International Association for Obsidian Studies Newsletter

Number 5 **Summer/Fall 1991**

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Assembled and edited by K. Tremaine and R. Jackson

CONTENTS

NEWS AND INFORMATION

Sexy Slides and Videotapes

Got your attention, didn't it? Videotapes documenting obsidian study methods are planned for production by the IAOS as instructional aids to institutions. This idea arose from a videotape produced by Yosemite National Park staff during an obsidian hydration training session with IAOS member Rob Jackson. The video proved quite useful in providing fledgling hydration laboratory technicians with a review of information presented during the training session. The many training sessions now conducted by IAOS institutional members have demonstrated that there are many subtle and unarticulated techniques in thin section preparation that can be effectively captured on film.

Possibilities for taping include: (1) hydration slide preparation and measurement procedures; (2) obsidian sourcing methods; and (3) obsidian research potential and interpretation of data. Tom Layton has volunteered to coordinate this venture. If you have any interest in participating, or have any ideas or expertise, please contact Tom at San Jose State University (408) 924-5542.

IAOS Annual Meeting

The International Association for Obsidian Studies held its annual meeting on March 6, 1991, at the Radisson Hotel in Sacramento, California, during the Society for California Archaeology Annual Meeting. Over two dozen members and interested persons attended. Topics of discussion included: 1) Reports on activities to the members; 2) New Business; 3) Future Activity Plans; and 4) Miscellaneous issues. A report of the proceedings begins on page 11.

New Officers

Brief "obsidian autobiographies" are presented below to introduce our readers to the new 1991-1992 IAOS President and President-Elect.

President, Thomas M. Origer:

My history in archaeology began in the late 1960s when I'd occasionally find suspicious "black glassy rocks" on my parents property which my mother identified as artifacts. To satisfy my curiosity, I attended my first archaeology course at the Santa Rosa Junior College (SRJC). Later, as my interest began to develop, I dropped out of the Natural Resources Program at Humboldt State University and enrolled in anthropology courses at Sonoma State University (SSU). It was my mentor, Dave Fredrickson, that got me hook and cultivated my interest in obsidian.

After receiving my B.A. from SSU in 1974, I began full-time work at the Cultural Resources Facility at SSU, and became more involved in research regarding hydration analysis and visual characterization of obsidian. Together, Rob Jackson and I helped put together the hydration laboratory at SSU, and made it a viable research and contract facility.

I went on to do my graduate work at San Francisco State University, which I completed in 1982. My thesis concerned hydration on temporally sensitive projectile points and obsidian debitage associated with radiocarbon dates, all materials from an area just north of San Francisco.

In 1983, I became a member of the Society for Professional Archaeologists, certified in Field Research and in Archeometric and Natural Science Research. As a professional, I have directed the Obsidian Hydration Laboratory at SSU since 1978. Coming full circle, I have taught courses in field archaeology and analysis/report writing at the SRJC for 12 years. Additionally, I have run my own CRM firm since 1983.

Among all the other things I am involved in, I am now the current president of the IAOS. The IAOS has brought together many obsidian researchers, and I share Craig Skin-

ner's thoughts that the IAOS has the potential to bring even more of us together. By communicating our ideas, obsidian research will continue to provide much information to archaeologists and be a window into the past.

President Elect, Craig E. Skinner:

I initially got interested in obsidian research over 10 years ago when I was fishing around for a Master's research topic at the University of Oregon. It began with an obsidian hydration dating project in central Oregon, but was rapidly redirected into the identification and characterization of Oregon obsidian sources and artifacts. Since that time, the study of obsidian characterization methods (both geochemical and otherwise) and interpretative techniques (what to do with the data once you've got it) and the identification and cataloging of geologic obsidian sources have developed into my major research themes and minor obsessions. I find myself aiming my family vacations to areas where I might drop by a new obsidian source or two- there are over 140 up here with no immediate end in sight! I've also lately expanded into the geochemical characterization of volcanic tephra (chemically very similar to obsidian). After having worked in relative isolation in Oregon for some time, I'm delighted to find that there are enough other people with the same interests out there to provide the energy to put together a coherent organization. These days, I'm working part-time on a Ph.D. at the University of Oregon and part-time as a geoarchaeological contractor/consultant. On a more personal level, I'm married, have a 12 year-old pre-teenage son, and spend my spare time backpacking, riding my mountain bike, searching for the perfect Great Basin hot spring, mastering my microcomputer, and of course, looking for the ever-elusive new obsidian source.

So, what directions am I interested in seeing the IAOS take in the future? I would like to see an increased emphasis on obsidian characterization methods as an IAOS agenda (though not at the expense of obsidian hydration dating) - these two major areas of obsidian research complement each other very nicely. I would like to see the energetic continuation of the current beginning at interlaboratory standardization procedures for both hydration and characterization laboratories - the more we can **reliably** use each other's data, the better. I also see the IAOS as a place for the gathering and redistribution of information that many of us may already have. Along these lines, Kim Tremaine and I have put together the obsidian bibliography and have plans for a more elaborate version in the future. Other future possibilities might include electronic obsidian source databases, obsidian source catalogs, obsidian-related collections of articles, on-disk data sharing of hydration and characterization information, as microcomputer BBS, and who knows what else... With desktop publishing, microcomputers, and modems, this is now all possible in a way that was unheard of only a few years ago.

Perhaps most importantly, though, I see the IAOS as a medium that can help us all stay in touch with each other - for the sharing of information, for advice, for ideas, for support, and for an interested ear. We're a widely-scattered group and we can do this through the newsletter, through meetings, through the mail, through the phone lines, and through the global computer networks. The more of us that can get on a first-name basis, the better. To this end, I would like to continue the search for a larger and broader membership - we may as well try to live up to the **international** in the IAOS.

Grant Awards for Obsidian Research

- Dr. Barbara Stark of Arizona State University received $4,649 (12 months) for trace elemental source characterization of La Mixtequilla obsidian artifacts from Veracruz, Mexico.
- Drs. Charlotte Beck and George T. Jones received $29,875 (24 months) for XRF analysis to chemically characterize obsidian sources, conduct archaeological source assignments, and perform hydration studies as part of research entitled "Western Pluvial Lakes Tradition Archaeology in Butte Valley, Nevada". Dr. Beck plans to report on the results (which she has just recently obtained) in a later newsletter.

ARCHAEOLOGICAL SCIENCE AT UNIVERSITY OF CALIFORNIA, BERKELEY

In the Spring semester, 1991, Steve Shackley, (Lowie Museum, UCB) will offer a course entitled *Archaeological Science* (Anth 131). This course will be offered regularly by Shackley, and will include guest lecturers in archaeological science. This spring guest lectures will include Professor R.E. Taylor (UC, Riverside) speaking on advances in AMS ^{14}C dating, Rob Jackson on obsidian hydration, Robert Yohe on advances in protein residue analyses, and others to be announced. Shackley will be assisted by Graduate Student Instructor Mark Hall, a Materials Scientist who specializes in metallurgical analyses. A major portion of the course will be devoted to petrology in archaeology focusing on optical petrography, geochemistry, and field petrology using instrumental facilities in the Department of Geology/Geophysics and the Lawrence Berkeley Lab.

Oregon Obsidian Bibliography Notice

Excerpt from the Introduction...1991 Obsidian in Oregon: An Interdisciplinary Bibliography, by Craig Skinner

With well over 100 discrete sources of obsidian already identified in the state of Oregon, this geographic area is very likely the most obsidian-rich in the World. If there was ever a region with potential for obsidian research, Oregon is **it**. Obsidian research is still, however, in its early stages in this

region. Many obsidian sources have yet to be located and documented and the limited number of obsidian characterization and hydration studies have rarely progressed beyond simple listings of the data. The literature related to obsidian research, particularly contract archaeological research reports, is widely scattered and is often buried deep in the gray zone of unpublished and limited-circulation reports.

The bibliography was compiled to help address the problem of limited and difficult access to the literature. I initially put it together so that I could organize the many scattered references that I had collected over the years. It's since proven very useful and it seemed like a good idea to clean up the bibliography and distribute it in wider circles. This initial bibliography was meant to be both comprehensive and interdisciplinary. It contains references to Oregon obsidian and obsidian-like vitrophyre (volcanic glass) that range from significant to the trivial.

If you would like a copy of the 53-page bibliography, I'll be happy send it to you for the cost of reproduction and postage ($5.00). I've also been developing an IBM PC electronic database version of the Oregon bibliography, a prototype of a more extensive system that I'm assembling with Kim Tremaine for the IAOS. This bibliography will eventually include short abstracts and keywords and should prove to be a handy obsidian research tool when completed. A partially-completed early development version (titles, keywords, and some abstracts) of the Oregon Obsidian Database is available which I'll include with a paper copy if you are interested. The database comes archived on a 5¼" 360K disk and includes a shareware database management system. If you need a 3½" 720K disk version, let me know. I'll announce the completion of the database in a future newsletter.

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E-Mail and Obsidian Research

Craig E. Skinner

As microcomputers and modems have proliferated in the last few years, so have computer-accessible communications networks. These commercial (CompuServe, for example) and university-accessible networks (Internet, BITNET) are now largely interconnected, making possible the use of electronic mail (e-mail) and file transfer services among users throughout the United States, Canada, Europe, Japan, Australia, New Zealand, and scattered other countries. Considering the near worldwide coverage of these networks, I'm still a bit surprised at how few archaeologists are taking advantage of their existence. From my home office (where I'm writing this), I can load up my tele-communications software, hook up to the Internet system at Oregon State University, and rip off a quick note to friends and colleagues practically anywhere on the planet. Or, for example, I can tap into the online catalog at UC Berkeley (or many other universities), and look around for useful literature references.

Needless to say, this strikes me as a potential resource that our widely scattered community of obsidian researchers could use to their considerable advantage. For those of you associated with universities (or, in some instances, those just living near a university), this e-mail opportunity may be available to you at little cost beyond the price of a modem (about $100). And not only is this a powerful professional tool, it's also entertaining. The same hardware and software that allows you to plug into the networks can also be used to call in to any of the literally thousands of electronic bulletin board systems (BBS's) that are locally available throughout the United States and Canada.

A Call for E-Mail Addresses

At this point, we have no idea who among us (IAOS current and potential members) are using the networks. If you are currently hooked up to Internet, Bitnet, CompuServe, MCI Mail, or other systems and would like your e-mail address included when we print an IAOS membership list in the near future, please drop me a note on the Internet at skinncr@jacobs.cs.orst.edu or on CompuServe at 76326,1676.

For those of you not presently connected to these various systems but wish they were, don't despair - I'm busy at work on an e-mail article for a future issue of the IAOS Newsletter. Stay tuned.

REPORTS AND PUBLICATIONS

The volume of so-called "gray literature" in archaeology is staggering, making it difficult for researchers who are not "plugged-in" to contract or research archaeology of a certain region to hear of and gain access to reports. In addition, the proliferation and number of journals, and the interdisciplinary nature of obsidian and glass studies make it difficult to keep abreast of all relevant, current literature. The IAOS Newsletter will alert readers to some of this information by reproducing abstracts and summarizing literature that may be of particular interest to IAOS members.

Yegingil, Z.

1990 Obsidian Analysis of the Prehistoric Site Cayonu. In, *Archaeometry* 1990, edited by E. Pernicka and G. Wagner, Birkhauser: Boston.

ABSTRACT

This study presents the first results and preliminary conclusions of a continuing project combining an analytical (Neutron Activation Analysis) and archaeological (Fission Track Dating) study of some obsidian artefacts from the oldest known village farming community site of Cayonu in Southeast Turkey.

The separates obtained from selected obsidian artefacts were dated and studied by fission tracks. Two types of ages have been recognized: one type referred to as geological ages, the second type as the archaeological ages. Track length distributions suggest that fission tracks in these materials, were subject to the lower threshold of temperature-length of time heating and as a result have a tendency to give a younger age. For the purpose of obtaining a corrected age the two correction methods have been used, one the density method (Storzer and Wagner, 1969), the other the plateau age method (Storzer, 1973).

For the further studies the same samples, and the geological obsidian separates from the volcanic sources in East Turkey, will be analyzed by INAA and will be tested for any correlation between their trace element characteristics.

Capannesi, G., A.F. Sedda, and A.M. Palmieri

1990 Classification of Near East Obsidians Using INAA. In, *Archaeometry* 1990, edited by E. Pernicka and G. Wagner, Birkhauser: Boston.

ABSTRACT

Obsidian was a widespread material in the Near East from 7500 up to 3500 B.C., and obsidian artifacts have been discovered in almost all the Anatolian and Mesopotamian archaeological finds, even far-away from production sites. This fact testifies to the importance of this material and the presence of extended commercial trades. The known obsidian outcrops in the Near East belong to two main geographic areas the Kayseri and Nigde districts, in Central Anatolia, and the region of the lake of Van and districts of Kars and Erevan, in Eastern Anatolia. No further open-site mines have up to now been found out in the course of a great number of geological explorations performed by the oil-companies.

In the last years many researchers have focused their attention on the analytical characterization of obsidians, in the attempt of locating the geological origin of archaeological artifacts. One of the most powerful methods in studies of this type is Instrumental Neutron Activation Analysis (INAA), due to its almost unique combination of high multielemental sensitivity and of high accuracy, even with a few milligram samples.

In the present work some obsidian rock samples coming from the sites of Nemrut Dag, Bingol, Suphan Dag, Ziyaret and Erevan were analyzed by INAA, for a total of 23 elements per sample. In the same way some obsidian finds from the archaeological excavations of Gijiar, Anganeh and Balu 1 (4000-500 b.C) were also analyzed. The obtained analytical data were used as input for Cluster Analysis, Principal Components Analysis and Canonical Discrimination Analysis. A successful classification of the sites was achieved, and an assignment of archaeological samples to the regions was also attempted and discussed.

Francaviglia, V.M.

1990 Obsidian Trade Across the Red Sea in Neolithic Times? In, *Archaeometry* 1990, edited by E. Pernicka and Gunther Wagner, Birkhauser: Boston.

ABSTRACT

That some trade in obsidian across the Red Sea occurred even in neolithic times is fully maintainable. Obsidian tools from various Neolithic and Bronze Age settlements in the Yemeni Highlands, along the coastal plain of Northern Yemen and Southern Saudi Arabia and, finally, from Farasan Islands have been collected and analysed by XRF. All of them are of peralkaline affinity. Geological samples from several flows of the Northern Yemen obsidian-producing volcanoes (Jabal Isbil and Jabal al-Lisi) have also been collected and analysed for comparison. With only a few exceptions, most of the archaeological obsidians analysed do not originate from the above-mentioned Yemeni volcanic fields (as expected, given the very short distance between supposed sources and sites). Moreover, all the archaeological tools taken into consideration cluster - whatever plot we use - into a homogeneous group. It seems indeed reasonable to maintain that they originate from a single source which, due to the abundance of obsidian-producing volcanic edifices along the opposite coast of the Red Sea, may be traced to Eritrea or Djibouti.

Al Isa, K., J.N. Barrandon, B. Gratuze, and M.C. Cauvin

1990 Non Destructive Analysis of Obsidian Artifacts Using Nuclear Techniques. In, *Archaeometry* 1990, edited by E. Pernicka and G. Wagner, Birkhauser: Boston.

ABSTRACT

The determination of the geographical sources of obsidian used in ancient times in the production of artifacts have always interested the archeologists in order to determine ancient trade patterns.

If the analysis of a geological sample does not pose any problem, the analysis of ancient artifacts is more difficult because these objects cannot be always sampled. This is the reason why we developed a new analytical method, based on the work we have already done on glass objects. In order to perform bulk non destructive analysis of obsidian artifacts we used fast neutron activation analysis. The neutron flux is produced with a cyclotron.

In an archeological respects, obsidian being a natural glass, its manufacture is not subjected to ancient technological problems. Then the determination of major elements is of less importance than for synthetic glass, and often the determination of trace elements is sufficient to relate artifacts to their sources. So instead of two irradiations, a single irradiation followed by two direct gamma spectrometry measurements is carried out. The thirteen following elements are then determined as a function of sodium concentration: Ca,

Ti, Fe, As, Rb, Y, Zr, Nb, Sb, Cs, Ba, Ce, and U. Sodium is then determined together with Li, F, and Al by particle induced gamma rays emission (PIGME) using a 3 MeV protons beam from a Van de Graaff.

The method was applied to the study of Near Eastern obsidian artifacts found on archeological sites (Turkey and Syria) dated from 7500 to 3000 BP. The obtained results allow to establish ancient trade patterns in this region.

Webster, D. and A. Freter

1990 Settlement History and the Classic Collapse at Copan: A Redefined Chronological Perspective. *Latin American Antiquity* 1(1):66-85.

ABSTRACT

Surveys, test pitting, and large-scale excavation carried out since 1975 around the Classic Maya center of Copan, in western Honduras, have yielded a wealth of settlement data. A total of 2,048 obsidian-hydration dates have redefined the Late Classic Coner ceramic phase, showing it to extend well into the Early Postclassic. Sites with Coner ceramics exhibit much more intraphase chronological variation than expected. The Classic "collapse" at Copan was much more protracted than thought previously. There is an abrupt royal collapse at about A.D. 800, but subroyal elite activity continues for another 200 years, and population declines gradually over a period of four centuries.

Ammerman, A.J., A. Cesana, C. Polglase, and M. Terrani

1990 Neutron Activation Analysis of Obsidian from Two Neolithic Sites in Italy. *Journal of Archaeological Science* 17:209-220.

ABSTRACT

The report presents the results of the characterization of obsidian from two Neolithic sites in Italy. Gaione on the Po Plain and Bevilacqua in Calabria. The comparison of neutron activation analyses made at laboratories in Milan and Bradford shows good agreement between the two. Neutron activation analysis is confirmed to be a reliable method for the sourcing of obsidian in Italy. A total of 17 pieces of obsidian from Gaione is examined; this makes it the Neolithic sites with the largest number of samples analysed to date in northern Italy. Three different sources of obsidian are observed at the site: Lipari, Palmarola and Sardinia. In addition, the material from Gaione displays an association between lithic technology and the source of the obsidian. Specifically, obsidian from the island of Lipari is represented at Gaione principally in the form of blades. The six pieces analysed from Bevilacqua all come from Lipari. The report closes with a brief discussion of some of the implications of the results for the study of exchange systems in the Neolithic period.

Mazer, J.J., C.M. Stevenson, W.L. Ebert, and J.K. Bates

1991 The Experimental Hydration of Obsidian as a Function of Relative Humidity and Temperature. *American Antiquity* 56(3):504-513.

ABSTRACT

The experimental hydration of obsidian for up to 30 days is described at relative humidities (RH) of 60, 90, 95, and 100 percent and at temperatures of 150, 160, and 175 C. Under isothermal conditions, the rate of hydration increased by as much as 25 percent between 60 and 100 percent RH. The RH dependence is nonlinear, with the majority of the rate increase occurring between 90 and 100 percent RH. The effect of RH can be related to the driving force for molecular water diffusion in obsidians as described by the chemical potential difference between water sorbed onto the obsidian surface and intrinsic water in the obsidian. The differences in hydration rates caused by RH differences in experiments approximate the error commonly described for obsidian-hydration dating. These results suggest that obsidian-hydration dating requires a knowledge of the site temperature and relative humidity in order to accurately generate age estimates.

Rauch, F., J.E. Ericson, W. Wagner, Ch. Grimm-Leimsner, R.P. Livi, Chengru Shi, and T.A. Tombrello

1991 Hydration of Tektite Glass. One of the Brown Bag Preprint Series in Basic and Applied Science (Submitted to the Journal of Non-Crystalline Solids).

ABSTRACT

Tektite glass is very resistant against attack of water or humidity, as is manifested in the survival of tektites in nature for millions of years. Hydrothermal experiments, aimed at clarifying this property, reveal that tektite glass develops a hydration rind as do other silicate glasses of similar composition, although at a much lower rate. These hydration data, describable as a diffusion process, are encouraging with respect to the study of the hydration status of ancient tektite surfaces and for developing a dating technique.

Burton, Jeffrey F.

1990 Obsidian Hydration and Archaeological Reality in the Western Great Basin. Masters Report, Department of Anthropology, University of Arizona, pp. 35.

ABSTRACT

The Casa Diablo obsidian source is a group of resurgent domes in eastern central California. Obsidian from the Casa Diablo source is found in prehistoric sites throughout central California and the western Great Basin, and has been interpreted as an integral part of an extensive trans-Sierran exchange network. Changes in production through time would have had profound implications for prehistoric demography and, by extension, socio-political organization.

As for other quests to reconstruct human prehistory, precise chronological information is necessary to discover changes in obsidian production through time. Unfortunately, chronometric data continue to be inappropriately applied to questions of prehistoric behavior and demography. The validity of various behavioral and demographic reconstructions is examined from the standpoint of both the accuracy and resolution of obsidian hydration analysis. Although many critical environmental and chemical factors in hydration have been identified, the combined effects of sampling and other formation processes have been underestimated and obscured.

The purpose of this paper is threefold: 12) to examine currently proposed Casa Diablo obsidian hydration rate formulas, 2) to examine the application of obsidian hydration data in the construction of models of prehistoric culture change, and 3) finally, to propose an alternative model of prehistoric cultural change based on strong case inferences.

Jackson, Thomas L., and Michael W. Love

1991 Blade Running: Middle Preclassic Obsidian Exchange and the Introduction of Prismatic Blades at La Blanca, Guatemala. *Ancient Mesoamerica* 2:47-59.

ABSTRACT

Obsidian prismatic blades first appeared in the Pacific coast of Guatemala at the beginning of the Middle Preclassic, ca. 900 B.C., at the site of La Blanca. Blades were imported in finished form and supplemented an existing technology based on hard-hammer percussion. This indicates that by the Middle Preclassic obsidian was being traded in at least two forms: raw material and finished products. The beginnings of blade use coincide with a number of important social and political changes on the Pacific coast. Most important of these are the emergence of La Blanca as a regional center and the formation of a settlement hierarchy that includes over 50 sites. X-ray fluorescence reveals that the material used to make the blades comes from three geological sources: El Chayal, Ixtepeque, and San Martin Jilotepeque. An analysis of the source frequencies through time reveals that El Chayal obsidian dominates the assemblage throughout the Conchas A and B subphases, but is present in Conchas C and D. This latter occurrence may signal a shift in trade relationships, but the overall pattern suggests that exchange connections established in the Early Preclassic were continued during the Middle Preclassic.

Bouey, Paul

1991 Recognizing the Limits of Archaeological Applications of Non-Destructive Energy-Dispersive X-Ray Fluorescence Analysis of Obsidians. Materials Research Society Symposium Proceedings 185:309-320. In, Materials Issues in Art and Archaeology II, ed. by P.B Vandiver, J. Druzik, and G.S. Wheeler.

ABSTRACT

The present NDEDS XRF study demonstrates that the discrimination of obsidian subsources in the Coso Volcanic Field of southeastern California is not adequately established. Powdered-specimen research (Bacon et al. 1981) defined several subsource regions at Coso, using a very small sample of rocks. Conclusions from that analysis led to a NDEDS XRF study (Hughes 1987), also using a small number of samples, which discriminated four artifact-quality outcrops on the basis of rubidium and zirconium concentrations. This latter report has become a standard for analysis of archaeological materials, however, problems with sample size and analytical precision have not been addressed.

The present study was designed to address precision as it pertains to the analysis of archaeological specimens. Samples included 30 large (4 cm) and 30 small (cm) samples from two subsource areas. Using analyte/Compton net peak ratios to compensate for size and surface geometry inconsistencies, Rb and Zr concentrations in ppm were produced on the basis of linear regressions derived from analyte/Compton net peak ratios for rock standards. Results indicate that specimen size influences the range of element concentrations and that a considerable degree of overlap exists for the ranges of Rb and Zr for both source areas.

Archaeological evaluations based on subsource variability have proven provocative for chronometric and prehistoric trade problems, but compromises associated with inadequate sample sizes and the relative imprecision of NDEDS XRF dictate a more cautious approach to the use of those data.

Erlandson, J.; R.E. Hughes; C.E. Skinner; M.L. Moss, and J. Boughton

1991 Trace Element Composition of Obsidian Artifacts from the Beaverdam Creek Site (35CR29), Central Oregon. *Current Archaeological Happenings in Oregon*, 16(2):9-11.

ABSTRACT

Twenty samples of obsidian debitage from the Beaverdam Creek Site in the Ochoco Mountains of central Oregon were geochemically characterized in the hope that megascopic obsidian attributes (color, translucency, texture, inclusions) could be used to identify sources of artifactual obsidian. The primary objective of the visual classification of obsidian was foiled, however, when only three of the 20 artifacts could be correlated with known sources (Dog Hill and Burns Butte). At least five additional "unknown" sources were identified. Comparison of the Beaverdam Creek data with those from several other sites in the same region, the Wind Creek sites (35GR147, -148, -159, and -162) and Indian Spring Site (35HA1421) indicate that several of the unknown sources are shared among the sites. A table of trace element data and a ternary diagram comparing the sites mentioned are included.

Comments: The large proportion of unidentified obsidian sources that are reported in this article are typical of trace element characterization studies of artifacts from this region.

Several prehistorically-significant obsidian sources in north-central Oregon remain to be located and characterized.

Skinner, Craig E. and Carol J. Winkler

1991 Prehistoric Trans-Cascade Procurement of Obsidian in Western Oregon: The Geochemical Evidence. *Current Archaeological Happenings in Oregon*, 16(2):3-9.

ABSTRACT

Recent obsidian characterization data from western Oregon archaeological sites was examined for evidence of trans-Cascade obsidian procurement. Analysis of the spatial distribution and frequency of 1,071 characterized artifacts from major Western Cascades drainages resulted in the identification of several trends of central Oregon obsidian use in the region west of the Cascade Divide. Artifacts originating from numerous eastern Oregon obsidian sources, particularly those in the Newberry Volcano vicinity, Silver Lake, and Spodue Mountain, were identified at many western Oregon archaeological sites. While eastern Oregon obsidian is found in varying frequencies in all major Western Cascade drainages, the proportion of glass from those sources rises dramatically in the Willamette River Middle Fork drainage and other Western Cascades drainages to the south of the Middle Fork. This shift from predominantly western Oregon to eastern Oregon sources may be attributable to the interplay of a variety of different processes including the presence of trans-Cascade travel corridors and procurement systems, the existence of trans-Cascade exchange systems, artifact curation behavior, ethnic or cultural boundaries, and geographic variables such as source distance and ease of access. An analysis of the relationship of artifact sample size and the number of identified obsidian sources (source diversity) indicates that source diversity differs considerably from drainage to drainage. Examination of a subset of characterized artifacts from the Willamette River Middle Fork drainage also suggests that the proportion of characterized artifacts originating from eastern and western sources may vary by artifact category. Several suggestions regarding sampling strategies and future directions in western Oregon obsidian characterization research are made.

Comments: This is the first initial synthesis of obsidian characterization data that has been appearing with increasing frequency in western and central Oregon. The existence of much of the data is due directly to Oregon U.S. Forest Service policies favorable to obsidian research. Since we finished the article, we've added considerably to our artifact database and are now busy reanalyzing the data.

Weisler, Marshall

1990 A Technological, Petrographic, and Geochemical Analysis of the Kapohaku Adze Quarry, Lana'i, Hawai'ian Islands. *New Zealand Journal of Archaeology* 12:29-50.

ABSTRACT

The well known Polynesian ethnographer and archaeologist, Kenneth Pike Emory, surveyed the island of Lana'i, Hawai'ian Islands, in 1921 and conducted on the the first extensive settlement pattern studies in Polynesia. More than 65 years after he visited the largest adze quarry on the island at Kiapohaku, this important adze production centre was relocated, and a surface collection of flakes, adze blanks and preforms was made. The assemblage is described and a reduction sequence is proposed for the production of adzes from flakes. Technological comparisons with other adze quarries in Polynesia suggest Polynesian-wide similarities in the production of flake adzes. Petrographic descriptions and geochemical characterization of quarry rock are presented.

Bove, Frederick J.

1991 The Paryjuyu Project: A Test of the Hatch Hypotheses. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

Recently Hatch proposed that two separate ceramic traditions evolved on the Guatemala South Coast in the Earlh Formative period with the western or Narango tradition gradually replacing the central-eastern Achiguate tradition in the Terminal Formative and Classic periods. Data from the Paryjuyu zone, an intermediate region between the two are presented and several explanations for the perceived change are examined using linguistic, ceramic, settlement pattern, and obsidian hydration measurements. These will assist in testing various interpretative models of social/cultural change during the Formative-Classic transition.

Braswell, Geoffrey E.

1991 Obsidian Procurement, Economy and Use: A View from the Maya Highlands. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

Two recent archaeological projects, Ri Rusamaj Jilotepeque and the Encuesta Arqueologica Kaqchikel have studied obsidian procurement, economy and use patterns in the municipios of Sumpango and Alotenango, Department of Sacatepequez and San Martin Jilotepeque, Department of Chimaltenango. A comparison of six workshops is presented and general results are discussed in a diachronic framework.

Briggs, Jennifer, and Geoffrey E. Braswell

1991 Obsidian Outcrops in the Kaqchikel Maya Highlands. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

Although much research has focused on trace element analysis sourcing of obsidian artifacts, few studies have investigated the sources themselves in detail. Ri Rusamaj Jilotepeque has located obsidian outcrops, quarries and workshops in both the municipios of San Martin Jilotepeque and San Batolome Milpas Altas. These are described physically and some suggestions are made relating outcrops and archaeological sites in the surrounding area.

Clark, John

1991 Statecraft and State Crafts: A Reconsideration of Mesoamerican Obsidian Industries. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

Arguments for state-controlled obsidian industries in Mesoamerica suffer serious ethnocentric, logical, and methodological inadequacies. Despite decades of research, the minimal archaeological expectations of state-controlled crafts remain elusive. The unresolved inferential basis for "state control" presupposes more fundamental questions. What is meant by "the state" and "state control"? Why and how would a state control craft production? With internally differentiated states strategies for economic regulation varies depending upon the potential distribution of benefits to rival political factions. Given the tributary mode of production characteristic of Mesoamerican states, the concept of state control, as normally applied, needs to be rethought.

Cook, Patricia

1991 Residential Construction on Albion Island, Belize. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

Recent excavations on Albion Island, Belize, were undertaken to examine the growth and development of a nonelite Maya house group. Construction techniques of the ancient residences on the island were found to differ from those across the river on mainland Belize. At sites such as Nohmul and San Estevan, mounds were composed of soil mixed with large amounts of cultural debris-- ceramics, chert and obsidian tools-- and faunal remains in successive, usually larger platforms. Group 200 on Albion Island was not built in this pattern; boulders and cobbles were piled atop bedrock to support sing and multiple phase occupations.

Freter, AnnCorinne

1991 Reconstruction of the Late Classic Rural Ceramic Production System in the Copan Valley, Honduras. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

The Copan valley survey and test pitting project (1983-1989), produced evidence of several small scale ceramic production sites. The geographic distribution of these sites strongly correlates with the location of known pottery clay sources, and the sites cluster temporally between 800-1000AD based on obsidian hydration. Their limited scale, contemporaneity, and geographic distribution suggest that utilitarian pottery in the Copan valley was produced on a local (probably lineage) level at several loci within the rural region, in contrast to a system of centralized mass production.

Healan, Dan M.

1991 From the Quarry Pit to the Trash Pit: Models of Toltec Obsidian Exploitation. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

Recent archaeological data are used to evaluate various models of obsidian procurement, processing and distribution within the framework of the Early Postclassic Toltec state and its capital city of Tula, Hidalgo, Mexico. Data are derived from three general sources: 1) analysis of artifacts from sites in the Tula region and other regions of Mesoamerica; 2) excavation of obsidian quarries and habitation sites in the vicinity of Zinapecuaro, Michoacan, the principal source of obsidian for early Tula.

Hughes, Richard E.

1991 The Sources of Hopewell Obsidian. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

More than two decades have passed since Griffin, Gordus and Wright employed neutron activation analysis to demonstrate that the majority of obsidian in middle western Hopewell archaeological sites originated at the Obsidian Cliff source in Yellowstone National Park, Wyoming. The present study employed x-ray fluorescence analysis to evaluate this conclusion using a large sample of Hopewell artifacts from Ohio and Wisconsin. Results show that in addition to Obsidian Cliff glass, sites in both regions contain artifacts fashioned from sources outside Yellowstone in eastern Idaho. These results are evaluated with particular reference to extant reconstructions of Hopewell obsidian procurement and conveyance.

Iceland, Harry

1991 Obsidian Trade at the Close of the Classic Period in Central Mexico: The Evidence of the INAH Salvage Archaeology Excavations at Azcapotzalco, Mexico. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

Analysis of obsidian and other lithic artifacts from excavations at Azcapotzalco, Mexico contributes to our understanding of lithic procurement and manufacturing processes, other economic activities, and intersite relations, and confirms the potential contributions of obsidian analysis to site dating in central Mexico. The results of NAA conducted at the Missouri University Research Reactor support the conclusions of visual analysis and growing evidence from other central Mexican sites that at the end of the Classic Period obsidian exchange networks utilizing the Pachuca, Hidalgo sources were largely replaced by a widespread dependence on the considerably more distant obsidian source at Ucareo, Michoacan.

Love, Michael, and Thomas L. Jackson

1991 Middle Preclassic Obsidian Exchange in Pacific Guatemala. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

Prismatic obsidian blades were used first in Pacific Guatemala during the Middle Preclassic when blades were imported in finished form. Blades supplemented an already existing household-level industry which used a technology of simple hardhammer percussion and bipolar flaking. Finished blades and raw material used in household production came mostly from the same sources, but at different rates. A comparison of source frequency and consumption rates shows that Middle Preclassic obsidian exchange was not monolithic and tightly controlled, but that different forms of obsidian were exchanged along different paths and possibly through different mechanisms.

Polglase, Christopher

*Goodwin and Associates

1991 Community and Household Variation in Obsidian Production and Use During the Early Neolithic of Southern Italy. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

The Early Neolithic communities of Calabria (southern Italy) are located near Lipari, one of the major sources of obsidian in the region. The exchange of Lipari obsidian through mainland Italy has been well documented. This paper will consider variation in the availability, the production, and the use of obsidian from several Early Neolithic sites. Comparisons between individual households within these sites also will be made. The paper's results will consider: 1) the significance of geographic proximity to exotic resources; 2) the potential for social and economic control over these resources; and 3) the evidence for local and regional standardization of lithic production.

Ridings, Rosanna

1991 Thermal Histories of Obsidian Artifacts from Pot Creek Pueblo: Implications for Obsidian Hydration Dating. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

As an absolute chronometric technique, obsidian hydration has a great deal of potential. In some cases, however, obsidian hydration dates have conflicted with other available chronological data. Recent research on this problem has focused on techniques for estimating the effective hydration temperature, or on the methodology of induced hydration studies. In this comparative study, several different techniques for estimating effective hydration temperature have been applied at Pot Creek Pueblo, for which more than 100 tree-ring dates are available. Preliminary results suggest that incorporating information on the long-term thermal histories of artifacts may be important.

Tykot, Robert H.

1991 Archaeological Applications of ICP-Mass Spectrometry: An Obsidian Case Study. Paper presented at 56th Annual Meeting, Society for American Archaeology, New Orleans, Louisiana.

ABSTRACT

The development and increasing commercial availability of Inductively Coupled Plasma Mass Spectrometry (ICP-MS) systems provides archaeologists with an alternative to the standard methods of neutron activation, atomic absorption, and x-ray fluorescence analysis. Major, minor and trace elements may be determined with a high degree of precision, and detection limits below 1 part per billion. Finally, a laser ablation device permits the analysis of solid samples in a virtually nondestructive manner. The provenience of western Mediterranean obsidian artifacts will be examined as case study of this new technique.

TECHNOTES

This section of the Newsletter is devoted to sharing new techniques, innovative ideas, sources of equipment and supplies, and discussing new technologies, and providing guidance on obsidian studies techniques. Obsidian analysts are invited to submit information relating to these topics.

Guidelines for Submitting Obsidian Source and Hydration Samples

R.J. Jackson

BioSystems Analysis, Inc.

BioSystems is producing an obsidian studies manual to assist and provide direction to archaeologists in developing and implementing obsidian studies. The following is presented as an example of the kind of guidance that will be presented in the manual for archaeologists submitting obsidian specimens for obsidian source and hydration analysis.

With few exceptions, obsidian hydration technicians are not trained in lithic technology and are not well qualified to determine the types of flakes (i.e., sampling strategy) or the most appropriate artifact thin section locations for obsidian hydration analysis. In addition, source and hydration laboratories are seldom included in or informed of the research objectives and sampling strategies behind client submittals, so that technicians would find it difficult to assist in the selection of samples or cut locations, even if they were trained in lithic technology. As a result, archaeologists who wish to consider technological factors that affected the structure of obsidian assemblages must be responsible for providing obsidian labs with appropriate specimens and specific instructions.

Size

Small specimen size is more of a concern for x-ray fluorescence spectroscopy than hydration analysis. Generally, flakes smaller than 8-10 millimeters in length and width, and less than about 3 millimeters in thickness cannot be subject to non-destructive XRF. Size limitations for source analysis may affect the choice of samples that would, otherwise, be selected for hydration analysis, if hydration sample selection and interpretation is dependent on source identification, as it often is. However, x-ray fluorescence analysis of exclusively large flakes may lead one to believe that an entire obsidian assemblage contains only the source material represented in the large-size debitage. Failure to account for prehistoric economic and technological activities that depositied exclusively small flakes can lead to incorrect assumptions regarding mobility and exchange , and even temporal periods of site use.

The sequence of obsidian analysis is important to consider when submitting small samples. If specimens are smaller than about 15 mm in length and width and obsidian source analysis is planned, then source analysis should occur prior to hydration analysis. Hydration cuts on flakes in the 10-15 mm size range can destroy specimen geometry , making it difficult to perform non-destructive XRF.

It is possible to prepare a thin section from nearly any flake size commonly collected in 3 mm (1/8 inch) screen. Even pressure flakes as small as four or five millimeters in length or width can be prepared. However, flakes smaller than about 6 mm in maximum dimension may be destroyed in producing a hydration thin section, making the flake unsuitable for subsequent source study.

Hydration Cut Locations

The locations for a thin sections are generally more important to consider for formal tools (e.g., projectile points that have a greater potential for exhibiting complex use histories) than obsidian flakes. Barring specific cut location requests, hydration technicians' criteria for thin section cuts include: 1) areas than will produce near 90 degree edges to avoid edge-bevelling ; 2) locations characterized by uncomplicated flake scar morphology that will produce straight and continuous edges (step-fractured or undulating artifact surfaces caused by multiple pressure flake scars are usually avoided because surface topography is uneven); and 3) avoidance of heavily weathered, patinated, and sand/wind-blasted surfaces. These hydration lab criteria may or may not coincide with the criteria used or the information desired by the archaeologist submitting the specimens. In brief, don't expect the hydration technician to independently select an artifact location that will maximize archaeological information. In most circumstances, location is not an important technological problem or consideration for flakes.

There are several ways to identify, for the hydration laboratory, the artifact location desired for a thin section. The simplest method is to apply a dab of photocopy "white-out" on the artifact or flake in the desired cut location. If you want the cut to be a specific depth, extend the white-out line to the desired depth. The white-out will wash off as soon as water or oil from the thin section saw contacts it. DO NOT coat the white out with laquer, nail polish or other coating, as the white out may adhere to the thin section and obscure the hydration rind. Artifact illustrations also can be used to note the desired cut locations, although correlating the illustration with the artifact location is time consuming and the technician is more likely to misinterpret the location.

Finally, informing the source and hydration labs of your research goals and sampling strategy may allow the obsidian specialists (e.g., lab technicians) to assist in applying laboratory procedures that will extract the desired research data.

REPORT OF THE THIRD ANNUAL IAOS MEETING

The third annual meeting of the IAOS was held on March 26, 1991, at the Radisson Hotel in Sacramento, California, during the Society for California Archaeology Annual Meeting. Over two dozen people attended the meeting. The following are brief excerpts and highlights of the meeting.

I. Report of Activities to the Members

- Production and distribution of two issues of the IAOS Newsletter by Rob Jackson;
- Two membership drives by Lisa Swillinger;

- Development of Draft Survey Forms for both hydration and sourcing laboratories by Chris Stevenson and Craig Skinner. The surveys, when completed, are intended provide comparative information between labs and enable lab profiles for a future newsletter issue.
- Completion and availability of a comprehensive and interdisciplinary obsidian bibliography by Kim Tremaine and Craig Skinner;
- Investigation into standard reference particles (polymer beads 1, 5, and 10 microns in diameter) for calibrating microscope micrometers for hydration measurement by Rob Jackson;
- Investigation into a Video Caliper System for measuring hydration by various interested parties.

II. New Business

° **Report on Membership:**

As of March 1990, there were 21 Regular, and 6 Institutional members. As of March 1991, there were 41 Regular, and 9 Institutional members (doubled the membership!)

° **Report on Finances:**

In March 1990, the IAOS account contained $285. In March 1991, the IAOS account contained $834. Lisa Swillinger reported that we were able to conserve money due to Chico State University's willingness to absorb mailing and printing costs.

- A Life-Time Membership category was added for a cost of $200 (our first lifetime subscriber is Dr. Thomas Layton, San Jose State University);
- In response to individuals and institutions that may not be able to afford membership fees, it was agreed that in cases of documented hardship, membership fees be reduced or waived.
- It was agreed that membership renewal procedures would be standardized in future. Rather than renewing individual members each year upon the month of their joining, **all** renewals will occur on the same month in order keep things simple.
- A motion was made to disassociate with the Society for Archaeological Sciences (SAS). The IAOS received very little benefit from our association with the SAS, and IAOS monies could be better spent on a nicer newsletter and the production of occasional publications. The motion was passed.

° **Election of New Officers for 1991-1992**

New officers were elected for 1991-1992. Lisa Swillinger from CSU, Chico, was elected to serve as Secretary-Treasurer for another year. Craig Skinner, University of Oregon, was elected President-elect. Thomas Origer, Sonoma State University, serves as the 1991-1992 President.

- There was agreement that next year, nominations be made in advance, that biographies be provided for each candidate, and that ballots be mailed out instead of holding votes at the annual meeting.

III. Future Activity Plans:

- Production of a video(s) on obsidian hydration dating, sourcing etc. to sell to institutions as instruction and a source of income. Rob Jackson reported making a videotape of hydration slide preparation for Yosemite National Park. Kristina Roper reported that BioSystems had made a video for training of XRF sourcing. Tom Layton agreed to coordinate this project.
- Updating the bibliography: New references and/or manuscripts can be brought to the attention of either Craig or Kim to be added to an obsidian bibliography/database.
- Mail-outs to universities internationally, posting information on our organization.
- Creation of committees to accomplish specific projects (e.g., membership drive, lab survey, newsletter, video). Individuals volunteered to be responsible for newsletter sections:

  Short Reports: Mike Rondeau
  Reviews: Bruce Dahlstrom
  Calendar Events: Dr. Steven Shackley

- Publish the membership list, with addresses, phone numbers, and e-mail addresses etc. so that members can network.
- Producing an "Introductory Reader" on obsidian studies for publication. Dr. Thomas Layton has prepared one which may serve the purpose. We must look into the legalities of reproduction.

MEETINGS AND EVENTS

Compiled by Dr. M. Steven Shackley, of the Lowie Museum of Anthropology, 103 Kroeber Hall, University of California,Berkeley, CA 94720 USA; (510) 642-3681; FAX 643-8557. BITNET: SHACKLEY @ UCBCMSA

September 1991

Sept. 10-13. Conference on Advances in Instrumentation and Techniques for Electron and other Microscopies. Bristol, U.K. Meetings Office, Institute of Physics, 47 Belgrave Square, London SW1X 8QX, U.K.

October 1991

Oct. 7-11. International Conference on Archaeometrical Research, Veszprem, Hungary. Mrs. Katalin Siman, Ar-

chaeological Institute, Hungarian Academy of Science, Budapest, Pf. 14, H-1250, Hungary.

Oct. 21-24. Geological Society of America Annual Meeting, San Diego, California, USA. Vanessa George, GSA, Box 9140, Boulder, CO 80301, USA (303-447-2020).

November 1991

Nov. 3-8. Optical Society of America Annual Meeting, San Jose, California, USA. Optical Society of America, 2010 Massachusetts, Ave, NW, Washington, DC 20036, USA.

Nov. 11-28. Archaeological Stone - Scientific and Technical Studies, London. Dr. A.P. Middleton, Research Laboratory, British Museum, London WC1B 3DG, U.K.

Nov. 15-18. 1st International Colloquium on the Role of Chemistry in Archaeology. Hyderabad, Indian. The Director, The Birla Institute of Scientific Research, Asmangadh Palace, Malakpet, Hyderabad - 500 036 (A.P), India.

Nov. 20-24. American Anthropological Association Annual Meeting, Chicago, Illinois, USA. American Anthropological Association, 1703 New Hampshire Ave., NW., Washington DC 20009, USA (202-232-8800).

December 1991

Dec. 12-13. American Association for the Advancement of Science, Washington, DC, USA. AAAS, 1333 H St., NW, Washington, DC 20005, USA (202-326-6400).

March 1992

Mar. 23-27. International Symposium on Archaeometry, Fowler Museum of Cultural History, University of California, Los Angeles. Correspondence: *Archaeometry 92*, Pieter Meyers, LACMA Conservation Center, 5905 Wilshire Boulevard, Los Angeles, CA 90026 USA, (213) 857-6161, FAX (213) 931-7347. Abstracts due November 1, 1991.

** This important conference is not often held in North America, and more rarely in California. Many IAOS members will be presenting papers on a wide variety of issues. We urge members from western North America to attend and become acquainted with archaeometrists from many parts of the world.

April 1992

Apr. 8-12. Society for American Archaeology 57th Annual Meeting, Pittsburgh, PA, USA. Program Committee Chair: Gary M. Feinman, Department of Anthropology, University of Wisconsin, Madison, WI 53706, USA.

Apr. 27-May 2. Materials Research Society Spring Meeting (Symposium P: Materials Issues in Art and Archaeology III), San Francisco, California, USA. Materials Research Society, 9800 McKnight Road, Pittsburgh, PA 15237, USA (412) 367-3003.

December 1992

Dec. 2-6. American Anthropological Association Annual Meeting, San Francisco, California, USA. American Anthropological Association, 1703 New Hampshire Ave., NW., Washington DC 20009, USA (202-232-8800).

ABOUT THE IAOS

The IAOS was established to:

1) develop standards for analytic procedures and ensure inter-laboratory comparability;

2) develop standards for recording and reporting obsidian hydration and sourcing results;

3) provide technical support in the form of training and workshops for those wanting to develop their expertise in the field.

4) provide a central source of information regarding advances in obsidian studies and the analytic capabilities of various laboratories and institutions.

Membership

The IAOS needs membership to ensure the success of the organization. To be included as a member and receive all of the benefits thereof, you may apply for membership in one of the following categories:

- Regular Member $20.00/year
- Institutional Member $50.00/year
- Life-Time Member $200.00

Regular members are individuals or institutions who are interested in obsidian studies, and wish to support the goals of the IAOS. Regular members will receive any general mailings; announcements of meetings, conferences, and symposia; newsletters; and papers distributed by the IAOS during the year. Regular members are entitled to attend and vote in Annual Meetings.

Institutional members are those individuals, facilities, and institutions who are active in obsidian studies and wish to participate in inter-laboratory comparisons and standardization. If an institution joins, all members of that institution are listed as IAOS members, although they will receive only one mailing per institution. Institutional members will receive assistance from, or be able to collaborate with, other institutional members. Institutional members are automatically on the Executive Board, and as such have greater influence on the goals and activities of the IAOS.

*Membership fee may be reduced or waived in cases of financial hardship or difficulty in paying in foreign currency. Please complete the form and return to the Secretary with a short explanation regarding lack of payment.

**Because membership fees are very low, the IAOS asks that all payment be made in US dollars in international money orders or checks payable on a bank with a US branch. If you do not do so, much of your dues is spent in currency exchange.

If you wish to join us, mail a check or money order to the IAOS:

Ms. Lisa Swillinger, Secretary-Treasurer
Department of Anthropology
California State University at Chico
Chico, California 95929-0400

Call for Articles and Information

Submissions for articles, short reports, or announcements for inclusion in the next newsletter should be received by November 15, 1991. We accept electronic media on IBM compatible 3.5" or 5.25" diskettes, in a variety of word processing formats including Wordperfect (4.2 or 5.0), Wordstar, and Microsoft Word or ASCII text formats. A hard copy should accompany diskettes.

Articles: Send articles to Lisa Swillinger (address above).

Meeting and Events: If you have any information on upcoming conferences or other events, please keep Dr. Steven Shackley informed. He can be reached at the Lowie Museum of Anthropology,103 Kroeber Hall, University of California, Berkeley, CA 94720 USA; (510) 642-3681; FAX 643-8557; BITNET: SHACKLEY @ UCBCMSA.

Short Reports: If you are interested in briefly reporting on research findings (e.g., one column in length), contact Mr. Mike Rondeau (916-920-7458).

IAOS Officers, 1990-1991

President: Thomas M. Origer
President-Elect: Craig E. Skinner
Secretary-Treasurer: Lisa Swillinger
Newsletter Editor/Producer: Robert J. Jackson