radiocarbon dating literacy.

To my mind, the best chapter in Taylor's book is the one on evaluating radiocarbon data, in which specific examples are given for problems that have occurred in archaeological interpretations and their solutions or, at least, resolutions. Safeguards are also suggested to prevent needless misinterpretations, for example, in a checklist of major sources of anomalous ^{14}C values for typical archaeological contexts (Table 5.1, p. 107). Another prize-winning table (Table 3.3, p. 67) offers a guide to sample size requirements for various materials in categories of routine pretreatment, extended pretreatment analysis, and special circumstances. Yet the reader is warned to use this guide only in general terms because of individual laboratory requirements.

Intricacies of pretreatment procedures and problems offer the archaeologist an awareness of what happens to a sample in a radiocarbon laboratory, and this should lead the reader to a greater appreciation for the complexities of the process. Case studies include descriptions of the difficulties of dating shell, which necessitate accounting for ocean mixing and reservoir effect, and bone dating, as well as problems pertaining to variations in ^{14}C concentration in

the atmosphere due to fossil-fuel emissions, nuclear weapons testing, cosmic-ray flux, and varying exchange rates in carbon reservoirs. Other problem-related topics rarely discussed among archaeologists include the solid carbon method of dating employed in the early days of radiocarbon dating as well as the shrinking numbers of published results.

Especially helpful to the archaeologist are discussions of current conventions used by the radiocarbon community for reporting age values, the development of accelerator mass spectrometry (AMS), and the use of calibration curves. What a pity that this book was "in press" just as the latest, high-precision dendrochronological calibration curves (*Radiocarbon* 28(2B), 1986) were published. Probably the only beef I have with Taylor is that he failed to mention the International Radiocarbon Data Base (IRDB) despite the fact that he has been involved in its planning since 1985.

I close by quoting from one of Polach's entries, "A Skeptic View of Radiocarbon Dates" by Charles B. Hunt in 1956, "As it stands at present, discrepancies in the dates are numerous and the causes of the discrepancies are not fully understood. This means that dates must be viewed as suspect."



Old Bering style carving

Quantifying Archaeology, STEPHAN SHENNAN. x + 364 pages, 109 figures, 79 tables. 1988. North American publisher, Academic Press; European publisher, Edinburgh University Press. Cloth \$34.95.

Reviewed by Mark Aldenderfer, Department of Anthropology, Northwestern University

This is a welcome book destined to make an important contribution to the increasingly mature and sophisticated use of quantitative and statistical methods in archaeological research. Texts of such clear value have been rare in archaeology, and with the exception of David Hurst Thomas' recent updating of his book *Figuring Anthropology*, the other "standard" introductions to quantitative thinking in archaeology (Doran and Hodson's 1975 *Mathematics and Computers in Archaeology* and Orton's 1980 *Mathematics in Archaeology*) have been written for different audiences and are somewhat dated. Shennan states in the Preface (p. viii)

that the book is intended to be an introductory text for students with no statistical or mathematical background, and in general, he is highly successful in achieving his stated purpose. The book moves smoothly through presentations of basic descriptive statistics, a review of nominal variables and the use of the chi-squared statistic, bivariate statistics and regression, and finally, discussions of important multivariate methods that have seen much use in archaeology, including cluster analysis, principal components analysis, factor analysis, multidimensional scaling, and other, similar procedures. With minor exceptions, these presentations are well-conceived and clear, and one of the major strengths of the book is its use of examples. Most of them are unforced and resemble questions archaeologists might actually ask of their data. This is a pleasant departure from those introductory texts which confront students with rather contrived and unconvincing applications.

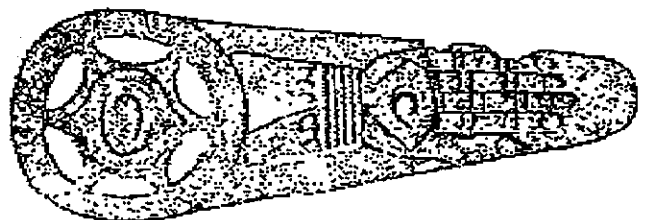
Despite these obvious strengths, however, there are some shortcomings in the text. I was disappointed by the introductory chapters (1 and 2). While the topics discussed in each were relevant and important, they did not seem to go far enough. For instance, a review of the place of quantitative procedures in archaeological research occupies only three short paragraphs (p.6). Similarly, EDA (exploratory data analysis) procedures, which have been strongly recommended by many as being particularly appropriate to the initial stages of archaeological research, receive only cursory treatment in Chapter 3. While all of us agree that archaeologists need more statistical training, there is a concomitant need for training in how to *think* about quantification in the first place. Archaeologists have long dodged the knotty problems of measurement—what to measure, how to measure, and above all *why* to measure. An introductory text would appear to be an ideal forum to raise these questions, but those interested in grappling with this issue will have to turn to other sources for satisfaction.

There is no discussion of spatial statistics whatsoever, a strange omission in a book that purports to be a primer of statistics for archaeologists. While the author acknowledges this omission (p.ix), he attempts to justify it by claiming that good texts for these methods exist elsewhere, citing Hodder and Orton's *Spatial Analysis in Archaeology*, a useful, but unfortunately dated volume. Since its publication, significant advances have been made in both theoretical and methodological domains of spatial analysis in archaeology, and some discussion of these advances in the book under review would have proved valuable.

Another, less damaging problem area is the discussion of numerical classification procedures. There is a continuation of the unfortunate conflation of numerical taxonomy and cluster analysis. As many authors have noted (myself included), the two are not intrinsically or necessarily re-

lated, and only one of the seven distinct families of clustering methods can in any sense be tied closely to the methodology of numerical taxonomy, a largely discredited approach to classification in the biological sciences. While the discussion of hierarchical agglomerative and iterative partitioning methods is thorough, including a much-needed section on the validation of a clustering solution, the author has failed to mention the large and still-growing literature on the critical evaluation of the performance of different clustering methods when confronted with data sets of known structure. Certain clustering procedures, such as Ward's method, seem to do better than others when confronted with data sets typical of many disciplines, whereas others, such as k-means analysis, are extremely sensitive to type of pass, type of starting partition, and other factors. Likewise, the performance of many similarity measures has been evaluated, and many recommendations regarding appropriate combinations of similarity measure and clustering method have been offered. While a detailed discussion of these topics is beyond the scope of the volume, the omission of any citation of this literature is disturbing.

These shortcomings, however, are not fatal, and I believe the text will fill a major gap in the archaeological literature. I say this, however, with a final caution. There are two ways to think about statistics and archaeology: one way, probably the most common, is to teach statistics to archaeologists. That is, standard statistical methods as routinely employed in the social sciences are translated into archaeological contexts. The best examples of this approach, such as this book, effectively and meaningfully show students how these methods can help archaeologists make sense of their data. The second approach, one that has yet to see the publication of a basic text, is to teach archaeological quantification. Ideally, this would include an extended discussion of the measurement process in archaeology and the relationship of quantification to research design, some thought about the emergence of a quantitative idiom in archaeology (the belief that problems are best posed and ultimately understood in quantitative terms), and, of course, a full presentation of statistical and quantitative methods in their application to archaeological problems. The difference between these two approaches might explain in part why the author decided to omit spatial techniques from the text. In this sense then, this book might best be renamed *Archaeological Statistics*, because a more comprehensive integration of quantitative thinking, statistics, and archaeology awaits the future.



Copper object, Moundville, Alabama

Pottery Analysis: A Sourcebook. PRUDENCE M. RICE. University of Chicago Press, Chicago and London, 1987, xxiv + 559 pp., figures, tables, glossary, references, index. \$45.00 (cloth).

Reviewed by Frederick R. Matson, Research Professor of Archaeology Emeritus, The Pennsylvania State University.

This is an essential book to have on one's archaeological ceramic reference shelf, providing critical summaries of published data with bibliographical resources for professional archaeologists and a pottery encyclopedia for students. It is well written, has good illustrations, carefully prepared figures and tables, and typographically is far more approachable than Shepard's long-valued *Ceramics for the Archaeologist*. Rice has done a fine job of topically integrating a large body of literature enriched by her critiques and syntheses. It is truly a sourcebook, as the title indicates, not a bible. This volume on archaeological and ethnographic pottery studies can be mined and reminded. Rice says in her Preface

"This book is about concepts and issues in the study of pottery Above all, this book deals with pottery as a source of insights into people and cultures it was prepared as a "sourcebook" — it is intended as a relatively broad reference work, but on some levels it must also act as an introduction to the subject This book attempts to weave the many approaches to pottery — field and laboratory, archaeological and ethnographic, technical and cultural, empirical and theoretical — into a single fabric the study of archaeological pottery has undergone many recent developments in technical elaboration and precision ... but there has not been a commensurate development in theory, or integrated approaches in analyzing and interpreting ceramic data, so that technical expertise can be optimally utilized."

She has been remarkably successful in approaching her objectives.

The book is organized into five parts of unequal length, comprising 15 chapters in all. At the end of each chapter there is a listing of references applicable to its contents. It would be helpful to the reader to review the Preface in which Rice discusses her objectives in writing *Pottery Analysis* and comments on each of the five parts.

Part 1, Introduction (25 pp.), consists of a brief selective overview of pottery and its history. One might quibble with the first sentence, "Pottery was the first synthetic material humans created," since Kingery and others have shown convincingly that plaster floorings and statuettes

were in use in the Near East long before there was archaeological evidence of pottery manufacture. One should refer to the definitions of *Pottery* and *Ceramics* in the Glossary, else the reader might be slightly confused, for Rice understandably uses the word ceramics for more than one of the four definitions of the term that she published. She briefly includes Chinese and European ceramics (stoneware and porcelain) as well as pottery (low-fired non-vitrified vessels made of clay) in her essay. She should have cited among her references a fine resource for ceramic history, *World Ceramics, An Illustrated History*, edited by Robert J. Charleston. (McGraw Hill Book Company, New York, 1968).

Part 2, the Raw Materials of Pottery Making (80 pp.), provides a useful introduction to the complex subject of the nature and properties of clays from their geological origins through their behavior when plastic, during drying, and finally when being fired. A serious student of pottery must have a background appreciation of these matters before undertaking the detailed analysis and interpretation of ancient pottery or of contemporary ethnographic studies of pottery manufacture. If one plans to test clays and sherds in a laboratory, knowledge of the materials covered in Part 2 is essential.

Rice emphatically cautions those wanting to study and test clays and potsherds that

"Chemical or mineralogical data on clays are not informative unless research questions are framed so that chemistry and mineralogy can provide answers.... In looking for answers, in ceramic studies as well as in other areas of research, it is important not to lose sight of the questions." (pp. 51-53).

Section 4.3.3, Some Considerations of Firing Technology (pp. 107-109), is essential reading for those who would seriously study pottery. Inclusion of or cross-reference to archaeological and ethnographic examples would be desirable. This might better integrate Part 2 with other parts of the book and make it more attractive and less obligatory reading for the student, but that is the author's decision to make.

Part 3, Pottery Manufacture and Use (194 pp.), will, for many archaeologists and ethnographers, be most valuable. A vast amount of mostly recent literature from many world regions is cited, often critically, in the five chapters that deal with: ethnographic pottery manufacturing, pottery economics - production and distribution, vessel function (form, technology and use), decorative styles and stylistic analysis, pottery classification and quantification, and finally assemblage composition and site formation processes. The discussions are enhanced by the use of good illustrations, diagrams and tabulations. It is obvious that examples reported from one village or culture cannot be

compared directly with those from another area, but knowing of them can provide useful insights in developing methodological approaches and in evaluating data. The time restrictions of longitudinal ethnographic pottery studies such as those of Longacre may well limit the nature of postulates that can be effectively tested elsewhere. The final chapter of Part 3 in which various methods of classifying pottery, estimating vessel equivalents, determining "the numbers and kinds of utensils that constitute the ceramic assemblages at household, site and community levels in prehistoric contexts" and the processes involved in site formation may be broadly useful to archaeologists with myriad concerns in addition to those generated by the excavation of potsherds.

Part 4, Characterization Studies of Pottery (138 pp.), might better be entitled Technological Characterization for in it are discussed ceramic ecology, sampling, color, porosity, hardness, strength, thermal stress, an extensive series of mineralogical, chemical and spectroscopic analytical techniques, and the use of the electron microscope. A final chapter is devoted to characterization of "temper," provenience studies, the estimation of firing temperatures and approaches to dating. This is quite a sizeable assignment, and it is done well. Each topic can be further pursued in more detail with the aid of the references given. M.L. Tite's *Methods of Physical Examination in Archaeology* (Seminar Press, London and New York, 1972) remains the basic reference work for many of the topics listed above aside from developments since about 1970 which can be followed in *Archaeometry* and *Art and Archaeology Technical Abstracts*. Rice's characterizations from the viewpoint of a technically trained ceramics archaeologist together with Table 13.1 which compares nine methods of physiochemical analysis serve as a good introduction to the several subjects. These chapters will be of use to those undertaking or directing laboratory analytical studies of pottery. In practice, however, the procedures chosen except in the best of academic or museum worlds, are determined by the interest and availability of scientifically trained colleagues who are using equipment suitable for the study of one's problems. Too much effort has been wasted on "exploratory studies" which quickly lead to a declining interest on the part of one's scientific collaborators. Rice offers a list of thirteen questions to be considered before selecting and initiating analytical procedures (pp. 373-374). I would add the too-often ignored follow-up of close cooperation and dialogue between the archaeologist and the analyst in the interpretation of results.

Part 5, Epilogue (21 pp.) is an interesting essay on continuity and change in pottery systems with respect to the societies in which they were operating. The cautionary implications will be of use to archaeologists concerned with testing theories based on their studies of ancient pottery in its social context.

The Glossary (15 pp.) is an extensive compilation of terms applicable to ceramic studies. Five specialized dictionaries were consulted in its preparation. It is an excellent working guide. A few definitions might be strengthened in the next edition. Problems of terminology always arise when archaeologists too freely make use of terms. I recall criticizing a good friend who was describing in print certain Greek pottery as polished, when in reality it was burnished. His response was that he used terms that suited his needs. Reference to Rice's definition of these terms in her Glossary, when they are compared, would make the difference clear. In practice, when one needs to make detailed comparisons between pottery that is under study and materials from other sites, the investigator arranges to physically examine such pottery or sherds, not relying completely on published reports with their terminologies. Perhaps it is time to renew a collaborative effort to agree upon comparable terms in several languages in addition to English, especially French, German, and Spanish. As we have all learned, dictionary definitions in another language can be misleading in an archaeological ceramic context. For publications in English, it would be helpful if Rice's Glossary were accepted and used without too much reluctance.

The extensive list of references (56 pp.) includes citations of books and articles largely published in the 60s, 70s and 80s. They in turn can often lead the reader back into the earlier literature. A quick scan indicates that there are only four or five citations each in French, German, and Spanish. This is not surprising in a book that is essentially oriented toward American research interests, including pertinent studies in many parts of the world.

Rice acknowledges assistance from two well-known solid state physicists with archaeometric interests - Alan Franklin and Wendell Williams - and from a ceramic ethnoarchaeologist - Warren DeBoer - as well as aid in the preparation of a figure and a table. Don Rice is recognized for his general assistance. There must have been a great deal of background aid in the preparation of this exceptionally well-organized book. The staff of the University of Chicago Press should be commended for their success in producing such a well-edited and typographically attractive book. These qualities greatly facilitate its use.

Reviewers try to avoid being influenced by their personal biases or specialized interests. However, they do address the portions of the volume which they feel they can best evaluate for the readers of the journal in which the review will appear. Thus, different facets of an important book will be mentioned in the several reviews. Since the SAS membership encompasses many archaeological and ethnological interests, I am listing the published reviews of *Pottery Analysis* of which I am aware. Dean E. Arnold's review is to appear in *Antiquity* 63: June (1989). Gordon Bronitsky is writing for *La Tinaja* 1:2-5 (1988). Charles C.

Kolb's review is in *American Scientist* 76:408-409 (1988), and he is also preparing a review for the *Journal of Field Archaeology*. D.P.S. Peacock's review appears in *American Journal of Archaeology* 93:143-144 (1989), while Robert L. Rands' is in *Science* 240:818-819 (1988).

One cannot expect perfection from the reviewer's standpoint in such a massive one-author volume. However, I

found few items with which I seriously disagreed. Such points can best be discussed with the author when a revised edition is prepared in another decade when further syntheses and applications of theoretical concepts may have appeared. This is an outstanding sourcebook for those concerned with the study of ancient pottery in its cultural framework or with the ways of contemporary village potters.

Laboratory Profile

Conservation Analytical Laboratory Smithsonian Institution

The Conservation Analytical Laboratory (CAL) of the Smithsonian Institution was established in 1963 as a laboratory for conservation and analysis of Smithsonian collections. CAL has now grown to a full-time staff of forty and, under the direction of Dr. Lambertus van Zelst, has activities carried out in three departments: archaeometry, conservation science and conservation treatment.

The Department of Archaeometry was established within CAL in 1983 under Jacqueline Olin, who was recently appointed as Assistant Director for Archaeometric Research. The department is concerned with research in archaeological studies of provenience and ancient technology as well as in art historical studies involving neutron induced autoradiography and methods of examination of paint sections and samples.

Studies involving data derived from laboratory studies are used in close conjunction with archaeological information to characterize selected New World ceramics in order to assess the (1) relationship of targeted settlements to the flow of ceramic goods and information; (2) relationship of environmental resources to production and distribution; (3) relationship of craft specialization to exchange; (4) extent of ceramic fall off versus presence of social boundaries and (5) the extent of independence of technological development versus cultural filtration. Current inter-institutional collaborative programs include those in the American southwest (Hopi Yellow-firing pottery, 1300-1890 A.D.; Zuni Matsaki Polychrome, Mimbres Black-on Yellow; production at Chodistaas Pueblo, Arizona); the Maya region (Palenque region, Chiapas; Maya Polychrome production and hieroglyphic content; warfare and change in the Petexbatun region; Guatemala, Formative-Classical transition on the Guatemalan Pacific Coast); Lower Central America (Greater Nicoya Ceramic Survey; cultural development and filtration in Nicaragua; ceramic production and exchange in Honduras); and Peru (Pikillacta Cuzco Valley, Lower Mantaro Valley).

Chemical characterization by neutron activation analysis is used to identify geological sources of obsidian artifacts

and thereby construct models of exchange systems in the ancient Near East and their modifications through time. The site of Umm Qseir was chosen for study because its location, on the central Habur River in Northern Syria, places it on a proposed major obsidian exchange route from the Lake Van Region in Turkey to the Levant. Also three regions in the Trans-Caucasian area of the southern Soviet Union, corresponding roughly to the modern republics of Georgia, Armenia, and Azerbaijan are being studied. The Georgian SSR region contains a single known obsidian source near Lake Paravani in the southern highlands. The Armenian SSR region contains at least 5 chemically distinct obsidian sources located at Mt. Aragats and to the south and east of Lake Sevan. There are no known obsidian sources in the Azerbaijan SSR, however, there is access to the eastern Armenian sources and to a proposed source to the south in Iranian Azerbaijan.

INAA and lead isotope ratio analyses are being used in the studies of Spanish and Spanish Colonial ceramics, especially majolica, to address the issue of Spanish and New World supply of the colonies during the 16th and 17th centuries. The 15th and early 16th century Spanish conquest in the New World relied on an *encomienda* strategy that evolved during the conquest of Islamic Spain. An alternative mission strategy also existed in the New World and was carried out by the Franciscans and other monastic orders. Artifacts from production sources in Spain and the New World as well as from military and mission sites in the New World are being analyzed in an effort to address questions regarding the source of production of ceramics supplied to these sites. In addition, information regarding the organization of ceramic production in the New World is being addressed specifically with regard to when production began and where raw materials, such as lead, were obtained. Lead isotope studies have shown that lead used in Spanish Colonial ceramic glazes of the sixteenth century was obtained in Mexico.

Other research at CAL involves reconstructing the fabrication methods of ancient ceramics from macro- and microstructure and measurements of the properties of raw materials and finished objects in order to understand the complex of behavior involved in their production. Current studies include investigation of how the fabrication and firing technology of Upper Paleolithic ceramic figurines

from Dolni Vestonice, Czechoslovakia, are related to their use and of the conditions which produced a ceramic technology without pottery at 26,000 B.P. Another study involves determination of how Neolithic plaster technology evolved into pottery technology at the Neolithic period site of Abu Hureyra in Syria. The processing evidence from faience workshops and industrial debris of the second millennium B.C. at Harappa, Chanu-daro, Kerma and other sites is leading to an understanding of regional differences in the technological development of glassy materials. Some interactions involving technology transfer between China, Korea and the Near East during the early Islamic or Tang to Song periods are being studied. In addition, a study of the recently discovered third millennium B.C. glass beads from Nippur is underway.

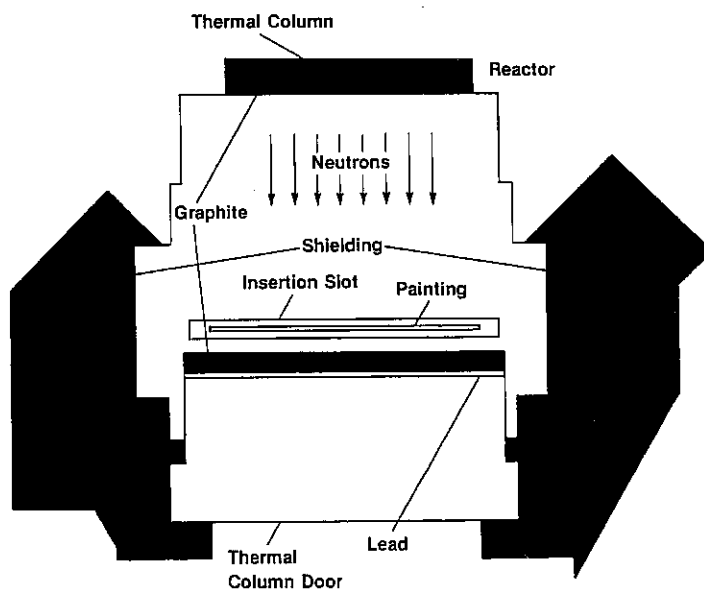
In conjunction with a projects aimed at reproducing music wire of the sort used on harpsichords and other musical instruments in the 18th century, surviving samples of antique harpsichord wire have been characterized for properties such as strength, stiffness and internal damping which are significant in terms of sound a wire string produces. This project has required research into the history of wire making, such as the special procedures for the control of alloying during the smelting and refining of iron for wire making.

Current projects in art historical studies include the preparation of a manuscript based on neutron induced autoradiography studies of paintings by Thomas Wilmer Dewing (1851-1938) and the preparation of materials for an exhibition of paintings by Albert Pinkham Ryder (1847-1917). One section of the exhibition devoted to Ryder's technical methods will present results of a study using autoradiography. These results have given evidence of usefulness in understanding the physical structure of Ryder's paintings; many paintings have deteriorated and show severe cracking. Autoradiography shows the extent and location of the cracking patterns that occur at different depths within the paint structure. The thermal column of the research reactor at the National Institute of Standards and Technology is being modified by the CAL to be used for neutron induced autoradiography of paintings.

Post-doctoral Fellowships in Materials Analysis were established in 1976. These fellowships have been awarded annually since that time and are for research on problems in the application of techniques of the physical sciences to problems in art history, anthropology, archaeology, and the history of technology. A number of the current research programs of the Archaeometry Department have

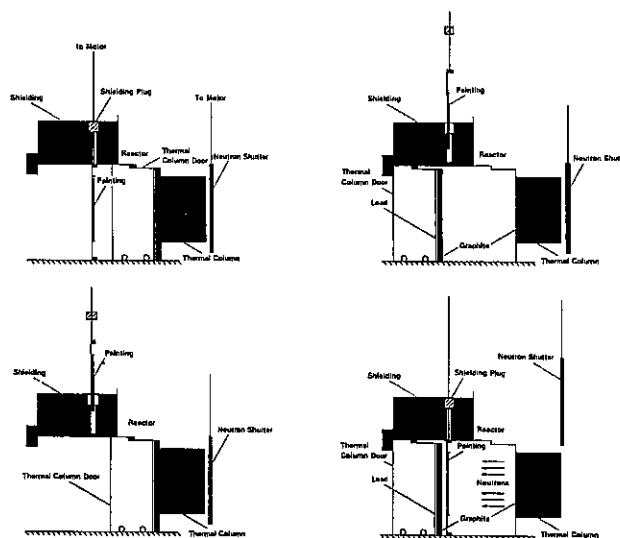
developed from projects begun by post-doctoral fellows. Others are research areas which staff members had pursued as the research of their graduate or post-graduate studies or they have developed at CAL as an outgrowth of studies of Smithsonian collections and related materials. Information regarding these fellowships is available from the Office of Fellowships and Grants, Smithsonian Institution, Washington, D.C. 20560. Projects of current Fellows are "The Role of Regional Systems of Ceramic Production and Exchange Processes of Third Millennium BC Urban Development at Tell Leilan (Syria): A Ceramic Compositional Analysis" and "The Archaeometallurgy of Ancient Anatolia."

The Conservation Science Department under Dr. Marion Mecklenberg, Assistant Director for Conservation Research, has programs in the following areas: the deterioration and preservation of materials and specimens found in natural history museums in order to better preserve them (especially type specimens) for morphological research and exhibition and to protect their molecular information; the identification of the constituent materials of early photographic plates, prints and processes to determine the mechanisms of chemical and environmentally induced mechanical degradation; the development of historical information on the technology of modern plastics and elastomers and the chemical aging and degradation processes and recommendations for the treatment of objects; studies of the mechanical properties of artistic and cultural materials with special attention to the effects of shock and vibrations on the stability of art objects in transit; the definition of the chemical, mechanical and physical effects of solvents used to remove varnish coatings on painting design layers in order to determine the



Plan view of the painting activation port, National Institute of Standards and Technology's research reactor.

potential hazards and provide information leading to safer approaches to the removal of disfiguring surface coatings and accretions on paintings; and the correlation of accelerated aging to the natural chemical aging of cellulose.



Four steps of painting activation procedure, counter-clockwise from upper left.

polarizing and metallographic microscopes. In addition, facilities available for research through collaboration with other institutions include neutron activation analysis and neutron induced autoradiography, isotopic mass spectrometry,

Within the Conservation Science Department of CAL, the Biogeochemistry Program is carrying out research concerning the deterioration and preservation of calcified tissue such as bone, shell and paleobiological material. And in conjunction with this program, there is research underway concerning dietary habits, ancient disease states, and genetic markers from archeologically derived tissue protein.

The research efforts of the staff in the Conservation Treatment Department are directed especially at the development and improvement of conservation treatment technology. The conservators in this department, all specialists in particular groups of materials and types of objects, perform actual treatments of Smithsonian collection items, especially those presenting such complicated problems that the highly specialized scientific skills and facilities present at CAL are needed in order to find a solution.

Research at CAL is carried out using the Laboratory's own facilities at the Museum Support Center of the Smithsonian as well as through collaboration with the National Institute of Standards and Technology, Brookhaven National Laboratory, Carnegie Institution of Washington and other institutions, when appropriate. The Smithsonian Archaeometric Research Collections and Records (SARCAR) is a research database for chemical, physical, metallographic, petrographic and other data from archaeological research samples and provides a repository for the related archaeometric research samples. The laboratory facilities of CAL include infrared spectrometry, differential thermal analysis and thermogravimetric analysis, X-ray diffraction and X-ray radiography, gas chromatography, gas-chromatograph-mass spectrometry, direct current plasma-optical emission spectroscopy, scanning electron microscopy, electron microprobe and X-ray fluorescence analysis, and

and thermoluminescence dating. Several members of the CAL staff hold Guest Worker or Research Associate appointments at the National Institute of Standards and Technology and the Carnegie Institution of Washington.

The present staff of the Archaeometry Department includes Ingrid Alexander, Art Historian; Ronald L. Bishop, Sr. Research Archaeologist; M. James Blackman, Sr. Research Chemist; Yu-Tarng Cheng, Sr. Research Physicist; Martha Goodway, Metallurgist; Emile Joel, Chemist; and Pamela Vandiver, Sr. Ceramic Scientist. The Conservation Science staff includes David W. von Endt, Organic Chemistry Group Leader; Mary T. Baker, Research Organic Chemist; David W. Erhardt, Research Organic Chemist; Melanie E. Feather, Electron Microscopist; Walter R. Hopwood, Organic Chemist; Mark H. McCormick-Goodhart, Photographic Scientist; Noreen C. Tuross, Research Biochemist; and Harold Westley, Chemist. The conservation staff is Mary W. Ballard, Sr. Textile Conservator; Roland H. Cunningham, Sr. Paintings Conservator; Jia-Sun Tsang, Paintings Conservator; Carol A. Grissom, Sr. Objects Conservator; Harriet F. Beaubien, Objects Conservator; Timothy J. Vitale, Sr. Paper Conservator; Dianne van der Reyden, Sr. Paper Conservator; Marc A. Williams, Sr. Furniture Conservator; and Donald Williams, Sr. Furniture Conservator.

Research Associates, Visiting Scientists, Research Collaborators and 1988-89 Materials Analysis Fellows are: Veletta Canouts, P.E. Hare, Susan Hobbs, David Kingery, Robert M. Organ, Edward V. Sayre, and Rita P. Wright; Emlen Myers; Fernando Amores, Patty Crown, Robert Ehrenreich, Rosemary Gianno, Bonnie McEwan and Hector Neff; Gil Stein and Aslihan Yener.

Jacqueline Olin, CAL MSC, Smithsonian Institution, Washington, D.C. 20560

Meetings Calendar

New listings are marked by a *. Many meetings can only be listed in one issue, due to space limitations. The Meetings Calendar editor receives additional information for many of the listed meetings. You may contact him, preferably by BITNET, for further details.

Summer. Gordon Research Conferences. New Hampshire. Dr. Alexander M. Cruikshank, Director, Gordon Research Conferences, Gordon Research Center, University of Rhode Island, Kingston, RI 02881-0801 (401-783-4011). See *Science*, 3/3/89 for program, which includes: Analytical Chemistry, Aug. 7-11; Applied and Environmental Microbiology, July 24-28; Bones and Teeth, July 10-14; Calcium Phosphates, July 24-28; Solid State Studies in Ceramics, Aug. 14-18; Fiber Science, July 3-7; Inorganic Chemistry, July 31-Aug. 4; Inorganic Geochemistry, Aug. 14-18; Chemistry at Interfaces, July 17-21; Chemistry and Physics of Liquids, Aug. 14-18; Organic Reactions and Processes, July 17-21; Physical Metallurgy, Aug. 7-11; Statistics in Chemistry and Chemical Engineering, July 31-Aug. 4; Three Dimensional Electron Microscopy of Macromolecules, June 19-23; X-ray Physics, Aug. 7-11.

July

- * July 9-15. 31st International Congress of International Union of Physiological Sciences. Helsinki. Prof. Osmo Hanninen, Secretary General, PO Box 722, 00101 Helsinki, Finland.
- * July 10-14. 4th International Conference on Electron Microscopy. Honolulu. G.E. McGuire, Microelectronics Center of North Carolina, PO Box 12889, Research Triangle Park, NC 27709.
- * July 23-24. International Symposium on Computer-Aided Materials Characterization. Charlotte. R. Biederman, Worcester Polytechnic Institute, Worcester, MA 01609 (508-831-5453).
- * July 23-28. Micronutrients: Trace Elements. Saxtons River, Vermont. Dr. Robert W. Krauss, Executive Director, FASEB (Federation of American Societies for Experimental Biology) Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814.
- * July 24-26. 42nd Annual Summer Symposium on Analytical Chemistry - Surface Science in Analytical Chemistry. Blacksburg, Virginia; sponsored by the American Chemical Society. Pat Smith, Chemistry Department, Virginia Tech, Blacksburg, VA 24061.
- * July 24-28. Environmental Applications of Gas Chromatography/Mass Spectrometry, Short Course.

Bloomington. Executive Education Program
Indiana University, SPEA 410H, Bloomington, IN
47405 (812-855-0193).

- * July 24-Aug. 3. Modern Topics in Electronics Imaging. Rochester. Margaret Evans, One Lomb Memorial Drive, Rochester, NY 14623 (716-475-5944).
- * July 31-Aug. 5. Europhysics Study Conference on Physics Education: Interdisciplinary Aspects of Physics Education. Altmunster/Taunsee, Austria. H. Kuhnelt, Institut fur Theoretische Physik, Universitat Wien, Boltzmanngasse 5, A-1090 Wien, Austria.

August

- * Aug. 2-5. 7th International Congress on Mathematical and Computer Modeling. Chicago. Xavier J. R. Avula, Department of Mechanical and Aerospace Engineering, University of Missouri-Rolla, Rolla, MO 65401 (314-341-4661).
- * Aug. 2-7. 32nd Congress of International Union of Pure and Applied Chemistry. Stockholm. Stockholm Convention Bureau, PO Box 6911, S-10239, Stockholm, Sweden.
- * Aug. 6-10. Symposium on Coastal-barrier Biosphere Reserves on the US Atlantic Coast. Toronto. W. Gregg, US-MAB 8 Directorate, National Park Service, Washington, DC 20240.
- * Aug. 6-11. Symposium on Innovation in Measurement Science. Geneva, NY. Instrument Society of America, 67 Alexander Drive, PO Box 12277, Research Triangle Park, NC 27709 (919-549-8411).
- * Aug. 10-12. International Conference on Computational Techniques and Applications. Brisbane, Australia. School of Environmental Studies, Griffith University, Nathan, Queensland 4111, Australia.
- * Aug. 15-18. Workshop on the Design and Analysis of Multistage Population Studies. Denver. Lyman L. McDonald, Associated Western Statisticians, 2317 Sherman hill Road, Laramie, WY 82070.
- * Aug. 20-27. 32nd Symposium of the International Association for Vegetation Science: Forests of the World. Uppsala, Sweden. Prof. E. van der Maarel, IAVS, Institute of Ecological Botany, Uppsala University, Box 559, 75122 Uppsala, Sweden.
- * Aug. 27-31. 5th Interdisciplinary Laser Science Conference. Stanford. Jim Spellos, American Physical Society Meetings Department, 335 E. 45th Street, New York, NY 10017 (212-682-7341).
- * Aug. 28-Sept. 1. 12th International Congress on X-ray Optics and Microanalysis. Cracow, Poland. 12th ICXOM, Institute of Metallurgy, Academy of Mining and Metallurgy, al. Mickiewicza 30, Pl-30-059, Cracow, Poland.
- * Aug. 28-Sept. 1. X-ray Spectrometry, Short Course. Albany, NY. Henry Chessin, Department of Physics, State university of New York at Albany, 1400 Washington Avenue, Albany, NY 12222 (518-

442-4512).

- * Aug. 31-Sept. 6. 5th International Symposium on Palaeolimnology. Ambleside, UK. Professor F. Oldfield, Department of Geography, Liverpool University, PO Box 147, Liverpool L69 3BX, United Kingdom.

September

- * Sept. 3-9. 9th International Symposium on Environmental Biogeochemistry. Moscow. Mikhail V. Ivanov, Director, Institute of Microbiology, Prospekt 60-Letiya Oktyabrya 7, 117811, Moscow, USSR. Possible travel assistance for U.S. participants; contact G. Stotzky, Department of Biology, 1006 Main, New York University, New York, NY 10003.
- * Sept. 5-8. 3rd European Simulation Conference. Edinburgh, Scotland. United Kingdom Simulation Council, c/o D. J. Murray-Smith, Department of Electronics and Electrical Engineering, University of Glasgow, Glasgow G12 800, Scotland, United Kingdom.
- * Sept. 10-15. 3rd European Conference on the Spectroscopy of Biological Materials. Bologna. A. Bertoluzza, Dipartimento di Biochimica, Centro di Studio Interfacolta sulla Spettroscopia Raman, Via Selmi, 2, 40126 Bologna, Italy.
- * Sept. 13-15. Remote Sensing Society Annual Conference. Bristol. Krystyna Brown, Remote Sensing Unit, Department of Geography, University of Bristol, University Road, Bristol BS8 1SS, U.K.
- * Sept. 18-22. 37th Symposium of Vertebrate Palaeontology and Comparative Anatomy. Leicester, UK. M. A. Taylor, Leicestershire Museums, 96 New Walk, Leicester LE 1 6TD, United Kingdom.
- * Sept. 25-27. SSA-IMACS 1989 Biennial Conference on Modelling and Simulation. Canberra, Australia. SSA-89 Secretariat, A. J. Jakeman, Centre for Resource and Environmental Studies, Australian National University, GPO Box 4, Canberra ACT 2601, Australia (062-49-4277). Topics include: Ecosystem modelling; Modelling for forestry and agriculture.

October

- * Oct. 11-13. 5th Annual Scientific Computing and Automation Conference and Exposition. Philadelphia. Don Weise, 301 Gibraltar Drive, PO Box 650, Morris Plains, NJ 07950-0650 (201-292-5100).
- * Oct. 15-20. Soil Science of America Annual Meeting. Las Vegas. SSA, 677 S. Segoe Road, Madison, WI 53711 (608-273-8080).
- * Oct. 16-19. 6th Latin-American Regional Astronomy Meeting. Rio Grande do Sul, Brazil. Jacques Lepine Instituto Astronomico e Geofisico USP, Caixa Postal 30627, 01051 Sao Paulo, SP Brazil.
- * Oct. 18-21. Pacific Conference on Chemistry and Spec-

troscopy. Pasadena. Harold Goldwhite, Program Chairman-American Chemical Society, Department of Chemistry, California State University, Los Angeles, CA 90032 (213-343-2300). Abstract deadline: 7/19/89.

- * Oct. 23-26. Beijing International Conference on System Simulation and Scientific Computing. Beijing. BICSC Conference Secretary Group, Automatic Control Department, Beijing Institute of Aeronautics and Astronautics, Beijing 100083, China.

November

- Nov. 2-3. Diseases and Demographics of Pre-Columbian Peoples of America. Washington, DC. Thomas Harney, Public Information Officer, National Museum of Natural History, Smithsonian Institution, 10th & Constitutional Avenue NW, Washington, DC 20560 (202-357-2458).
- Nov. 6-9. Geological Society of America, Annual Meeting. St. Louis. GSA, 3300 Penrose Place, Boulder, CO 80301 (303-447-8851). Includes pre-meeting field trip on Archaeological Geology and Geomorphology in the Central-Mississippi-Lower Illinois Valley Region, Illinois and Missouri. See SAS Bulletin, 12(1), for details.
- * Nov. 8-11. Tampa. 51st Annual Meeting for the Southeastern Archaeological Congress. Nancy White, Department of Anthropology, University of South Florida, Tampa, FL 33620 (813-974-2209). Abstract deadline: 8/31/89.
- * Nov. 12-15. National Computer Graphics Association Mapping and Geographic Information Systems. Los Angeles. National Computer Graphics Association, 2722 Merrilee Drive, Suite 200, Fairfax, VA 22031 (703-698-9600). Conference and exposition for users and vendors of products and services for automated mapping and GIS.
- Nov. 15-19. American Anthropological Association, Annual Meeting. Washington, DC. AAA, 1703 New Hampshire Ave. NW, Washington, DC, 20009 (202-232-8800). Abstract deadline: 4/1/89.
- Nov. 19-23. Conference in Honor of Professor Thurston Shaw. Ibadan, Nigeria. Kit Wesler, Wickliffe Mounds Research Center, PO Box 155, Wickliffe, KY 42087 (502-335-3681). Theme: Fifty Years of Archeology in Africa. Visits to sites.
- Nov. 22-24. 1st European Conference on Materials Science and Technology; sponsored by the Federation of European Materials Societies. Aachen, FRG. Deutsche Gesellschaft fur Metallkunde Ev, Adenaueralee 21, D-6370 Oberursel, Federal Republic of Germany (06171). Abstract deadline: 2/28/89.
- * Nov. 27-Dec. 2. Materials Research Society Fall Meeting. Boston. Gary L. McVay, Pacific Northwest Laboratories, PO Box 999, Richland, WA 99352 (509-375-3762). Abstract deadline: 7/1/89.

December

- Dec. 4-8. American Geophysical Union Fall Meeting. San Francisco. A. Fred Spilhaus, Jr., Executive Director, AGU, 2000 Florida Avenue NW, Washington, DC 20009 (202-462-6903).
- * Dec. 17-22. International Chemical Congress of Pacific Basin Societies. Honolulu. Pacificchem '89 Secretariat, American Chemical Society, 1155 16th St. NW, Washington, DC 20036 (202-872-8069). Abstract deadline: 4/28/89.
- * Dec. 18-20. Theoretical Archaeology Group, Annual Meeting. Newcastle upon Tyne, UK. TAG Organizing Committee, Department of Archaeology, University of Newcastle upon Tyne, Newcastle upon Tyne, NE1 7RU, United Kingdom.
- Dec. 27-30. Archaeological Institute of America, Annual Meeting. Boston. Joan Bowen, Director, AIA, 675 Commonwealth Avenue, Boston, MA 02215 (617-353-9361).
- Dec. 27-30. American Society of Zoologists Joint Annual Meeting; cosponsors include the American Microscopical Society and the Society of Systematic Zoology. Boston. Mary Adams-Wiley, Executive Officer, American Society of Zoologists, 104 Sirius Circle, Thousand Oaks, CA 91360 (805-492-3585). Abstract deadline: 8/4/89.

January 1990

- * Jan. 9-13. 175th Meeting of the American Astronomical Society. Washington, DC. AAS, 2000 Florida Avenue NW, Suite 300, Washington, DC 20009.
- * Jan. 11-13, 1990. Society for Historical Archaeology Conference on Historical and Underwater Archaeology. Tucson. Edward Staski, SHA Program Chair, Department of Sociology/Anthropology, Box 3BV, New Mexico State University, Las Cruces, NM 88003. Abstract deadline: 5/10/89.

February

- Feb. 5-9. Topical Meeting on Laser Applications to Chemical Analysis. Incline Village, NV. Optical Society of America, Meetings Department, 1816 Jefferson Place NW, Washington, DC 20036 (202-223-0920).
- * Feb. 18-24. Mathematische Modelle in Der Biologie. Oberwolfach, Federal Republic of Germany. Mathematisches Forschungsinstitut Oberwolfach Geschäftsstelle, Alberstrasse 24, D-7800 Feiburg im Breisgau, Federal Republic of Germany.

March

- * March 5-7. SIAM (Society for Industrial and Applied Mathematics) Conference on Applied Probability in Science and Engineering. New Orleans. SIAM Conference Coordinator, Suite 1400, Archi-

facts Building, 117 S. 17th St., Philadelphia. PA 19103-5052 (215-564-2929).

- * March 29-April 1. Northeastern Anthropological Association Annual Meeting. Burlington. Stephen Pastner, Program Chair, Department of Anthropology, University of Vermont, Burlington, VT 05405-0168 (802-656-3884). Proposal deadline: 12/15/89.

April

- * April 1-6. 74th Annual Meeting of the Federation of American Societies for Experimental Biology. Washington, DC. FASEB Office of Scientific Meetings, 9650 Rockville Pike, Bethesda, MD 20814.
- April 2-6. International Symposium on Archaeometry. Heidelberg. Archaeometrie, E. Pernicka, Max-Planck-Institut für Kernphysik., Postfach 10 39 80, D-6900 Heidelberg, Federal Republic of Germany. Abstract deadline: 11/1/89. Symposia include: dating of organic and inorganic materials; prospecting; provenance studies; technology; mathematical and statistical methods; one-day theme session on Chronology and Environment of Early Man - The Archaeometric Approach.
- April 4-6. Climate Change on the Great Plains. Lincoln. Ken Dewey, Center for Great Plains Studies, 1213 Oldfather Hall, University of Nebraska, Lincoln, NE 68588-0314. Proposal deadline: 7/1/89.
- * April 5-9. Society for American Archaeology Annual Meeting. Las Vegas. SAA, 1511 K St. NW, Suite 716, Washington, DC 20009 (202-223-9774).
- April 16-20. Materials Research Society Spring Meeting: Material Issues in Art and Archaeology. San Francisco. Pamela Vandiver, Research Physical Scientist, Smithsonian Institution Conservation Analytical Lab, Museum Support Center, Washington, DC 20560 (301-238-3700). Topics: Ancient technology - Processing evidence from workshops and industrial debris; Analysis of properties to interpret function; Materials degradation; Characterization through compositional and structural analysis.
- * April 18-22. Society for American Archaeology, 55th Annual Meeting. Las Vegas. James Moore, Program Chair, Department of Anthropology, Queens College, 65-30 Kissena Boulevard, Flushing, NY 11367. Abstract deadline: 10/1/89.
- * April 19-22. American Association of Geographers Annual Meeting. Toronto. AAG, 1710 16th St. NW, Washington, DC 20009 (202-234-1450).
- April 23-27. General Assembly of the European Geophysical Society. Copenhagen. EGS Office, Postfach 49, D-3411 Katlenburg-Lindau, Federal Republic of Germany. Abstract deadline: 1/31/90.

May

- May 21-25. 6th International Conference on Archaeozoology. Washington, DC. The International Council for Archaeozoology, c/o Department of Anthropology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560. See SAS Bulletin, 12(1), for details.
- * May 28-June 1. 6th International Conference on Hunting and Gathering Societies. Fairbanks. Linda Ellanna, CHAGS 6, Anthropology Department, University of Alaska, Fairbanks, AK 99775.
- * May 29-June 1. American Geophysical Union Spring Meeting. Baltimore. AGU Meetings, 2000 Florida Avenue NW, Washington, DC, 20009 (202-462-6900).

Summer/Fall, 1990

- * July 1-7. Society for the Study of Evolution Annual Meeting. College Dr. Barbara A. Schaal, SSE Executive Vice-President, Department of Biology Washington University, St. Louis, MO 63130 (314-889-6822).
- * Aug. 6-9. 1990 Joint Statistical Meetings; co-sponsored by the American Statistical Association, the Biometric Society, and the Institute of Mathematical Statistics. Washington, DC. ASA, 1429 Duke St., Alexandria, VA 22314-3402 (703-684-1221).
- * Aug. 19-25. 20th Meeting of the Federation of European Biochemical Societies. Budapest. 20th FEBS Meeting Secretariat, Hungarian Biochemical Society, MTESZ, Budapest 1368, PO Box 240, Hungary.
- * Aug. 28-30. IMACS European Simulation Meeting on Problem Solving by Simulation. Esztergom, Hungary. A. Javor, Central Research Institute for Physics of the Hungarian Academy of Sciences, H-1525 Budapest 114, PO Box 49, Hungary.
- * Sept. 4-8. 8th General Conference of the European Physical Society. Amsterdam. L. Roos, FOM-Institute for Atomic and Molecular Physics, PO Box 41883, NL-1009 DB Amsterdam, The Netherlands.
- * Sept. 24-29. 7th International Conference on Geochronology, Cosmochronology, and Isotope Geology Meeting. Canberra. Organizing Committee IGOC7, Research School of Earth Sciences, Australian National University, Box 4, Canberra, ACT 2601, Australia.
- * Oct. 8-12. 5th Australasian Remote Sensing Conference. Perth. Golden West Conventions, PO Box 411, West Perth, Western Australia 6005, (619-3227922).
- * Oct. 21-26. Soil Science Society of America Annual Meeting. San Antonio, Texas. SSA, 677 S. Segoe Road, Madison, WI 53711 (608-273-8080).

- * Oct. 29-Nov. 1. Geological Society of America Annual Meeting. Dallas. GSA Meeting Department, PO Box 9140, Boulder, CO 80301 (303-447-2020).
- * Nov. 14-18. American Anthropological Association Annual Meeting. New Orleans. AAA, 1703 New Hampshire Ave. NW, Washington, DC 20009 (202-232-8800).
- * Dec. 2-9. 20th International Ornithological Congress. Christchurch, New Zealand. Ben D. Bell, Secretary-General, XX International Ornithological Congress, Zoology Department, Victoria University, Private Bag, Wellington, New Zealand.
- * Various dates, 1989. Professional short courses. York, UK.
- Oct. 13. Level IV Reports and Desk-Top Publishing.
- Oct. 17 Soils for the Archaeologist
- Nov. 16-17. Computer Graphics in Archaeology S. Garside-Neville, Professional Studies Secretary, Department of Archaeology, Micklegate House, Micklegate, York, YO1 1JZ (0904-652272).

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

TL & ESR Seminar

The 6th Specialist Seminar on TL and ESR Dating will be held in Clermont-Ferrand from July 2-6, 1990. Clermont-Ferrand is located in the Massif Central, 380 km south of Paris. The aim of the Seminar is to bring together active research workers in the fields of thermoluminescence and electron spin resonance dating.

The Seminar will be sponsored by the French committee for the International Quaternary Union (INQUA) and the International Union for Pre- and Protohistoric Sciences (UISPP). Oral sessions will be preferentially devoted to techniques and problems, while dating applications should be presented on posters. To make allowance for review papers, the number of oral presentations will be limited to 60 (no more than one per participant). The total number of publications (including posters and oral presentations) will be limited to 140.

All sessions will be held in the Congress House (La Maison des Congrès) situated in the center of Clermont-Ferrand. Accommodation will be provided at Hotel Coubertin, close to the Congress House. Those interested in attending the Seminar and who have not yet received the first circular are requested to apply to the organizers: Jean FAIN, Didier MIALLIER, Laboratoire de Physique Corpusculaire (associé au CNRS-IN2P3), Université Blaise Pascal, F-63177, AUBIERE CEDEX (FRANCE).



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ABONNEMENT 1989

REVUE D'ARCHEOMETRIE

N° 13

En renvoyant le bulletin de commande joint, vous pouvez souscrire dès à présent votre abonnement 1988 à la REVUE D'ARCHEOMETRIE. Celui-ci assure la réception du N°13. Le prix de l'abonnement 1988 a été fixé à 115 F *franco de port*.

Par ailleurs, nous attirons votre attention sur le fait que certains numéros anciens de la REVUE D'ARCHEOMETRIE s'épuisent. C'est déjà le cas des N° 1, 4, 5 et du supplément C-14 ; ce sera aussi le cas du supplément S (1981, 360 pages) dans très peu de temps. N'hésitez pas à compléter vos collections. Les numéros épuisés ne feront pas systématiquement l'objet de rééditions.

Pour recevoir le N°13 - 1989 (environ 100 pages et 10 articles) de la REVUE D'ARCHEOMETRIE ou les numéros anciens, n'oubliez pas de joindre au bulletin de commande le règlement correspondant, établi à l'ordre du G.M.P.C.A.

L. LANGOUET

BULLETIN DE COMMANDE

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Pour toute correspondance concernant la REVUE D'ARCHEOMETRIE, écrire à :
Loïc LANGOUET, Laboratoire d'Archéométrie, Université de Rennes, 35042 RENNES Cédex

SAS

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SAS BULLETIN

Society for Archaeological Sciences

Editorial Staff

Editor: Patrick Martin

Department of Social Sciences
 Michigan Technological University
 Houghton, MI 49931
 Office (906) 487-2070 Dept. (906) 487-2113
 BITNET: PEM-194@MTUS5

Archaeological Chemistry: Joseph B. Lambert

Department of Chemistry
 Evanston, IL 60201
 Office (312) 491-5437 Dept. (312) 491-5372
 BITNET: CHEMDEPT@NUACC

Archaeometallurgy: Martha Goodway

CAL MSC, Smithsonian Institution
 Washington, DC 20560
 Office (301) 238-3733 Dept. (301) 238-3700
 FAX: (301) 238-3667

Book Reviews: Prudence Rice

Department of Anthropology
 University of Florida
 Gainesville, FL 32611
 Office (904) 392-7189
 BITNET: DHDYGJ3@NERVM

Environmental Archaeology: David R. Yesner

Department of Anthropology
 University of Alaska
 3211 Providence Dr.
 Anchorage, AK 99508
 Dept. (907) 786-1375

Geoarchaeology: Julie K. Stein

Department of Anthropology
 University of Washington
 Seattle, WA 98195
 Office (206) 543-9604

Meeting Calendar: Rob Sternberg

Department of Geology
 Franklin and Marshall College
 Lancaster, PA 17603
 Office (717) 291-4134
 BITNET: R_STERNBERG@FANDM

Remote Sensing: James I. Ebert

Ebert & Associates
 3100 Ninth St. N.W.
 Albuquerque, NM 87107
 Office (505) 344-9676

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Department of Anthropology
 University of Wisconsin
 Madison, WI 53706
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Department of Geology
 Franklin and Marshall College
 Lancaster, PA 17603
 Office (717) 291-4134
 BITNET Address: R_STERNBERG@FANDM

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Radiocarbon Laboratory
 University of California
 Riverside, CA 92521 U. S. A.
 Office (714) 787-5521
 BITNET: RETAYLOR@UCRVMS

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