International Association for Obsidian Studies Newsletter

Number 3 **Summer 1990**

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Assembled and edited by R. J. Jackson

Contents

NEWS AND INFORMATION

IAOS Annual Meeting

The International Association for Obsidian Studies (IAOS) held its annual meeting on Friday, April 6, 1990, at the Holiday Inn in Foster City, California, during the Society for California Archaeology Annual Meeting. Over two dozen members and interested persons attended. A wide range of topics were discussed, including: 1) goals and achievements of the IAOS; 2) new business and election of new officers; and 3) standards for data collection and analysis. A report of the proceedings begins on page 10 of the Newsletter.

IAOS Obsidian Studies Volume

The Society for California Archaeology symposium on obsidian studies, organized by Kim Tremaine, produced a number of well-recieved papers covering a wide variety of topics (Newsletter Number 2 included paper abstracts). The session prompted numerous requests for copies of symposia papers, and several individuals recommended the publication of symposia papers.

Institutional members of the IAOS have agreed to sponsor a volume as the first of what may become a series designed to disseminate meeting papers and interesting articles that may not otherwise be published. The process of publication in major journals takes many months or even years, and involves series of reviews and revisions. While this process is necessary to maintain high quality and academic standards, it also limits the sharing and distribution of information and new ideas. Many excellent papers are never made available to an audience wider than the institution or conference at which they were presented. An "occasional papers" series may help to address this problem. All papers will be subject to some editorial attention, and papers will be presented in American Antiquity format. However, the volume will not be subject to lengthy external review. This means that authors will be primarily responsible for content and clarity.

Sonoma State University's Obsidian Hydration Laboratory has offered to assist with the costs of production. We will keep the IAOS members informed on the availability of the volume in future Newsletters. We anticipate that the volume will be completed in the spring of 1991.

Obsidian and Flaked Stone Technology Series

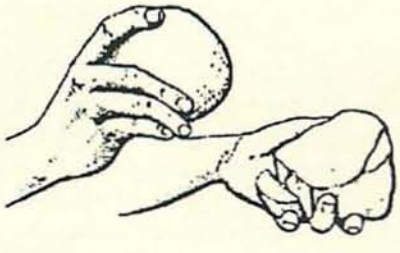
Obsidian specialists have focused primarily on the geochemical attributes and environmental variables affecting the rate of hydration of obsidian. Archaeology has witnessed significant advances in the understanding of these attributes and processes. However, prehistoric technology and discard patterns, which initially formed the archaeological deposits from which obsidian is recovered, have been largely ignored by archaeologists selecting specimens for obsidian source and hydration studies.

Many regard obsidian hydration as too imprecise to be useful, subject to uncontrollable and unknowable factors, and its application as a waste of time and money. This perspective results from the disappointment many have experienced when obsidian hydration data do not fit their assumptions concerning the age, integrity, and structure of archaeological sites. Skeptics of obsidian hydration have understandable concerns. Given limited money for analysis, it is certainly more responsible to fund studies with a history of producing useful information than it is to conduct certain studies (i.e. obsidian hydration) simply because such studies can be performed, regardless of their utility.

While reluctance to conduct or rely on obsidian studies is understandable (hydration studies in particular), obsidian hydration studies have not been granted a fair trial. I believe that there are at least two major reasons for a frequent lack of conformance between data and expectations. First, archaeologist's assumptions regarding the nature of prehistoric site occupation, the formation processes that affect the distribution of archaeological materials in a deposit and site structure, may be incorrect or at best simplistic. Second, even if basic assumptions are correct, sampling and analytic procedures may not select obsidian samples appropriate to address the intended research questions. Unless lithic technology is considered in obsidian source and hydration studies, inappropriate samples may be selected and the results of such studies will often disappoint and fail to "make sense".

The results of obsidian studies may also reflect the unforeseen complexity and patterning of archaeological deposits and prehistoric human behavior. Rather than respond to unexpected data by critically examining models, expectations, and sampling procedures, many question the physical process of obsidian hydration or problems in measurement.

Obsidian hydration studies can be granted fair evaluation only if researchers account for the major variables that affect the nature of obsidian deposits and artifacts, as well as the geochemical and hydration variables. Lithic technology includes: raw material procurement: stone tool manufacture; artifact use, maintenance, reuse; scavenging and recycling of used tools and manufacturing byproducts; and the deposition of lithic tools and debitage. Archaeological assemblages were affected by all of these facets of technology, and should be accounted for in conducting obsidian source and hydration studies. The following article by Mike Rondeau is the first in a series that considers lithic technology as an important aspect of obsidian studies.



ARTICLE

OBSIDIAN HYDRATION AND LITHIC TECHNOLOGY

by Michael F. Rondeau

Abstract

The use of obsidian hydration analysis as a dating technique is often relegated to a generic level of inquiry (e.g., site placement in time). The potential of hydration data to explore a wide range of additional research questions fundamental to the understanding of point typologies, the timing of changes in subsistence and mobility strategies, and the understanding of the structure of site deposits and their cultural components, are discussed. A need for specific research questions guiding the generation of hydration rind data based on technologically selected obsidian samples is recognized. Examples of how lithic technology can be integrated with hydration studies to address a range of additional research questions are offered.

Introduction: The Changing Face of Obsidian Studies

The use and reuse of obsidian for flaked stone tools in California has proven in recent years to have been much more varied and complex during prehistory than previously anticipated.

In the Sierra Nevada mountains, complex patterns of obsidian scavenging, reworking, and reuse are emerging (Hall 1984; Jackson 1984; Moratto 1972; Munday 1984; Skinner 1986, 1987, 1988a, 1988b). Comparable levels of complexity are also being recognized in the Lower Sacramento Valley (Dougherty 1990) and the North Coast Ranges (Bartel 1979; Basgall and Bouey 1984; Goerke and Cowan 1983; Goerke and Flenniken 1978; Orlins 1972; White and Fredrickson 1981).

Variations in subsistence and mobility strategies can be indicated by changes in obsidian procurement, use, and reuse. Such research avenues are, however, seldom exploited. The extent of these behavioral shifts, as indicated by the flaked stone record, are not well documented. The presence and extent of changes identified by technological studies can be corroborated and enhanced by hydration rind data. Archaeologist's ability to infer changes in the flaked stone record has been hampered by poor temporal definition. Obsidian hydration can provide direct temporal evidence for these changes. The following examples offer a sampling of the kinds of research possibilities that may be addressed when hydration and technological studies are unified.

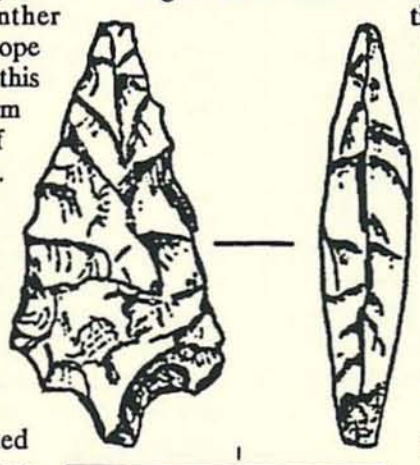
Case One: CA-CAl-629/630

Studies currently in progress on flaked stone from the West Locus of CA-Cal-629/630, a large prehistoric oc-

cupation site in the west central foohills of the Sierra Nevada, are used to illustrate four examples of how research might benefit from the combined use of hydration and technology (Rondeau n.d.). The first two examples concern the twin issues of projectile point type clarifications and the timing of point rejuvenation. The barbed-like points of Phase I (A.D. 500 to A.D. 1500) of Central California's Late Horizon (A.D. 500 to Contact) are made from a variety of silicate materials as well as obsidian. The issue of appropriate typological placement for this Gunther Barbed-like point type is beyond the scope of this paper, although the author views this nomenclature with skepticism. The term Gunther will be used only for sake of brevity to describe a general point form.

Also found in this deposit are somewhat smaller points with leaf to ovate blade elements and similar, small contracting stems. Initial examination of technological attributes (Rondeau n.d.) suggests that the small, stemmed leaf type is a rejuvenated form of the Gunther type. Unrejuvenated specimens of these Gunther points commonly evidence damaged or missing barbs (Figure 1a). Rejuvenation, in part, reshaped the lower portion of the blade margins where the barbs were damaged, causing prehistoric stone workers to alter the "Christmas tree" outline, resulting in excurvate margins (Figure 1b).

Figure 1a: 88-2136



(not to scale: 3.7 cm wide)

Illustrated by Dennis Leinfelder

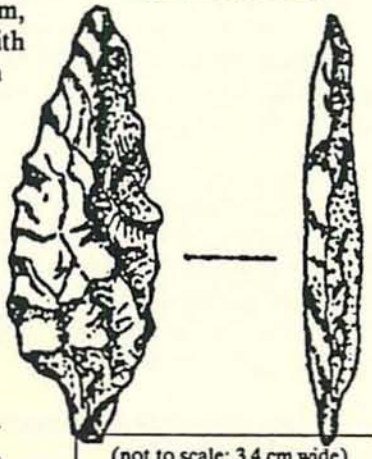
These points may have been rejuvenated during the same period as their original manufacture and use. Evidence to support or refute this idea could be generated by measuring hydration on portions of the points that were rejuvenated, compared to hydration on portions that had not been reflaked.

Another example deals with the common problem of points that do not fit within the morphological range of established types. One obsidian point specimen from CA-Cal-629/630 (a large Gunther specimen) was manufactured from an earlier, larger biface fragment. Not only was the original biface significantly larger in length, width and thickness than the Gunther, but the cross section ranged from highly bi-convex towards a diamond shape. Patches of weathered flake scars on both point faces are remnants of earlier biface surfaces. This reuse of an earlier biface piece could be consistent with the idea that rejuvenation of the Gunthers was practiced by their original makers. Hydration data might serve to indicate whether this piece was reflaked during the same period as the manufacture of the Gunthers.

The third research example has to do with the temporal span of use of the site's West Locus, the original age of the reworked biface fragments, and the temporal placement of the reworking activity. A majority of data, including projectile points (Gunther, Desert Side-notched and Stockton Serrated) from Phases I and Phase II (A.D. 500 to A.D. 1500, and A.D. 1500 to Contact), indicate mainly a Late Horizon component with a very limited occurrence of late and transitional Middle Horizon (1500 B.C. to A.D. 500) artifacts. During technological analysis, a number of small biface fragments were discovered in the obsidian debitage whose form and proportions suggested point types that pre-date the Late Horizon. A number of these indicate that their fragmentary nature was due in part to reworking. In some cases bipolar percussion was clearly practiced. Again, hydration analysis could indicate the original temporal placement of these pieces by examining rind thicknesses on the remnant biface surfaces.

The hydration range for the original bifaces could suggest a more substantial pre-Late Horizon occupation that has been masked by subsequent reworking of these biface fragments. The large Gunther might also provide hydration data on this question. Further, the temporal placement of the reworking of these fragments and the use of bipolar percussion could also be indicated by hydration data. These data could be generated by cuts on flake scars that indicate reworking and bipolar flaking. Temporal placement of this reworking, presumably for the manufacture of obsidian flakes, could then be shown to be temporally equivalent with these larger biface pieces or that it post-dated them, such as being coeval with the time of rejuvenation of the Gunthers.

Figure 1b: 88-5177



(not to scale: 3.4 cm wide)

Illustrated by Dennis Leinfelder

The final research topic for the West Locus of CA-Cal-629/630 concerns the following issues: 1) the placement of hydration cuts on debitage specimens, 2) the temporal placement of obsidian percussion biface thinning flakes, 3) pressure biface shaping flakes, and 4) whether or not the reworked obsidian biface pieces were scavenged elsewhere for reworking and brought to the West Locus.

The reworked obsidian fragments, even if they show an earlier period of manufacture, might have been scavenged at another locus of CA-Cal-629/630 and brought to the West Locus later in time for reworking. If this could be substantiated, then these specimens would not argue for a more substantial pre-Late Horizon presence.

Testing for evidence of scavenged obsidian from non-West Locus sources could be accoomplished by searching for double hydration readings on a technologically selected sample of the two flake types mentioned above. These readings would be taken on both the dorsal and ventral flake surfaces. The ventral rim readings would determine in what period the flakes were produced during biface manufacture. The dorsal readings would indicate during what period the previous biface surface had been flaked. If the ventral surfaces proved to be overwhelmingly late in time compared to older dorsal readings, then the "scavenging from elsewhere" hypothesis might be upheld. However, if numerous ventral surfaces also retain the older rim readings, then biface manufacture by pre-Late Horizon period site occupants occurred, also arguing for a more substantial earlier occupation.

Case Two: CA-Col-61

The following example concerns the hydration analysis of technique-diagnostic debitage and the placement of the use of these flaking methods within a site-specific chronology at CA-Col-61 (Rondeau 1990). General hydration dating of the obsidian dominated debitage defined two distinct sets of obsidian rind thicknesses in different site areas.

In the main site area, a single period of obsidian flaking accounted for nearly all of the obsidian debitage. The sparse, western margin of the site exhibited a pattern of more equal presence of obsidian from the main time period with that from periods both earlier and later in time although the debitage numbers were small.

The more dense eastern area contained both flakes from the notching of bifacial artifacts, and bipolar flakes, at least in part from the reworking of bifaces. Neither flake type was recovered from the western area. Hydration data could serve to temporally place not only the notching and bipolar activities, but the age of the pieces that were being reworked by bipolar percussion.

Case Three: Linguistic Prehistory

Attempts to study linguistic prehistory have been plagued by an inability to make connections between the archaeological record and the predecessors of ethnographically known linguistic groups. One problem has been in assigning linguistic affiliations to artifact assemblages. Usually there are no acceptable archaeological correlates to the behavioral patterns of specific linguistic groups. Without behavioral correlates, there can be no attempts to identify the results of those behavior patterns in the archaeological record. This methodological gap usually results in linguistic assignments being no more than poorly supported assertions. However, this need not always be the case.

The results of the field analysis of fourteen lithic scatters on the Eastern Madeline Plains in northeastern California has suggested that an ethnographic boundary may be defined between the Pit River Indians to the west and Northern Paiute groups to the east by what appears to be differential reduction of obsidian pebbles (Rondeau 1987).

The Pit River groups and others further west such as the Shasta and Wintu used bipolar percussion to flake obsidian pebbles while to the east, reduction of the same raw material type appears to have been accomplished by direct free-hand percussion. Adequate dating of lithic scatters in Northern Paiute territory remains to be accomplished along with the control of other variables. However, if obsidian data should indicate the contemporaneity of these two reduction techniques for small obsidian pebbles, and the needed corroboration of additional field data is provided, then not only might an ethnographic boundary be identified, but hydration data could also serve to document the chronology of the Paiute intrusion into California.

Budgeting for Hydration Research

If hydration budgets are exhausted prior to the completion of technological studies of flaked stone, research potentials like those enumerated above cannot be addressed. The case examples above provide research questions valid for certain regions of California. As such, these questions can be incorporated into proposed research designs, thereby earmarking in advance, an appropriate portion of the hydration budget.

The value of defining both the structure of the stone tool record and its changes through time, is found with its relation to the past systemic context of the larger social and adaptive systems which produced it. If the argument is accepted that the very structure and changes to that structure are the result of, and therefore reflect, larger social and adaptive behavior sets, then a temporally controlled, behavioral definition of the stone tool record may be expected to provide insights into an array of past activities beyond just those of tool manufacturing and use. The potential for a more precise temporal placement of shifts in adaptive strategies, through the combined use of technological and hydration analyses, as well as a more precise definition of the types of social groups involved, and changes in their activities, are issues that warrant more careful consideration in the construction of research designs and the budgets funding such proposals.

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n.d. Preliminary Findings: Report on the Analysis of Flaked Stone from the West Locus of CA-Cal-629/630, Calavaras County, California. Ms. in preparation.

Skinner, E. J.

1986 Appendix A: Analysis of Flaked Stone from the Crane Valley Hydroelectric Testing Program. In: Cultural Resources of the Crane Valley Hydroelectric Project Area, by S. K. Goldberg, S. S. Salzman, E. J. Skinner, J. Burton, M. E. Skully, J. J. Holson, and M. J. Moratto, Vol. III, Part 2, pp. 419-594. Ms. on file Pacific Gas and Electric Company, San Francisco.

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1988b Scavenging and Reuse: An Alternative to Models of Late Prehistoric Trans-Sierran Exchange in Central California. Paper presented at the 22nd Annual Meeting of the Society for California Archaeology, Redding.

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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. The IAOS Newsletter will alert its readers to some of this information by reproducing abstracts and summarizing both new and old literature that may be of particular interest to IAOS members.

Dougherty, John W.

1990 *The Obsidian Projectile Points of the King-Brown Site: CA-Sac-29, Sacramento County, California.* M.A. thesis, Department of Anthropology, California State University, Sacramento.

This study revisits the King-Brown site, CA-Sac-29. William Olsen first wrote a detailed excavation report of the site based on excavations carried out by Sacramento State College in the early 1950s. However this was neither the first nor the last series of excavations to be conducted at the site. Earlier, in 1939, tests had been made at the site by the Sacramento Junior College, under the direction of Franklin Fenenga. Subsequent to the 1950s another excavation was conducted in order to salvage information from the site before it was partially destroyed by the construction of Interstate 5. CA-Sac-29 has been a rich, but largely unacknowledged, source of information about the prehistory of California, supplying data for Fenenga's study of projectile point weights and Gifford's studies of Californian bone and shell implements (Fenenga 1953; Gifford 1940, 1947).

The present work re-examines the collection of obsidian projectile points from the King-Brown site. Using obsidian hydration data from the site compiled largely by L. D. Arnold (1969) and XRF information collected by T. Jackson (1974, 1986), the typological variation in projectile points, by obsidian source, was tested for temporal change. During the course of the analysis over 1,000 obsidian artifacts and fragments were examined. Over 400 were at least partially typeable.

In general, it was found that the data from CA-Sac-29 were in agreement with previous models of Central California prehistory. However, certain generalizations that have become common places in discussions of the region's prehistory were found to be unwarranted. In particular statements regarding changes in the Stockton Series projectile points through time were not found to be reflected in the data. Also shifts in the source area of obsidian tool material were not as expected. The earliest period of site use, marked by hydration rinds ranging from 2.8 microns to about 4.8 microns, used obsidian solely from the Napa source. The later period, characterized by Augustine Complex traits, while still dominantly marked by Napa obsidian, also shows a diverse set of trans-Sierran obsidians from sources as distant as Southern Oregon and the Owens Valley. These exotic glasses are associated with a morphologically diverse set of artifacts, excluding the most common forms associated with the Stockton Series.

In conclusion, it seems that the Central California Middle Horizon may have been more regionally complex than generally thought. Regional complexity continued to develop during the later period, with a greater incidence and possibly new forms of inter-regional exchange. At CA-Sac-29 these exchanges probably took the form of whole single artifacts, likely the result of gift exchanges or possibly gambling losses, or some similar mechanism.

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Grenn, R.C., and J.R. Bird

1989 Fergusson Island Obsidian from the D'-Entrecasteaux Group in a Lapita Site of the Reef Santa Cruz Group. *New Zealand Journal of Archaeology.* Volume 11:87-99.

Abstract

The use of a number of the known Pacific island obsidian sources by people assigned to the Lapita cultural complex is well established. Until now, however, such use of known sources in the D'Entrecasteaux Island Group off the northeastern Papua New Guinea coast has not been documented. This paper seeks to show that obsidian from one of the more accessible sources on Fergusson Island, Kukia, may occasionally appear in sites of the Lapita cultural complex. It sets out the reasons for believing that one flake from a Lapita site in the Reef Islands of the Santa Cruz Group is from this source and explores some of the implications.

Seelenfreund, Andrea, and Charles Bollong

1989 The Sourcing of New Zealand Archaeological Obsidian Artefacts using Energy Dispersive XRF Spectroscopy. In *Saying So Doesn't Make it So: Papers in Honour of B. Foss Leach.* University of Otago Printing Department.

Editor's Summary

Five obsidian source areas are documented in New Zealand, all occurring on North Island. Using the Otago University X-Ray Fluorescence Spectroscopy facility, discrimination is clear between Mayor Island and other North Island sources (Northland, Inland, Coromandel, Great Barrier), although separation within these last three sources is not successful. Therefore, the XRF procedures are best suited to discriminate between Mayor Island and all other New Zealand obsidian sources. As part of a large research project analyzing the use and distribution of New Zealand obsidian, artifacts from 58 archaeological sites were analyzed to determine their origin. The archeological assemblages were separated into groups of approximately contemporaneous sites (based on radiocarbon dating) to allow for a comparison of the sites on a regional and local basis to detect changes in the use of various obsidian sources through time. The article provides a detailed description of the energy dispersive XRF spectroscopy instrustumentation and procedures.

Obsidian use was interpreted by site function within each chronological group. The study indicates that although Mayor Island obsidian was the most popular obsidian used at early sites throughout New Zealand, other sources were also exploited. Through time, other sources were used increasingly, particularly when these sources were close at hand. The authors suggest that changes in source use may reflect increasing difficulty in obtaining Mayor Island obsidian, particularly within the North Island. Ties between islands, as evidenced by obsidian distribution is also discussed. The study also indicates that source use varied according to site function, generally with a single source occurring at temporary hunting camps.

Stevenson, C.M., J. Carpenter, and B.E. Scheetz

1989 Obsidian Dating: Recent Advances in the Experimental Determination and Application of Hydration Rates. *Archaeometry* 31(2):193-206.

Editor's Summary

A laboratory method of obsidian rate determination is advocated over methods that correlate obsidian hydration rind thicknesses with radiocarbon dates. The paper assesses the ability of accelerated induced hydration methods to develop hydration rate constants at elevated temperatures and pressures, and evaluates the potential of a heat flow model for estimating the temperature at different depths within the soil. A temperature prediction model often used by solar scientists and civil engineers to determine soil temperature by depth was used to calculate the daily soil temperature to produce an annual rate. The authors examine obsidian artifacts from the Joyce Well site, a well-dated pueblo in southwest New Mexico, to assess the suitability of the approach. The range of obsidian hydration ages calculated for archaeological specimens, based on the rate derived from the induced hydration experiments (A.D. 1147 $\pm$ 118 years to A.D. 1537 $\pm$ 88), were in fairly good agreement with other archaeological evidence, including averaged radiocarbon dates, which produced dates ranging from A.D. 1250 to A.D. 1400. The authors advocate careful experimentation in accelerated rate determination procedures, as well as evaluation of soil temperature prediction models, before they are routinely applied.

Sheppard, P.J., R.G.V. Hancock, L.A. Pavlish, and R. Parker

1989 Samoan Volcanic Glass. *Archaeology in Oceania* 24:65-69.

This article is the first in a "Research Report" section of *Archaeology in Oceania*. The new section will publish short articles of 2500 words or less on the results of research and work in progress, with the goal of disseminated the results of important findings.

Abstract

The elemental and petrographic analysis of volcanic glass from early ceramic contexts on Upolu (Western Samoa) and Tutuila (American Samoa) are reported and compared to analyses of geological basaltic glass from Goat Island, Tutuila. It is concluded that the archaeological samples are unlike the Goat Island material or any other

material from Melanesia or the western Pacific, but are very similar to Samoan Trachytes suggesting a local source.

Society for American Archaeology Symposium

A number of papers relevant to obsidian studies were presented at the 55th Annual Meeting of the Society for American Archaeology in Las Vegas, Nevada, April 18 - April 22, 1990. Dr. J.E. Ericson organized a poster session titled "Advances in Hydration Measurement, Hydration Experiments and Chemical Characterization of Lithic Sources." Other papers relating to obsidian studies were also given in a variety of symposia at the meeting. Paper titles, authors, and abstracts are reprinted below from the SAA Annual Meeting Program. Included are papers that were attended by IAOS members who reported on their relevance, and those whose titles or abstracts discuss obsidian.

I. Friedman, F. Trembour, and F. Smith (USGS). *Obsidian Hydration Rates as a Function of Relative Humidity.*

We have determined that the hydration rate of obsidian under surficial conditions is a function of relative humidity (rH). Relative humidity measurements of soil at various sites, integrated over a one year time-span, show that the soil rH is approximately 100% at depths greater than about 10 cm. Obsidian samples that hydrated on the surface are exposed to a higher effective temperature than those that were buried. However the effect on the rate of hydration of the lower rH of the surface samples tends to compensate for the increased rate due to the higher temperature experienced by these samples. This explains why surface samples seldom show thicker hydration than those buried in the soil at the same site.

Kim Tremaine (Sonoma State). *The Complexities of Glass Surface Reactions and Implications for Obsidian Dating.*

Glass scientists have made considerable advances recently in their understanding of glass surface reactions, increasingly documenting the complexity of glass weathering processes. Many factors, working synergistically, have been shown to affect both mechanisms and rates of weathering. In this paper, literature pertaining to glass weathering models and the effects of such factors as solution pH, solution composition, glass surface-area-to-solution volume, relative humidity, and temperature, are reviewed. Implications regarding the dating of obsidian are then explored. Several problems are identified and future research directions suggested.

Anderson-Gerfaud, Patricia (CNRS-Institut de Prehistoire Orientale). *Examples of Tools Showing Craft Specialization Activities in the Harrappean of Pakistan and the Neolithic of Turkey.*

Enigmatic tool types found in two distinct cultural contexts, flint blades with oddly-distributed "gloss" and heavily-abraded dentate obsidian tools, have been commonly assumed to be "sickles". However, microwear analysis of tools of these types from Nausharo (Harrappean, Pakistan) and Cafer Huyuk (Neolithic,Turkey) revealed odd "mechanical-appearing" microwear traces which experiments showed correspond most closely to the tool's edges having been pressed and pivoted against particular lithic objects (found in the same levels as the tools) in order to shape them while they were turned on a wheel. In this manner, at Nausharo, humid ceramics were shaved and burnished and at Cafer Huyuk, grooves and ridges were made on stone bracelets.

Beck, Charlotte, George T. Jones (Hamilton College) and Richard E. Hughes (California State University, Sacramento). *Lithic Raw Material Procurement and Its Relationship to Late Pleistocene-Early Holocene Population Mobility in the Central Great Basin.*

Surprisingly little is known about the adaptive strategies practiced by late Pleistocene-early Holocene human populations in the Great Basin. While we believe these populations were generalists, utilizing resources associated with remnant pluvial lakes, we know nothing of the ranges within which they traveled or the degree of mobility they practiced. Using data generated over the past four years in Butte Valley, eastern Nevada, we consider these questions. In particular, we employ information from obsidian source and hydration studies to examine lithic raw material procurement and its role in structuring patterns of mobility among early Great Basin inhabitants.

Charlton, Cynthia L. Otis. *Figurine and Lapidary Production at Otumba: Craft Specialization in Domestic Contexts.*

Surface surveys and collections at Otumba (1987-1988) located barrio-like concentrations of debris from figurine and lapidary workshops. Excavations in 1988 and 1989 explored a figurine and a lapidary workshop, each within a domestic residence. Figurine production was associated with the manufacture of minor clay artifacts (marbles, wheels censers). Lapidary output included earspools, labrets of local and imported obsidian and rock crystal, points and blades of obsidian and chert, and lapidary tools of obsidian, chert and basalt. This wide range of products from household contexts indicates a broad production strategy.

Charlton, Thomas H. (Iowa). *Economics and Politics: The*

International Association for Obsidian Studies

OBSIDIAN HYDRATION SPECIMEN INFORMATION

Name of Submitter: _____ **Institutional Affiliation:** _____

Site Name(s)/Number(s): _____

CATALOG NO.	PROVENIENCE unit - level (cm)	DESCRIPTION morphological name, descriptive qualifier	COMMENTS temporal type, special instructions	SOURCE volcanic field subgroup (if known)	NOTES C14, association, etc.

DATE: **page** **of**

Case of Aztec Otumba.

Otumba reached its political and economic apogee during the Late Horizon (ca. 1400-1520). Archaeological evidence of these interrelated developments is found in the construction sequence within the nucleated core of TA-80, the elaboration and intensification of floodwater irrigation in the middle valley alluvial plain, the extent and volume of specialized craft production at TA-80 and immediately adjacent sites (groundstone, obsidian core-blade production, fiber spinning, figurine molding, and lapidary work), and the distribution of ceramics within Otumba and its dependent sites. These data confirm a Late Horizon pattern of regional variability in city-state economic and political development in the basin of Mexico.

Gilreath, Amy J., and W.R. Hildebrandt (Far Western Anthropological Research Group). *Prehistoric Human Occupation of the Coso Volcanic Field, Inyo County, California.*

Data obtained from survey/limited testing at nearly 450 sites and data recovery at an additional 33 sites within the Coso Volcanic Field (China Lake Naval Weapons Center), document hunter-gatherer adaptational variations from C. 12,000-200 BP. The spatial distribution of assemblages and features affords insights into diachronic changes in the use and production of Coso obsidian, and the dynamic relationship between food resources and obsidian procurement in resultant subsistence and settlement patterns. Chronological control of this archaeological record relies heavily on obsidian hydration data with corroborating radiocarbon dates.

Heller, L. Lynette (Arizona State). *Classic and Postclassic Obsidian Tool Production and Consumption Patterns. A Regional Perspective from La Mixtequilla, Veracruz*

Extensive obsidian data from the Proyecto Arqueologico La Mixtequilla regional survey of south-central Veracruz, Mexico, provide an appropriate basis for addressing both the social setting of obsidian tool production as well as the degree of economic specialization involved for a peripheral consumer population (i.e., far from obsidian geological sources). The issues of horizontally integrated economies, which foster primarily household level production and distribution system, versus vertically integrated economies, are examined in light of these data.

Hughes, Richard E. (California State University, Sacramento). *Obsidian Source Use in Great Basin Alpine Environments.*

Much of what is known about obsidian use in the Great Basin comes from a small number of caves and rockshelters proximate to lowland lakes, marshes, and rivers. Recent source analysis of several hundred obsidian artifacts from atop Mt. Jefferson, central Nevada, and the White Mountains, eastern California, illustrates the ways high-elevation living influenced the acquisition and use of obsidian in both areas, as well as how source-use patterning in these alpine sites articulates, and contrasts, with patterns observed at lowland sites.

Parry, William J. (CUNY-Hunter). *Specialized Production and Consumption of Obsidian Tools in an Aztec City-State.*

Late Aztec and early Colonial obsidian tools and debris from Otumba, an Aztec city-state in the Basin of Mexico, are described. Although obsidian is locally available, the majority of tools were made from nonlocal (Pachuca) obsidian. A wide range of obsidian implements was produced at Otumba, apparently by specialists, including prismatic blades, scrapers, bifacial knives, dart points, and arrow points. Many of the blades were consumed locally by other craft specialists, and blade cores were transformed into ear spools and labrets in specialized lapidary workshops.

Reynolds, Linda A. (USFS-Inyo). *Casa Diablo: The Once and Future Quarry.*

The east side of the Sierra Nevada is a volcanic landscape rich in obsidian flows utilized by prehistoric peoples. A programmatic treatment plan being developed by the Inyo National Forest for the management of obsidian quarries focuses on the Casa Diablo source, i.e., the glassy members of the resurgent dome of the Long Valley Caldera. Casa Diablo has supplied tool making material for both east and west side cultures from the mid-Holocene to the present. Based on specific regional research questions (e.g., trans-Sierran trade) and general questions pertaining to quarries worldwide, data categories for site recordation and evaluation are proposed.

Wurtzburg, Susan (SUNY-Albany). *Sayil (Yucatan Mexico) Lithics: Implications for Urban Economic Organization.*

This paper presents the results of the analysis of lithics from Sayil (800-1000 AD), and the implications of said results for understanding the socio-economic organization of a Terminal Classic Maya city. A functional analysis of the lithics permits some delineation of the reduction sequence, and its spatial manifestations. These artifacts are placed in their regional context as a Puuc assemblage. The lithic data, with their spatial attributes, are evaluated in socio-economic terms, and ultimately, are used to test models of urban organization.

International Association for Obsidian Studies Annual Meeting Report

The second annual meeting of the IAOS was held on April 6, 1990 at the Holiday Inn in Foster City, California, during the Society for California Archaeology Annual Meeting. Over two dozen people attended the meeting, including most of the Institutional Members of the IAOS. The following are brief excerpts and highlights of the meeting.

I. Report of Activities to the Members

The meeting began with a brief introduction and review of the goals of the IAOS, read from the bylaws. The activities of 1989 were then reviewed. These activities included:

- Development of IAOS Bylaws;
- Establishment of IAOS Newsletter - production and distribution of two issues;
- Completion of preliminary interlaboratory hydration comparison study - reported in IAOS Newsletter #1;
- Identification of variables and criteria for selection of slide set;
- Preparation by Kim Tremaine of comprehensive bibliography on obsidian studies;
- Establishment of bank account;
- IAOS member assistance in the establishment of new laboratories;
- Institutional member activities in assisting in the formation of new laboratories;

Tom Origer worked with Dr. Tom Layton and California State University, San Jose students in establishing obsidian hydration analysis capabilities.

Rob Jackson worked with Brian Wickstrom, already experienced at preparing and examining obsidian hydration slides, to assist Brian in establishing obsidian hydration analysis capabilities at Biosystems Environmental Analysis, Santa Cruz, California. Rob also conducted a day-long introductory training session for the cultural resources staff at Yosemite National Park. Yosemite National Park, already an Institutional Member of the IAOS, is assembling the equipment to perform obsidian hydration analysis for western Sierran archaeological sites, although they do not yet have full lab capabilities.

Lisa Swillinger, 1990-1991 Secretary-Treasurer for the IAOS from California State University, Chico, also attended Yosemite Training session in preparation for hydration analysis at Chico.

The training session was videotaped so that the Yosemite staff can review aspects of the specimen preparation and examination process.

Kathleen Hull, outgoing Secretary-Treasurer, reported on the finances of the IAOS. At the time of the annual meeting, the IAOS resources were modest, as many membership renewals were pending. Kathleen noted that the institutional members have carried the organization with their larger membership dues, and the need to expand membership was discussed. The importance of embracing obsidian source analysts in the organization was emphasized.

II. New Business

Election of New Officers for 1990-1991

New Officers were elected for 1990-1991. Lisa Swillinger from CSU, Chico, was elected as Secretary-Treasurer, and Tom Origer, Sonoma State University, was elected President-elect. Dr. Christopher Stevenson of Diffusion Laboratory, serves as the 1990-1991 President.

IAOS Newsletter

The IAOS Newsletter was discussed as an important tool for disseminating information and keeping the membership informed. Everyone agreed on the importance of the Newsletter . Rob Jackson volunteered to continue production of the Newsletter in 1990-1991.

Permanent Business Address

The problem of a permanent business address was raised. An organization trying to establish a membership simply cannot continue to change business addresses with new Secretary-Treasurers annually.

California State University, Chico volunteered to serve as the permanent mailing address for the IAOS. It has become clear that CSU, Chico is committed to long-term obsidian studies, developing the capability for both geochemical and obsidian hydration analysis. The Archaeology Laboratory at CSU, Chico is establishing a source identification program. Blossom Hamusek is interested in the Tuscan source, and has started working with John Young at CSU, Chico to geochemically characterize this and other sources with equipment at Chico. Bill Dreyer plans to explore the potential for chert identification. Their support of the IAOS further evidences this commitment to obsidian studies.

IAOS By-Laws

By-Laws of the IAOS were briefly discussed after their publication and review in IAOS Newsletter Number 2. Rob Jackson, their author, noted that several provisions already proved difficult to implement, and recommended minor revisions to ensure that the organization could easily accommodate change in its early years of development. It was clear that the membership was not interested in lengthy discussion of the By-Laws (who could blame

them). There was general agreement that the By-Laws were adequate, and Rob will make minor revisions to maintain flexibility in organization and operation of the IAOS.

III. Discussion Topics

1. Calibration Standards for X-Ray Fluorescence Spectroscopy. The advantages of consistent standards for the calibration of XRF analysis was subject to discussion at the meeting, with Richard Hughes and Paul Bouey particularly active in the discussion. In brief, the discussion revolved around the need and/or advantages of calibration to rock standards, such as those provided by the U.S. Geological Survey, or the National Bureau of Standards. Hughes currently reports his calibration standards in published papers. Bouey advocates a single set of standards, prepared and circulated amongst different laboratories. Paul noted differences between the results some laboratories produced. Apparently, standard samples obtained from USGS or NBS may be subject to further treatment by laboratories and universities. The method of preparation can affect the results, making cross-lab comparisons difficult.

It was clear that those not involved in obsidian source analysis (most of us) are not very well informed on the subject. For instance, how comparable are results obtained from XRF and neutron activation techniques? Perhaps we could solicit a short article in the future that outlines the issues involved.

2. Obsidian Source and Hydration Database. Kim Tremaine stressed the need for a comprehensive database on the geochemical and hydration characteristics relevant to each analyzed specimen. Others raised the issue of obsidian source recording. It was noted that there are at least 140 known obsidian sources in Oregon alone and that there is a need for standardized data collection and recording procedures. While individual laboratories and researchers have developed their own methods and categories of data collection, a single standard has not developed. The discussion soon turned to the development of standard data categories and the creation of a world obsidian source map.

Obsidian source data are amenable to computerized database applications, and the content of such a database was discussed. Richard Hughes emphasized the need to determine the subfield or subgroup within an obsidian "source" whenever possible. While subgroup determination for most sources will require detailed investigation, data collection and recording procedures can work toward such goals by collecting standard information on source specimens that note specific collection locations and geological occurrences.

3. *Standard Data Collection and Management.* Newsletter Number 2 included draft forms for the collection of standard obsidian hydration data. Members recommended some minor changes to the form, but there was unanimous agreement that Institutional Member laboratories should begin using the form, and send copies of the forms to their clients. These forms are:

OBSIDIAN HYDRATION ANALYSIS PROJECT DATA;

PROJECT ARCHAEOLOGICAL AND ENVIRONMENTAL DATA; and

OBSIDIAN HYDRATION SPECIMEN INFORMATION.

Revised versions of these forms are included in the Newsletter (inserted). Institutional member laboratories and obsidian hydration users alike are encouraged to copy and distribute these forms for immediate use. Future revisions will be considered on the basis of trial use.

4) Obsidian hydration measurement calibration standards. The IAOS is exploring the availability of photo-etched stage micrometers for each member hydration laboratory. See *Technotes* (page 12) for further information.

5) Obsidian hydration calibration standard slide set. The IAOS is in the process of assembling two slide sets. One set will consist of slides exhibiting a wide range of hydration phenomena and problems. This set will assist new laboratories and technicians in becoming familiar with the range of variables and images that can be encountered in obsidian hydration examination. The second slide set will consist of a "blind test" set that will enable the IAOS and its members to determine the comparability of information produced by member laboratories and technicians.

6) A standard laboratory designation system was discussed. Such a designation system would allow researchers and laboratories to immediately identify the facility that conducted the analysis of particular specimens, as well as assist laboratories in cataloguing their slide collections. Such a system might consist of a lab designation, the year the specimen was analyzed, and the sequential number of that specimen within that year.

7) A standard naming and abbreviation system for obsidian sources was discussed with great interest. It was noted that the literature contains numerous and often different abbreviations and names for the same sources. With a developing interest and ability to discriminate subgroups within a source, the need for consistency is even greater.

8) The IAOS is also interested in documenting individual obsidian sourcing and hydration laboratory procedures, in written form, on videotape, or both. Such documentation will assist all laboratories in streamlining their procedures,

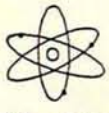
allowing each to learn the efficient techniques of others. In addition, such documentation will assist in identifying areas of concern in preparation and examination, and could constitute an excellent instructional tool.

9. Obsidian Studies Library and Bibliography. Participants at the meeting discussed the bibliography that Kim Tremaine was developing, with contributions by Janet Scalise. It was suggested that the final bibliography be distributed on diskette to the membership. Electronic media would be economical and flexible.

A centralized library of obsidian articles was also discussed. Janet Scalise noted that the University of California, Los Angeles facility had already compiled a rather large library, and she volunteered to accept any obsidian papers that members wished to provide for the library.

Kim Tremaine noted that Craig Skinner, new IAOS member, had developed an extensive bibliography on volcanism and obsidian studies. She will be contacting Craig to see if he is interested in some sort of collaboration.

Technotes



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

Standardizing Microscope Calibration

by R. Jackson

An important goal of the IAOS to enhance and ensure the comparability of obsidian hydration data produced by different obsidian hydration laboratories. Among the variables that must be accounted for are the microscope calibration and the calibration of different technician to the microscopes on which they will be making measurements. Optical microscopes are often calibrated with stage micrometers, which are essentially small, transparent "rulers" etched on the surface of a glass slide. While stage micrometers, like any standard measuring device, should measure in standard and identical increments, stage micrometers vary in quality as well as the widths of the increments that they measure. Institutional members of the IAOS have expressed interest in obtaining a single scale of reference. In other words, the IAOS is investigating the purchase of either a single stage micrometer for circulation among institutional member laboratories, or multiple copies of a single type of micrometer. I have been working with Scientific Instruments, Incorporated, of San Francisco to identify and contact suppliers of stage micrometers. The first round of investigation indicates that photo-etched micrometers may cost between $150 and $200 per slide. While this type of slide may ultimately be the most practical and readily available, we are exploring the potential of a new type of micrometer. Arising from computer chip manufacturing technologies, a new type of slide is currently being tested. This slide has a large number of chrome "dots" deposited on its surface. Thickness is a critical variable for some microscopists, and the manufacture process allows the layering of these chromium dots to the angstrom level of precision. Each dot is 25 microns in diameter. Variation in the diameters of these dots is much greater than their thickness, due to the etching process. However, my source at Scientific Instruments tells me that variation is no greater than 0.25 microns, which is the same as more traditional stage micrometers.

The advantage to these new micrometers is the cost. If testing proves these slides to be reliable and useable to a wide variety of applications, mass production would be inexpensive and I am told that slides might cost a few dollars each. Even if large-scale production does not materialize, it may be possible to obtain a set of these slides at a considerably lower per-slide cost than traditional stage micrometers. Prototypes of the micrometer are now undergoing testing, and we should have the results within several months. The potential saving is worth the wait. I will keep you informed.

Meeting Announcements

Second International Meeting on Spectroscopy Across the Spectrum - Techniques and Applications of Analytical Spectroscopy. Hertord, United Kindom. July 9-12. P.R. Brawn, Unilever Research, Colworth Laboratory, Sharnbrook, Beds. MK44 1LQ, U.K.

12th International Congress on Electron Microscopy. University of Washington, Seattle. August 12-16. Dr. J.K. Koehler, Biostructure SM-20, University of Washington, Seattle, 98195.

7th International Conference on Geochronology, Cosmochronology, and Isotope Geology. Research School of Earth Sciences, Australian National University, Canberra. September 24-29. Organizing Committee, IGOC7, Box 4, Canberra, ACT 2601, Australia.

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 activities described above require modest financing. Initial mailings were performed largely at personal expense, but as we grow this cannot continue. We need 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

Regular members are individuals or institutions who are interested in obsidian studies, and wish to support the goals of the IAOS. Regular members will automatically be subscribed to the Society for Archaeological Sciences (SAS) Bulletin, issued quarterly. If you already subscribe to the SAS Bulletin, deduct $10.00 from the membership dues. The SAS Bulletin shall be the regular forum for meeting announcements and developments of the IAOS. Regular members will also 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. In addition, Institutional members will automatically receive the SAS Bulletin and all other mailings sent to Regular members. If you wish to become an institutional member and already subscribe to the SAS Bulletin, deduct $15.00 from the membership dues.

This second newsletter is sent to everyone who has expressed an interest in the IAOS, current members and non-members alike. **If you do not join the IAOS, you may not receive future mailings.** While preparation of newsletters, mailings, the development of standards, and bibliographies is performed on a volunteer basis, reproduction and mailing costs cannot be supported without your help. 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

If you are interested in submitting a short article or announcement for inclusion in the next newsletter, the submission should be received by September 1, 1990. We accept electronic media on IBM compatible 3.5" or 5.25" disk, in Wordperfect (4.2 or 5.0), Wordstar, or ASCII text formats, as well as hard copy submissions if electronic media cannot be provided. Send your information to::

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IAOS Officers, 1990-1991

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Secretary-Treasurer: Lisa Swillinger

Newsletter Editor/Producer: Robert J. Jackson