

International Association for Obsidian Studies Newsletter

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Assembled and edited by K. Tremaine

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NEWS AND INFORMATION

SPECIAL OFFER TO IAOS MEMBERS: OBSIDIAN DATES IV

By now, you should have received an announcement concerning *Obsidian Dates IV*, edited by Clement W. Meighan and Janet L. Scalise. Thanks to a generous offer from the UCLA Institute of Archaeology, we are able to make copies of *Obsidian Dates IV* available to IAOS members for only \$10.00 per copy. In celebration of the new year and to show our appreciation for your continued support, the IAOS will pick up the postage to **any location in the world** for any current IAOS member that orders a copy of the volume.

This 1988 volume, the latest in a series from the UCLA Obsidian Hydration Laboratory, includes:

- An introduction to obsidian hydration dating studies by Clement Meighan.
- Twenty-three discussion papers by numerous authors related to various aspects of obsidian hydration dating and characterization research in

California, Arizona, the Southern Plains, Mexico, and Guatemala.

- 6,500 hydration rim readings from archaeological sites in California, Nevada, Arizona, New Mexico, Colorado, Wyoming, Mexico, Belize, Honduras, Ecuador, Peru, Chile, Easter Island, Greece, Hungary, and the former Soviet Union.
- Bibliographies concerning obsidian source, hydration, and characterization research.

At 511 pages, this to me should be considered a permanent standard work in the library of any obsidian researcher. Supplies of the book at the publisher are dwindling and this could be your last chance to pick up a new copy at a great price.

GREETINGS FROM THE PRESIDENT

Welcome to 1993! Time now to finish all those reports that you were going to get done before Christmas. I finally managed to get out to the northwestern Great Basin at the end of October for that last obsidian sampling field trip of the year. Very productive. A little chilly out there at this time of the year, but the hot springs helped. I keep wondering when I'll run across another obsidian researcher hiking around some remote obsidian dome, but no such luck this time. A word of advice: bring along two spare tires if you're traveling solo out in the Basin backwaters.

By now, you should have received a notice of a special offer for *Obsidian Dates IV* (see the announcement elsewhere in this issue). We were able to make this available to you at the low price of \$10.00 each because of a special arrangement with the University of California Institute of Archaeology. If this type of offer proves successful, we plan to repeat it from time to time with other obsidian-related volumes. We also looked into reprints of currently

out-of-print works such as *Obsidian Studies in the Great Basin* (R. Hughes - 1984) but were unable to proceed at this time because of the cost of a minimum reprint run (typically 100 copies). Several of these "classic" obsidian works are no longer in print and it would be a real service if the IAOS could facilitate their longevity.

Included in this issue of the *IAOS Newsletter* is the long-awaited membership directory. Take a look at your directory entry and check to see that all the information is correct and present - for many of you, there will be some missing pieces. This is the first edition of the directory and some of our original membership data proved to be a bit sparse. You'll be receiving an announcement in the mail soon concerning several IAOS business items, one of which will be any additions or corrections to the membership directory. Please mail the announcement with corrections back to us and we'll make sure that future editions of the directory include any changes.

Also included in this Newsletter is the new 1993 IAOS flyer and membership application form. Feel free to make thousands of copies and to post them everywhere. The flyers are newly revised in anticipation of a major membership drive in 1993. We will also have available (thanks to Viviana Bellifemine) a Spanish-language version of the flyer. And, if you haven't gotten around to it yet, don't forget to renew your membership for 1993. To make renewals easier for everyone, we'll be moving to a standardized renewal month for all members each new year. Watch the next Newsletter for details.

Elections for IAOS officers for 1993-1994 will be coming up, so please give some thought to nominations for President-Elect and Secretary-Treasurer. You'll be receiving a nomination request in the mail soon. Voting will be carried out by mail prior to the 1993 Annual Meeting with the results announced at the meeting.

The IAOS Obsidian Bibliography (version 1.5) is nearing completion and will be available to all IAOS members at no charge later this winter. The desktop paper model will follow shortly thereafter. This is a substantial upgrade to the current version with several hundred new references added along with a completely rewritten user interface. We'll have the disk version in the mail to those of you who are

interested sometime before the next Newsletter. We also hope to have the paper version done in time for the 1993 Annual Meeting - with luck, you'll be able to pick up your copy then. Copies for those of you who cannot make it to the meeting will go out in the mail this spring.

Coming in the next Newsletter issue: Results of the obsidian characterization laboratory questionnaire that were distributed in 1992. This will complement Kim Tremaine's obsidian hydration laboratory overview that appeared in the last issue of the Newsletter.

That's all for this issue. Hope to see you at the 1993 Annual Meeting in Pacific Grove, California. Watch the next issue of the Newsletter for all the details.

Cheers, Craig Skinner

IAOS ANNUAL MEETING IS COMING UP!

The International Association for Obsidian Studies will be holding its fifth annual meeting on Saturday, April 10th, at noon, during the Society for California Archaeology Annual Meeting in Pacific Grove. We have reserved a private dining room for the event, and plan to serve a good lunch. So...come if you can make it. We hope to see you there. Details on how to get to the place (Asilomar) will be available in the upcoming issue or mailout (whichever comes first).

SHORT REPORTS

Compiled by Michael F. Rondeau of CALTRANS, Office of Environmental Analysis, 650 Howe Avenue, Suite 400, Sacramento, California 92825 USA; (916) 263-3375; FAX (916) 263-3384.

The number of archaeological projects involving specialized obsidian studies is constantly increasing. New reports are finalized, fresh studies are begun, and older findings remain obscured in the gray literature of CRM reporting. This short reports section seeks to provide a brief sampler of recent reports, research in progress, and reports on past studies that have been extent for sometime. For contributions to Short Reports involving current or past studies as well as those still in progress, contact Mike Rondeau.

**OBSIDIAN HYDRATION STUDIES AT
ANDERSON FLAT, LAKE COUNTY,
CALIFORNIA**

During the summer of 1992, an archaeological excavation of several sites located near Highway 53 in the Clear Lake Basin of Lake County, California was undertaken by Sonoma State University under contract to CALTRANS. Excavation involved numerous localities within sites CA-LAD-72, 510, 881, and 974. An obsidian hydration field lab was established near the excavation as part of this project. This obsidian hydration field lab, run by Lisa Swillinger and Thomas Origer, produced approximately 1000 obsidian hydration measurements during 12 weeks of field work. An Olympus BH-2 petrographic microscope used in conjunction with an Olympus Cue Micro 300 Digital Video Caliper system was used in order to generate these measurements. Due to the existence of this field hydration lab, measurements were able to taken within hours of artifact recovery, providing immediate information on site stratigraphy, integrity, and relative age.

Borax Lake obsidian dominated the assemblages recovered during this project, and sampling strategy reflected this domination by focusing on Borax Lake obsidian tools and flakes. However, Konocti and Napa Valley obsidian sources were also represented in the recovered assemblages. Band widths ranged from no visible band to 12 microns or greater, although band widths greater than 12 microns were not considered to be representative of human cultural activity. These measurements reflect a long history of human occupation in this area, ranging from the Paleoindian period on through to the ethnographic period.

Post-field hydration studies for this project are currently being conducted by Thomas Origer and David Fredrickson at the Obsidian Hydration Laboratory at Sonoma State University. This additional sampling will result in a total of 1500-2000 obsidian hydration measurements for this project. Post-field hydration studies will address issues such as relative dating of components and assemblages, temporal trends of artifact types and relative rate correlations of different obsidian sources.

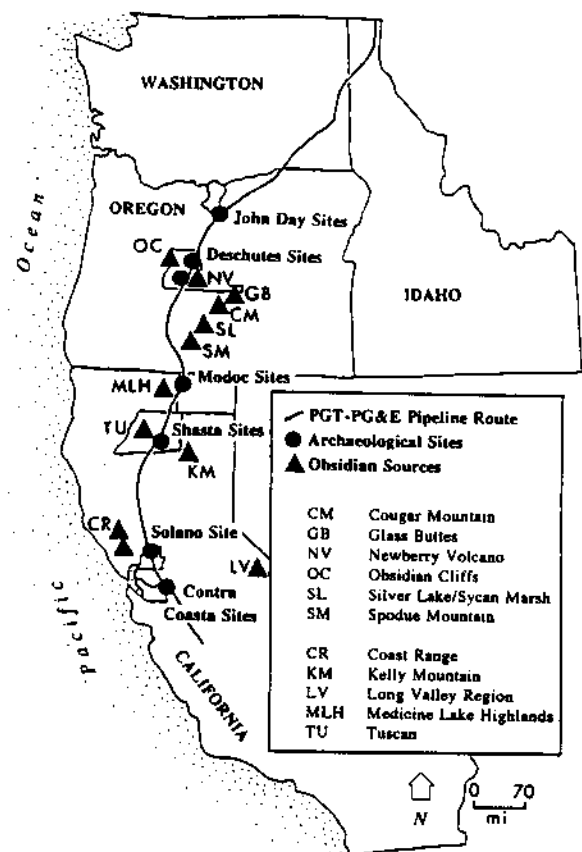
**OBSIDIAN RESEARCH AND THE PIPELINE
EXPANSION PROJECT: A 1991 VIEW FROM
THE PIPELINE**

by Craig E. Skinner, INFOTEC Research, Inc.

Introduction

Since 1988, INFOTEC Research, Inc. (IRI) has been the prime contractor for cultural resource studies associated with the Pacific Gas and Electric (PG&E) and Pacific Gas Transmission Company (PGT) Pipeline Expansion Project (PEP). This project, one of the largest pipeline projects in recent years, involves the construction of 845 miles of natural gas pipeline along a transect extending from Alberta, Canada, to Fresno County, California (Figure 1). Much of the project parallels an already existing natural gas pipeline dating to the 1960's.

Figure 1. Map of the PGT-PG&E Pipeline Expansion Project, major obsidian sources, and obsidian-related archaeological site locations.



A major archaeological component of the survey, testing, and data recovery activities carried out by IRI and subcontractors Biosystems Analysis and Far Western Anthropological Research Group has involved obsidian characterization and hydration studies of recovered artifacts. To date, over 6,000 artifacts have been characterized using x-ray fluorescence trace element methods by Richard Hughes (IRI) and BioSystems Analysis. Over 4,000 of these characterized artifacts were recovered during testing and data recovery efforts at Oregon sites in Gilliam, Sherman, Wasco, Jefferson, Deschutes, and Klamath counties. The remainder of the specimens were drawn from California sites in Modoc, Siskiyou, Shasta, Tehama, Colusa, Solano and Contra Costa counties. Tom Origer, Sonoma State University, has provided obsidian hydration measurements for a large proportion of these characterized artifacts.

Obsidian data for the PEP samples are most complete for items recovered during the 1991 field season and analyzed in 1991 and 1992. The remainder of this short research report will focus on the results of the preliminary analysis of these artifacts.

Results of 1991 PEP Testing Activities

In 1991, over 1100 obsidian artifacts from Oregon and California sites were characterized and examined for hydration rims. Oregon obsidian-related efforts were concentrated at fourteen Deschutes County sites located in the Newberry Volcano region near Bend and at five Sherman County sites situated in the John Day Canyon. In California, eleven sites from Modoc, Shasta, Contra Costa, and Solano counties were sampled.

Oregon. A total of 884 obsidian artifacts from nineteen Sherman and Deschutes County archaeological sites were selected for XRF and obsidian hydration analysis as part of the 1991 Oregon Pipeline Expansion Project activities.

Fifty-four artifacts from five sites in the John Day drainage of north-central Oregon, representing a 100 percent sample of analyzable obsidian artifacts, were chosen for analysis. The most striking characteristic of the results for the John Day obsidian studies is the predominance of obsidian from unidentified geologic sources. Between four and six unknown sources accounted for 72 percent of the characterized artifacts.

The low frequency of obsidian at the John Day sites (typically less than five percent) suggests parent obsidian sources located at some distance from the sites. Currently, we speculate that these sources may be located to the east or southeast of the John Day sites in the Ochoco and Malheur National Forests. With this problem in mind, numerous previously unexamined obsidian sources in north-central Oregon were sampled in 1992 by Richard Hughes. When completed, his geochemical analyses of the glasses may provide some resolution to the problem of the unidentified obsidian sources commonly recovered from north-central Oregon archaeological sites.

Deschutes County sites provided 830 artifacts for characterization and hydration studies. This sample comprised 3.7 percent of the more than 19,000 pieces of obsidian debitage recovered and 100 percent of all identified obsidian tools. A total of 13 identifiable sources or geochemical groups (not including several minor unknown sources) were assigned to the artifacts. Not surprisingly, Newberry Volcano, a major regional source of several pre- and post-Mazama obsidian flows and domes, was the major source area represented. Eighty-five percent of the artifacts originated from sources on the lower flanks of Newberry Volcano (McKay Butte and Quartz Mountain) or within the summit caldera. The remaining artifacts were correlated with sources in the central High Cascades (Obsidian Cliffs), the central Western Cascades (Inman Creek), the northwestern Great Basin (Cougar Mountain and Glass Buttes), and the Klamath Basin (Spodue Mountain and Silver Lake/Sycan Marsh). Fifty-four of the characterized artifacts were provisionally assigned to a provisional Unknown X group; it is not known yet whether this group represents unrecorded geochemical variation in the Newberry Caldera chemical group or whether it is a new source.

Preliminary analysis of the Deschutes County obsidian hydration data indicate heavy pre-Mazama use of materials from McKay Butte, the source of a visually distinctive glass located on the lower western slopes of Newberry Volcano. As evidenced by hydration measurements and the comparison of pre- and post-Mazama artifact samples, the use of McKay Butte glass decreased rapidly with the eruption of multiple post-Mazama obsidian flows in Newberry Caldera. Obsidian from these Newberry caldera sources rapidly displaced McKay Butte as the major regional obsidian source throughout the remainder of

the Holocene. Although most of the caldera flows erupted shortly after the Mazama event, the most recent of the flows, the Big Obsidian Flow, was emplaced only 1300 14C years ago. Anomalously thick hydration rims from several artifacts correlated with the Big Obsidian Flow led to the recognition of a previously unsampled early Holocene obsidian flow within the caldera that was nearly completely buried by tephra from Mount Mazama and from local vents. This 10,000 year-old obsidian flow, aptly named the Buried Obsidian Flow, was found to be very similar in trace element composition to the Big Obsidian Flow. Further trace element studies of the Buried Obsidian Flow glass are being carried out in conjunction with Tom Connolly, Oregon State Museum of Anthropology, and will provide more details about the chemical similarities of the two sources.

Hydration measurements of artifacts from several of the Deschutes County sites were hampered by the presence of an acid-resistant encrustation on many of the artifacts. A surprisingly large percentage of artifacts, typically between 15 and 20 percent, failed to yield readable hydration rims. The encrustation was found to be somewhat elevated in titanium (Ti), and had to be physically removed from those artifacts for which this minor element was considered source-diagnostic.

The overall picture presented by the analyzed Deschutes County artifacts is that of the dominant use of local obsidian sources combined with a marked mid-Holocene temporal shift in source preference, the latter due to the appearance of several post-Mazama obsidian flows in Newberry Caldera. There is no compelling evidence for the presence of active exchange systems in this region - the spatial distribution of the characterized artifacts can be most easily explained with models of direct access local procurement, procurement embedded within seasonal subsistence activities, and the occasional curation of artifacts, particularly tools.

California. Two hundred and fifty nine artifacts from eleven northern California sites were selected for obsidian analysis. Natural glass from four Modoc County sites (N=87) was found to originate almost exclusively from multiple sources in the Medicine Lake Highlands. The East Medicine Lake and Grasshopper Flat/Lost Iron Well/Red Switchback

chemical groups, the major sources represented among the Medicine Lake Highlands glasses, were responsible for 66 percent of the characterized artifacts. Six artifacts were found to originate from the 1100 year-old Glass Mountain obsidian flow. Like the mid to late Holocene flows at Newberry Volcano, this latter source is of particular interest because of its narrow chronological window of availability.

Obsidian studies at Shasta County sites (N=122) reveal a picture of local procurement from the widely-distributed Tuscan obsidian source (72 percent of the samples) along with significant longer-distance procurement (greater than 100 km) of obsidian from the Medicine Lake Highlands (23 percent). A single Kelly Mountain artifact was identified among the four Shasta sites.

Six artifacts from a small Solano County site (N=6) were found to originate from nearby Coast Range sources, primarily the Napa Valley source.

In the two Contra Costa County sites (N=43), Northern California Coast Range sources, particularly Napa Valley, dominate the collections with 32 samples. Small amounts of glass from Annadel and Borax Lake are also present. Trans-Sierran procurement of obsidian from the Long Valley Caldera region, a well-established pattern in central California sites, is indicated by the presence of four artifacts from the Casa Diablo, Bodie Hills, and Mono Glass Mountain sources.

1992 and Beyond. Obsidian-related research associated with the Pipeline Expansion Project is still very much a work in progress. In 1992, over 3,000 obsidian artifacts were selected for trace element and obsidian hydration analyses from Oregon sites in Jefferson, Deschutes, and Klamath counties and at California locations in Modoc, Siskiyou, Shasta, and Colusa counties. A significant collection of additional samples will also be processed in 1993. Trace element, obsidian hydration, and artifact data from the entire multi-year project are being gradually compiled into an extensive database that will be available for eventual analysis and interpretation. We anticipate that when the project is complete, this database will provide the largest single body of obsidian characterization and hydration data yet compiled from a single archaeological project. This body of

information should offer us an unprecedented look into the obsidian procurement patterns and obsidian hydration chronologies of central Oregon and northern California.

A LARGE OBSIDIAN DATABASE FOR THE NORTH-CENTRAL SIERRA NEVADA: PROBLEMS AND PROSPECTS

*by Charles H. Miksicek, BioSystems Analysis, Inc.,
Santa Cruz*

In the course of preparing a *Framework for Archaeological Research and Management in the North-Central Sierra Nevada and Overviews of the Prehistory of the Eldorado and Stanislaus National Forests*, BioSystems Analysis, Inc. has assembled four large database files with obsidian hydration and sourcing information for the region. At present the database contains 15 sites (235 records) for the Tahoe NF area, 80 sites (539 items) for Eldorado NF, 55 sites (1879 cuts) for the Stanislaus region, and 56 sites (2042 readings) for Yosemite National Park. This gives a grand total of 206 sites and 4695 hydration band measurements. These files include data for both the forests themselves and nearby sites in the same counties.

This database was gathered from individual files graciously shared by Tom Origer at the Sonoma State Obsidian Hydration Laboratory, Rob Jackson of the Lithichron - Laboratory of Obsidian Hydration (Rob now heads the BioSystems office in Sacramento), and records on file at BioSystems. Data from the UCLA Hydration Lab has not yet been incorporated into this database.

This whole project began with a simple attempt to assemble existing chronological information for the Stanislaus overview in an easily manipulated format. This first database, in DBASE IV Version 1.5, included artifact categories, catalog numbers, hydration data, source information, radiocarbon dates, drainage basin, and elevation (a proxy variable for EHT and vegetation community - I am, after all an archaeobotanist and not primarily an obsidian person). No provenience information other than site number was entered. About halfway through compiling the Stanislaus data, I learned that other researchers at BioSystems had intended to do this for the entire

north-central Sierra, so the Stanislaus effort became a pilot study.

Although this initial trial run was very time consuming, only a few minor problems were encountered. The Sonoma State files were in delimited ASCII format which could be imported into DBASE IV and merged into a single database. In the Sonoma State files, site number was not included as a separate variable but was reported as a line of text separating sets of hydration measurements. This problem was solved by first printing out individual ASCII files, deleting anecdotal lines of text, importing the files into DBASE, and then creating a new field with site number(s). The Lithichron files were in FOXPLUS which is completely compatible, and the BioSystems files were already in DBASE IV. A few older datasets had to be entered by keyboard. Variable fields were standardized by name, width, and type usually by creating a new field and renaming existing records. For example hydration band widths may have been reported as "Mean", "Mean1", or "Band1". Abbreviations for artifact types and obsidian sources also had to be made consistent (imagine having BH, BH(x), BH(v), BOD, Bodie, and Bodie Hills counted as six separate sources in a query). The Stanislaus database was kept in its original format but the process was streamlined for subsequent datasets. The Lithichron files were used as a template and other files were modified to fit this structure. While it took several weeks to pull together the Stanislaus database, find all of the supplemental information, and figure out all of the bugs, it only required three days to assemble the slightly larger Yosemite file.

As long as I am discussing problems I should mention that a file the size of the Yosemite database (440K) seems to be about the practical limit for desktop computers or small network applications. It takes a very long time to print this file, with summary statistics by site (count, mean, standard deviation, range) using the DBASE report function. Also this is near the memory limit for complex queries using Reflex, Paradox, Lotus, DBASE, or similar programs.

What are the advantages of pulling all of this information together into a few large databases? First of all it is much more appropriate to do exploratory data analysis, search for meaningful patterns, and test hypotheses if you have a large, statistically valid dataset. It is much easier to generate summary

statistics, tables, or graphics if the raw data are entered in some form of database or spreadsheet program.

Secondly a large dataset allows a researcher to more properly address broad-scale, regional questions such as chronology and exchange. It is difficult to get an adequate perspective from only a few sites.

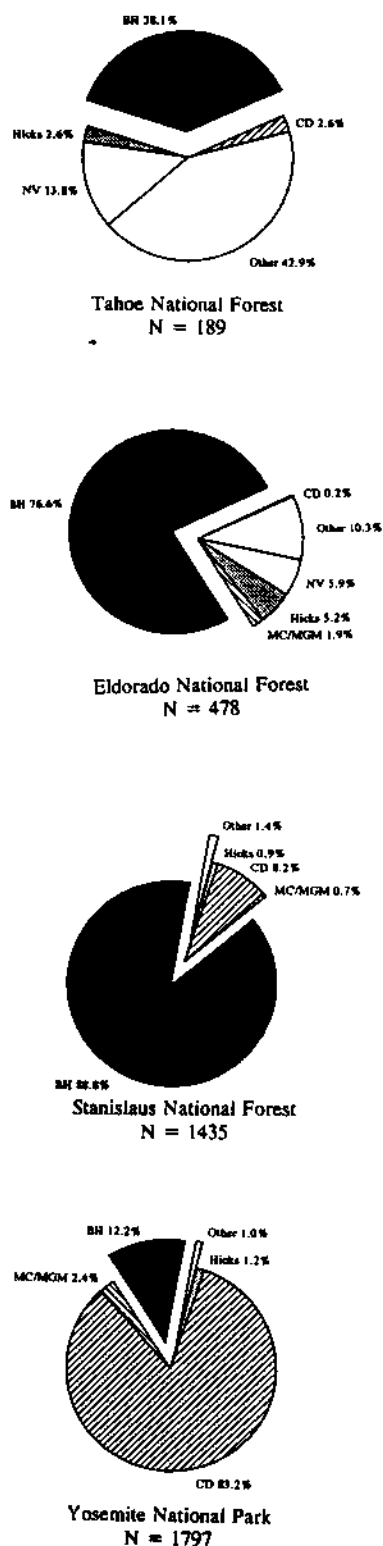
For example, prior to work at Clark's Flat (CA-CAL-S342) and Gabbot Meadow (eg. CA-ALP-192) it was generally assumed that the Sierras were only sparsely occupied prior to a thousand years ago. Nevertheless almost 60% of the hydration band measurements in the North-Central database, for both Bodie and Casa Diablo obsidians, are 4.0 microns or larger (82% \geq 3.0). [Note: There may be a little inherent bias in that people are probably more likely to submit older material for hydration, using the "why bother to cut another DSN?" approach to sample selection.]

The reciprocal relationship between Bodie Hills and Casa Diablo obsidian in the North-Central Sierra Nevada has often been discussed. Figure 1 presents available source information for the four large management units included in the present study. The transition from mostly Bodie to predominantly Casa D seems to occur between the Tuolumne (78% BH, 15% CD) and Merced (15% BH, 85% CD) River drainages.

It is also possible to start examining differences in the relative abundance of obsidian from various sources through time. Figure 2 summarizes hydration and source data from Stanislaus NF (mostly Bodie) and Yosemite NP (mostly Casa D). Do the contrasts between the two curves reflect slight differences in regional settlement, variations in source preference, dissimilar hydration rates, some unknown sampling biases, or a combination of the above factors?

By combining hydration measurements, source information, elevation, and independent chronological data (radiocarbon dates, time-sensitive artifacts, etc.), it should also be possible to refine and test source-specific hydration rate estimates for the west slope of the Sierra Nevada. Somehow that sounds like the basis for a future column though.

Figure 1. North-Central Sierra Source Data



North-Central Sierra Nevada Obsidian Hydration Profiles

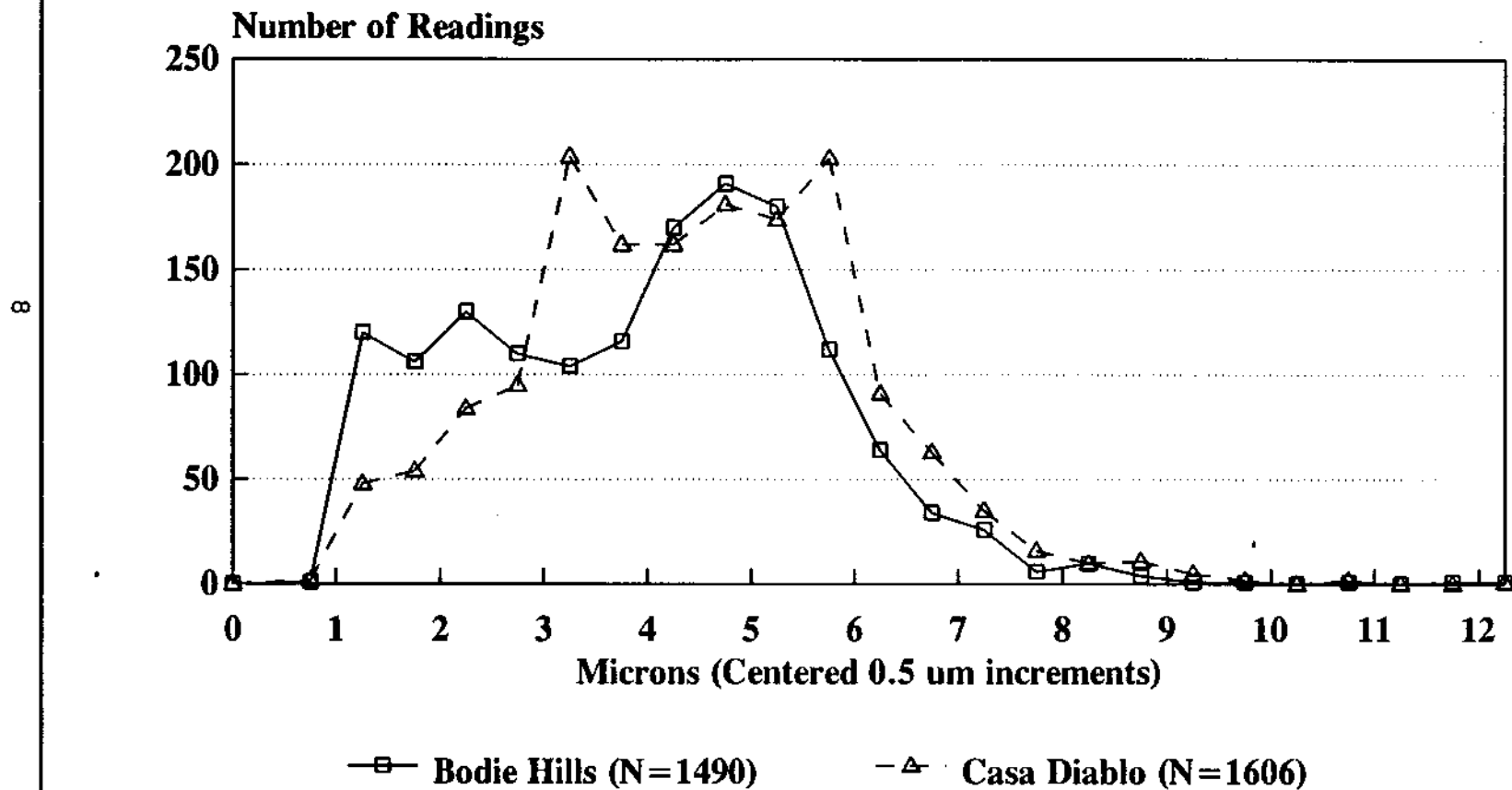


Figure 2. Stanislaus and Yosemite Data

ABSTRACTS AND ANNOTATIONS ON REPORTS AND PUBLICATIONS

Compiled by Kim Tremaine of BioSystems Analysis, Inc., 1017 Front Street, Sacramento, California 95814 USA; (916) 557-4500; FAX (916) 557-4511.

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.

Bailey, Jeff, Alan Bryan, Diane Cockle, and Ruth Gruhn

1992 New Information on Wilson Butte Cave, Idaho. Paper presented at the 23rd Great Basin Anthropological Conference, Boise Idaho.

ABSTRACT

New excavations at Wilson Butte cave recovered many artifacts and bone fragments from undisturbed zones in the lower deposits on the north side of the cave; as well, a great number of artifacts were recovered from the overlying disturbed deposits. The final report on the site stratigraphy and early artifacts by Alan Bryan and Ruth Gruhn is near completion, and results will be presented. A study of obsidian sources utilized by the prehistoric inhabitants has been carried out by Jeff Bailey, and Diane Cockle has completed a study of amateurs' artifact collections from the upper levels of the cave to address the question of ethnic identification of the latest prehistoric phase. Poster panels will summarize the significant new information.

Beck, Charlotte and George T. Jones

1992 Late Pleistocene/Early Holocene Territorial Use in Eastern Nevada. Paper presented at the 23rd Great Basin Anthropological Conference, Boise, Idaho.

ABSTRACT

Prehistoric hunter-gatherer mobility and territorial use has been of interest to Great Basin archaeologists for some time, yet getting at these aspects of prehistory through the archaeological record has proven quite challenging. Through the identification of raw material source areas utilized by late Pleistocene/early Holocene populations in eastern Nevada we have been able to discern local and regional patterns of toolstone conveyance as well as shifts in these patterns over time. In this paper we discuss these "micro" and "macro" source use patterns and how these patterns relate to strategies of mobility and territorial use during the late Pleistocene/early Holocene, period in eastern Nevada.

Cassidy, Julie K.

1992 Explaining Lithic Assemblage Differences in the Medicine Lake Highlands, Siskiyou County, California. M.A. Thesis, Anthropology Department, California State University, Chico.

ANNOTATION

Two prehistoric sites (Giant Crater and Doe Peak) located in the Medicine Lake Highlands at similar distances to Grasshopper Flat obsidian source, exhibited differences in flaked stone assemblages. Four prominent explanations as to variation were considered: (1) employment of different manufacturing technologies; (2) different functional purposes for the sites; (3) representation of two distinct ethnic groups; and (4) implementation of different mobility strategies. These explanations were substantiated with the exception of variation due to ethnic differences, given difficulties in assessing ethnic affiliation.

In addition to considering the above explanations, Cassidy also suggested that temporal differences in site use might contribute to an understanding of assemblage differences. Thus, hydration analyses were conducted on 137 obsidian specimens, yielding comparable micron ranges (Giant Crater 0.7 to 5.0µm; Doe Peak 1.2 to 5.7µm). Chronometric dates were derived based upon a rate developed by Basgall and Hildebrandt (1989) for sites in the Sacramento River Canyon, adjusted for difference in mean annual air temperature. Cassidy, in comparing the two sites, concluded that time overlap was indicated by micron

ranges, while temporal discreteness at these sites was indicated by micron means.

Green, James P.

1992 Obsidian Sourcing and Hydration Dating of Folsom Aged Artifacts from Owl Cave, Eastern Idaho. Paper presented at the 23rd Great Basin Anthropological Conference, Boise, Idaho.

ABSTRACT

Obsidian sourcing and hydration dating was undertaken in debitage, tools, and projectile points from the pre-8000 B.P. levels at Owl Cave. This study involved initiating a laboratory induced hydration study of source obsidians in the region, a means of controlling source specific hydration rates. In addition, source materials and artifacts were submitted for quantitative trace element analysis so that artifacts could be fingerprinted to specific sources. As temperature is a critical variable in obsidian hydration, ground and air temperatures in the site locality were investigated. These studies provided information on the sources and age of the Folsom aged artifacts, procurement spheres, artifact displacement, and the possibility of multiple Folsom occupation.

Hull, Kathleen L.

1992 Obsidian Hydration Studies: Initial Interpretations of Chronology and Obsidian Use. Paper presented at the 23rd Great Basin Anthropological Conference, Boise, Idaho.

ABSTRACT

As part of data recovery on the Kern River Pipeline Project, obsidian hydration analysis was completed for samples from sites in California, Nevada, and Utah. These data reflect a broad temporal span and, reviewed in concert with x-ray fluorescence geochemical source results for select samples, are useful in exploring diachronic patterns in obsidian use, particularly in the Utah portion of the pipeline route. The extensive sampling program undertaken in Utah has provided a foundation upon which to build a regional hydration database of use for relative temporal placement of site components and, too, for initial consideration of source-specific hydration rates.

Mazer, J.J., J.K. Bates, C.R. Bradley, and C.M. Stevenson

1992 Water Diffusion in Tektites: An Example of the Use of Natural Analogues in Evaluating the Long-Term Reaction of Glass with Water. *Journal of Nuclear Materials* 190:277-284.

ABSTRACT

A natural analogue approach is used to relate water diffusion in natural rhyolitic glasses of great age to water diffusion in nuclear waste glasses. Tektites are glasses of excellent durability with approximately 74 wt% SiO₂. They have a resistance to water diffusion similar to that for nuclear waste glasses where the diffusion coefficients are approximately 2×10^{-24} m²/s at 25°C. The results of a series of experiments with tektite glass in water vapor atmospheres between 150 and 225°C for up to 400 days are presented. Water diffusion was found to be the rate-determining process in all experiments. The reaction resulted in the formation of a birefringent hydration layer, that increased in thickness up to 4.8µm as a function of the square root of time. The temperature dependence of the reaction was quantified, allowing the experimental results to be extrapolated to repository-relevant conditions for nuclear waste glass. These calculations indicate that the water diffusion reaction process is slower than the reaction observed in nuclear waste glass experiments.

Raymond, Anan W.

1992 Obsidian Blades and Chert Bifaces: Two Lithic Technologies at Radtke Spring, Malheur National Wildlife Refuge, Oregon. Paper presented at the 23rd Great Basin Anthropological Conference, Boise, Idaho.

ABSTRACT

Receding floodwaters in 1990 revealed a dense archaeological site (35-HA-2011) at Radtke Spring, Malheur National Wildlife Refuge, Oregon. Wave erosion has washed away fine sediments leaving artifacts from presumably multiple occupations and activities all on the same surface. The cultural material is dominated by local Mud Lake Chert, and several imported obsidians. The organization of the chert and obsidian technologies is very different. The flintknappers assayed and reduced Mud Lake Chert into bifaces. While obsidian was reduced by

percussion into conical cores and blade flakes (Radtke Spring is the first reported case of core and blade technology in the Great Basin). The two technologies are solutions to toolstone availability, tool demand and use, and residential mobility. Limited evidence suggests that the two technologies are the product of different groups separated widely in time.

Rhode, David

1992 The World According to a Hydrating Obsidian Flake: Steps Toward Chronological Control of an Archaeological Landscape. Paper presented at the 23rd Great Basin Anthropological Conference, Boise, Idaho.

ABSTRACT

The success of the currently fashionable "landscape" or "distributional" archaeological perspective depends largely on how well we can accurately date the full range of archaeological phenomena in a region, and thereby periodize those phenomena into coherent occupational patterns. In the Yucca Mountain area, where much of the archaeology is comprised of surface lithic scatters of varying densities and distributions, obsidian hydration holds promise as a chronological technique applicable to much of the archaeological record. Because hydration is a temperature-sensitive process, and because temperature regimes vary considerably in different environmental settings throughout the region, correlation of hydration values of artifacts from different environmental temperature variation, such as the effects of elevation, landform aspect, substrate, and cover. This paper describes our efforts to map the environmental variability in temperature found in the Yucca Mountain region at various spatial scales, and to assess the chronological precision possible in the region using the obsidian hydration technique.

Schroth, Adella

1992 Preliminary Results of Dating the Stahl Site and the Pinto Basin Site. Paper presented at the 23rd Great Basin Anthropological Conference, Boise, Idaho.

ABSTRACT

This paper presents the preliminary results of archaeometric dating of the two type sites of the Pinto series of projectile points. Two sites from Pinto

Basin, Joshua Tree National Monument, Riverside, California are discussed. The reliability and validity of other archaeometric dates associated with Pinto points are also considered and the implications of the dates along with preliminary conclusions in regard to previous assumptions are given.

Swift, Mark

1992 Lithic Resources of Harney Basin, Southeastern Oregon. Paper presented at the 23rd Great Basin Anthropological Conference, Boise, Idaho.

ABSTRACT

Harney Basin is a land of rich and diverse lithic resources for stone tool manufacture. Hundreds of obsidian, basalt and CCS/MCS quarry sites have thus far been recorded on Forest Service and Bureau of Land Management lands within the basin. This paper summarizes the recorded quarry sites, looks at geologic information to suggest other potential obsidian source areas, and presents and analyzes existing sourcing data within the Harney Basin.

Woodall, Gregory R.

1992 Black Glass and Kern Gas: Recent Investigations of Obsidian Sources in the Eastern Great Basin. Paper presented at the 23rd Great Basin Anthropological Conference, Boise, Idaho.

ABSTRACT

The volcanic regions of southeastern Nevada and the western half of Utah contain numerous source areas of knappable obsidian. Many of these source locations were sampled in conjunction with data recovery efforts during the Kern River gas pipeline project. While several of the source areas have been previously reported, this paper presents new information on these known sources. In addition, several previously unreported sources, the potential for locating new source areas in the future, and the use of visual sourcing are discussed. Finally, implications of these new data for other research questions such as regional interaction and trade are presented.

Yohe, Robert M. II

1992 Lithic Resource Utilization at Rose Spring

(CA-INY-372): Results of a Technological Analysis of Flaked Stone Artifacts and Debitage. Paper presented at the 23rd Great Basin Anthropological Conference, Boise, Idaho.

ABSTRACT

One of the objectives of the recent re-excavation of the Rose Spring site in eastern California was to evaluate the impact of the introduction of the bow and arrow on local obsidian exploitation. Part of the strategy of this study involved the collection and analysis of a large sample of lithic reduction/production waste that was produced over the 6,000 year occupation of the site. A model of the anticipated change in the use of bifacial cores with the adoption of a new hunting technology requiring less lithic material was posited then tested by using the data generated from the this study.

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.

VIDEO-CALIPERS IN OBSIDIAN HYDRATION ANALYSIS

Video-calipers first became available to industry in the early 1980s. In the IAOS Newsletter #1, Fall 1989, the editor provided a brief introduction to one of these units, the CUE Micro 300. At Obsidian Hydration Analysis Service I have used a CUE 300 for almost a year and have found it far superior to the filar micrometer. I feel that a brief review of a system would be useful to other labs thinking about upgrading their equipment.

Advantages of Video-Calipers

1) There is no physical distance between the sample image and the measuring device, reducing possible optical/mechanical alignment problems. Additionally, with a video-caliper one bypasses a pervasive problem with filar micrometer eyepieces--that they tend to loosen themselves

within the microscope observation tube, allowing movement of the micrometer measurement lines over the sample image.

- 2) The video-caliper system produces far less eye strain because the technician can take measurements using both eyes, as opposed to one eye with the filar micrometer.
- 3) The video-caliper provides a larger field of view than the filar micrometer, thus requiring less sample manipulation and refocusing.
- 4) Measurement output can be directly transmitted from the video-caliper to a database. The Cue Micro models 200 and 300 provide an RS 232C serial port that can output the loci of individual measurements in ASCII for either immediate printing or incorporation into an optional computer database.
- 5) The video-caliper provides calibration presets for each objective lens, allowing calibrated magnification changes when investigating the sample. These calibration presets allow measurement with any objective, saving time and providing more accurate hydration band measurement and analysis. Often, a technician has to measure samples with somewhat ambiguous bands. To insure that what is being measured is indeed hydration, different magnifications help distinguish slight bevels or geo-chemical inclusions in samples.
- 6) Because video-caliper systems use video monitors, numerous settings for color, sharpness, and contrast are available.
- 7) By recording video signals from the caliper unit, the technician can document the loci of all measurements, thus providing a first step in hydration measurement replicability. Videotaped microscopy sessions can then be curated together with thin-sections, providing a permanent record.
- 8) The video-caliper facilitates instruction in hydration measurement by displaying the sample image to a video monitor. Technicians then can discuss their criteria for loci selection and optical adjustments before measurement. Students benefit from displayed images by seeing what a

beveled edge, a diffused band, and a band acceptable for measurement look like.

- 9) Olympus Corporation [see below] sells an optional "joystick" that allows the manipulation of video-caliper measurement lines. I have not found this option particularly useful. The advantage of this device is its placement near the microscope base, providing for slightly faster measurement. During measurement the technician regularly has to adjust the color and intensity of the measurement lines on the video-caliper unit, negating any advantage to having the "joystick" closer to the microscope base.

Disadvantages of the Video-calipers

- 1) The cost! Scientific Instruments Company has a number of packages that incorporate a video-caliper system into an existing microscopy system. These systems include a video camera, video monitor and the video-caliper unit. The prices for Olympus systems are \$2890 for the Cue Micro 100; \$3695 for the Cue Micro 200; and \$4395 for the Cue Micro 300. To implement these systems a trinocular head attaches to the microscope base and a 2.5x lens magnifies the optical image to a charged coupling device in the video camera.
- 2) Other vendors sell video-caliper products that are less costly. Boeckeler Instruments [available through Scientific Instruments Company] offers a complete measurement system for about \$3495. The Boeckeler system is more complicated than the Olympus system because it uses video image masks. A mask is a video-generated measurement tool superimposed upon microscopically derived optical images, providing point-to-point measurement. This feature is not available on the Olympus models.

The only disadvantage, other than cost, of video-caliper measurement systems in obsidian hydration measurement is the reduced quality of the displayed image. However, there are display and video camera options (particularly red, green, blue, and gray scale systems) available that mitigate reduced image quality.

Video-calipers are powerful measurement tools, providing many advantages to obsidian hydration

laboratories. The ability to record microscopy sessions and to depict the loci of measurements taken along hydration bands will increase the repeatability of obsidian hydration determinations. Moreover, displaying sample images on video monitors will allow obsidian hydration technicians to discuss their criteria for locus selection and methods for measurement, increasing inter-observer reliability.

For more information contact:

Jeff Hamilton; Obsidian Hydration Analysis Service, 5728 Calmor Avenue, Suite 4, San Jose, California, U.S.A., 95123; voice: (408) 578-9034.

Olympus Corporation; 4 Nevada Drive, Lake Success, New York, U.S.A., 11042-1179.

Powell Vision Systems; Tom Cavallero, 808 Alamo Drive, Suite 323, Vacaville, California, U.S.A., 95688; voice: (707) 447-9454.

Scientific Instrument Company; 1128 Evelyn Avenue, Sunnyvale California, U.S.A., 94086; voice: (408) 739-2631.

MEETINGS AND EVENTS

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

February

Feb. 8-11. Geologic Remote Sensing Meeting. Pasadena, CA, USA. Nancy Wallman, ERIM, Box 134001, Ann Arbor, MI 48113 USA. 313-994-1200 ext. 3234; fax 313-994-5123.

Feb. 11-16. American Association for the Advancement of Science, Annual Meeting. Boston, MA, USA. AAAS, 1333 H St. NW, Washington, DC 20005, USA (202) 326- 6400.

April

Apr. 7-11. Society for California Archaeology Annual Meeting. Asilomar, CA, USA. Society for California Archaeology, Department of Anthropology, California State University, Fullerton, CA 92634; 714-773-3977. **The Annual IAOS Business Meeting will take place during Saturday (4/10) at noon during the SCA meeting.**

Apr. 10. IAOS Business Meeting. Asilomar, CA, USA.

Apr. 11-17 Society for American Archaeology 58th Annual Meeting. St. Louis, MO, USA. Jay F. Custer, Department of Anthropology, University of Delaware, Newark, DE 19716 USA.

October

Oct. 25-28. Geological Society of America, Annual Meeting. Boston, MA, USA. Geological Society of America, 3300 Penrose Place, Boulder, CO 80301, USA. (303) 447-2020.

1994

Apr. 11-15. Materials Research Society, Spring Meeting, Symposium: Materials Issues in Art and Archaeology IV. San Francisco, CA, USA. Materials Research Society, 9800 McKnight Road, Pittsburgh, PA, USA; 412-367-3012.

Jun. 5-11. Geochronology, Cosmochronology and Isotope Geology (ICOG-8). Berkeley, CA, USA. Garniss Curtis, Institute of Human Origins-Geochronology Center, 2453 Ridge Road, Berkeley, CA 94709 USA; 510-845-4003; fax 510-845-9453.

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:

*Lisa Swillinger, Secretary-Treasurer
Department of Anthropology
California State University at Chico
Chico, California 95929-0400
(916) 898-6256*

**CALL FOR ARTICLES, REVIEWS,
SHORT REPORTS, ABSTRACTS, AND
ANNOUNCEMENTS**

Submissions for articles, reviews, short reports, abstracts, or announcements for inclusion in the next newsletter should be received by March 15, 1993. 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.x), Wordstar, and Microsoft Word or ASCII text formats. A hard copy should accompany diskettes. Articles or Reviews: Send to Lisa Swillinger (address above).

Short Reports: If you are interested in briefly reporting on research findings (e.g., one column in length), contact Mike Rondeau at CALTRANS, Office of Environmental Analysis, 650 Howe Avenue, Suite 400, Sacramento, California 92825; (916) 263-3375; FAX (916) 263-3384.

Abstracts & Annotations: If you are interested in submitting an abstract or annotation, please contact Kim Tremaine at BioSystems Analysis, 1017 Front Street, Sacramento, California 95814; (916) 557-4500; FAX (916) 557-4511.

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 Phoebe Hearst Museum of Anthropology, 103 Kroeber Hall, University of California, Berkeley, CA 94720 USA; (510) 642-3681; FAX 643-8557; BITNET: SHACKLEY @ UCBCMSA. Internet: shackley@cmsa.berkeley.edu

IAOS OFFICERS, 1992-1993

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