

Society for  
**California Archaeology**  
Newsletter

Founded 1966

Volume 40, Number 2

June 2006



**Eastern  
Sierra  
Bifaces**

*Inside:*

2006 Annual Meeting Wrap  
Tom King on CRM and Archaeobias  
Data-Sharing Meetings on Tap  
An Improved EHT Calculation

# Society for California Archaeology Newsletter

A quarterly newsletter of articles and information essential to California archaeology. Contributions are welcome. Lead articles should be 1,500-2,000 words. Longer articles may appear in installments. Send submissions as hard copy or on diskette to: SCA Newsletter, Department of Anthropology, CSU Chico, Chico CA 95929-0401 or as email or attachments to <gwhite@csuchico.edu>

The SCA Executive Board encourages publication of a wide range of opinions on issues pertinent to California archaeology. Opinions, commentary, and editorials appearing in the *Newsletter* represent the views of the authors, and not necessarily those of the Board or Editor. Lead article authors should be aware that their articles may appear on the SCA web site, unless they request otherwise.

## Editorial Staff

Managing Editor . . . . . Greg White (530) 898-4360  
gwhite@csuchico.edu

## Contributing Editors

Avocational News . . . . . open  
Education News . . . . . open  
Curation . . . . . Cindy Stankowski  
Federal Agency News . . . . . open  
Field Notes . . . . . Michael Sampson  
Historical Archaeology . . . . . R. Scott Baxter  
Information Centers . . . . . open  
Membership . . . . . open  
New Publications . . . . . Denise Thomas  
OHP . . . . . Michael McGuirt  
Legislation . . . . . Stephen Bryne  
CASSP . . . . . Chris and Beth Padon  
State Agency News . . . . . open

## Newsletter Deadlines

For Issue . . . . . Deadline  
March . . . . . February 20  
June . . . . . May 20  
September . . . . . August 20  
December . . . . . November 20

## Calendar Submissions

Patricia Welsh: . . . . . pmwelsh@sbcglobal.net

## Advertising Rates\*

1/4 page . . . . . \$70  
1/2 page . . . . . \$100  
Full page . . . . . \$175

\* - Ads that run three or more consecutive issues receive a 15% discount.

On the Cover:  
photo by Cris Lowgren



## Volume 40, Number 2

## June 2006

## Regular Features

### From the President

Frank E. Bayham . . . . . 3

### SCA Business and Activities

Legislative Liaison . . . . . 5  
IC Report . . . . . 7  
Student Membership Change . . . . . 8  
SoCal Data-Sharing . . . . . 8  
NorCal Data-Sharing . . . . . 8  
CASSP Report . . . . . 9  
Executive Board Meeting Report . . . . . 12  
2006 Annual Meeting Wrap . . . . . 14  
Web Sites of Interest . . . . . 27  
New Publications . . . . . 28

### News and Announcements

Meetings . . . . . 21  
On-Line Resources . . . . . 22  
Announcements . . . . . 24  
Publications . . . . . 26  
Conferences . . . . . 27  
Opinion and Comment . . . . . 27  
Calendar of Events . . . . . 45

## Articles

### Mea Culpa: How I Infected Cultural Resource Management With Archaeobias

Thomas F. King . . . . . 29

### Obsidian Bifaces of the Eastern Sierra: The Portuguese Bench and Cactus Flat Biface Cores

Alan P. Garfinkel, Jeanne Day Binning, Craig Skinner,  
Alexander K. Rogers, Russell Kaldenberg,  
and Thomas Chapman . . . . . 32

### An Improved Method for Computing Effective Hydration Temperature of Obsidian

Alexander K. Rogers . . . . . 37

## From the President



*"There are none so blind as those who will not see."*

I will only be writing 3 or 4 of these columns throughout my tenure as President of the SCA, and in this, my first, I wanted to outline the main concern that I laid out in my nomination statement and update you on what has transpired in recent months. Due to the able leadership of the past few Presidents, the current Executive Board, and a very able corps of staff and volunteers, the organization is in very good shape. By that I mean that the fiscal and various outreach activities of the SCA are running smoothly and moving ahead. This has allowed me to focus on a suite of issues that underlie the health of archaeology in California at large, and fall under the broad umbrella of *Ethical Standards and Guidelines*. I am optimistic by nature and would prefer to highlight some of the very positive aspects of modern archaeology in California (of which there are many), but unfortunately I am not able to do this. The magnitude of long-standing ethically questionable practices in heritage preservation and CRM has become so commonplace that they are mundane. No, they are worse than mundane - they border on incredulity. These practices, if left unchallenged and unchanged, can serve to

compromise the integrity of our profession.

What exactly am I alluding to here and how pervasive is it? To answer this question, allow me to freely excerpt from verbiage submitted to OHP for the recent draft statement on Archaeological Standards and Guidelines contained in the proposed State Historic Preservation Plan 2006-2010 (this is the unedited version but it closely parallels the proposed version; check it out at [http://OHP.parks.ca.gov/?page\\_id=21756](http://OHP.parks.ca.gov/?page_id=21756)):

It is simply too often the case that unique and important archaeological localities go unrecognized or their significance goes unappreciated due to inadequate professional training and/or experience, or the failure of practitioners to adhere to well-accepted standards of the profession. Numerous anecdotal accounts as well as validated cases indicate that a number of archaeological sites have been damaged or impacted due to weaknesses in the manner in which archaeological fieldwork and review is conducted. The effect of this failure on the preservation of California's heritage is insidious. That is, while the legislative framework and ethical guidelines exist to protect the archaeological past, the lack of oversight and monitoring of practice and performance has allowed a degree of unqualified and unprofessional archaeological work to proceed unimpeded and unnoticed. The unabated persistence of inadequate efforts to identify important archaeological properties and ensure their protection is allowing the erosion of professional standards and practice from within heritage preservation framework.

A litany of examples and actual cases can be (continued page 26)

## Society for California Archaeology Executive Board 2006-2007

### President:

Frank E. Bayham,  
Department of Anthropology,  
CSU, Chico, Chico, CA, 95929-400;  
Tel: (530) 898-4540;  
e-mail: FBayham@csuchico.edu

### Immediate Past President:

Shelly Davis-King, Davis-King & Associates,  
P.O. Box 10, Standard, CA, 95373-0010;  
Tel: (209) 928-3443;  
e-mail: shellydk@wildblue.net

### President-Elect:

Stephen Horne  
17225 SW Quail Road  
Terrebonne, OR 97760  
Tel: (541) 923-7778;  
e-mail: shorne@hotmail.com

### Southern Vice-President:

Andy York, EDaw Inc., 1420 Kettner Boulevard,  
Suite 620, San Diego, CA 92101;  
Tel: (619) 233-1454;  
e-mail: yorka@edaw.com

### Northern Vice-President:

Michael Newland, Anthropological  
Studies Center, Sonoma State University,  
Building 25, Cotati, CA 94928  
Tel: (707) 664-2734;  
e-mail: michael.newland@sonoma.edu

### Secretary:

Risa Huetter, Sentinel Archaeological  
Research, LLC, 735 Lytton Station Road  
Geyserville, CA 95441  
(707) 431-0526 voice  
e-mail: risa@sentinelcrm.com

### Treasurer:

Ted Jones, PO Box 579  
Valley Ford, CA 94972-0579;  
Tel: (707) 876-9415;  
e-mail: tedjones@ap.net

### Business Office Manager:

Greg White, CSU-Chico, Building 25, Suite 101  
Chico, CA 95929-001  
Tel: (530) 898-4360  
e-mail: gwhite@csuchico.edu

SCA Business Office  
Christa Frazer-Kerley  
Ph (530) 898-5733  
Fx (530) 898-4220  
SCAOffice@csuchico.edu



**Society for California  
Archaeology**  
Committees  
2006-2007

**Advanced Annual Meeting Planning**

Tom Origer;  
Tel: (707) 584-8200  
E-mail: [origer@origer.com](mailto:origer@origer.com)

**Annual Meeting Local Arrangements**

Jennifer Farquhar  
Tel: (831) 588-1724  
E-mail: [JFarquhar@albionenvironmental.com](mailto:JFarquhar@albionenvironmental.com)

**Annual Meeting Program Chair**

Mark Hylkema  
Tel: (831) 335-6381  
E-mail: [mhyllk@parks.ca.gov](mailto:mhyllk@parks.ca.gov)

**Archaeology Month Representative**

Laura Leach-Palm;  
Tel: (530) 756-3941  
E-mail: [laura@farwestern.com](mailto:laura@farwestern.com)

**Bennyhoff Memorial Award**

Patricia Mikkelsen  
Tel: (530) 756-3941  
E-mail: [pat@farwestern.com](mailto:pat@farwestern.com)

**CA Arch Site Stewardship Program**

Beth and Chris Padon  
Tel: (562) 432-1801  
E-mail: [bpadon@discoverworks.com](mailto:bpadon@discoverworks.com)  
E-mail: [cpadon@discoverworks.com](mailto:cpadon@discoverworks.com)

**Curator Representative**

Cindy Stankowski  
Tel: (619) 239-1868  
E-mail: [cstankowski@sandiegoarchaeology.org](mailto:cstankowski@sandiegoarchaeology.org)

**Fundraising**

open

**Membership**

open

**Native American Programs**

Janet Eidsness;  
Tel: (530) 629-3153  
E-mail: [jpeidsness@yahoo.com](mailto:jpeidsness@yahoo.com)

**Newsletter**

Greg White;  
Tel: (530) 898-4360  
E-mail: [gwhite@csuchico.edu](mailto:gwhite@csuchico.edu)

**Nominations**

open

**Proceedings**

Sharon Waechter  
Tel: (530) 756-3941  
E-mail: [sharon@farwestern.com](mailto:sharon@farwestern.com)

**Professional Standards and Guidelines**

Lynn Gamble  
Tel: (760) 371-1320  
E-mail: [lgamble@mail.sdsu.edu](mailto:lgamble@mail.sdsu.edu)

**Student Affairs**

Shannon Tushingham  
Tel: (916) 717-2794  
E-mail: [stushingham@ucdavis.edu](mailto:stushingham@ucdavis.edu)

**Web Site**

Greg White  
Tel: (530) 898-4360  
E-mail: [gwhite@csuchico.edu](mailto:gwhite@csuchico.edu)



# SCA Business and Activities

## ***Committee and Liaison Reports***

### **Committees and Liaisons: Where the Real Work of the Society Gets Done**

Over the years, committees and liaisons have performed much of the SCA's essential work. Committees and liaisons have an enduring and vital role within the SCA, shouldering much of the responsibility for day-to-day operations and special events.

Committees are composed of SCA members who have teamed together for promotion of SCA interests or execution of specific tasks. Committees and current staffing are listed in the adjoining sidebar.

Liaisons are individuals who act on behalf of the SCA in relation to other organizations and entities with an agenda or interests shared with the SCA. Liaisons are SCA members who also hold membership in the contact organization, and are expected to report to the SCA or represent our interests in the contact organization. Our current liaisons are listed in the sidebar on the facing page.

In keeping with Executive Board Manual procedures, each Committee has been assigned a Board contact. The Board contact must communicate with the Committee Chair, convey pertinent Executive Board decisions, and report on Committee activity at Executive Board meetings.

Committee and liaison chairs are appointed by the President and serve at the Executive Board's discretion. Committee members are selected by the committee chair and approved by the board.

Because committee composition has evolved in recent years, and, because SCA committee chairs serve at the board's discretion, each new board must review the purpose and role and face decisions about committee and liaison composition and responsibilities. In recent weeks we have been contacting current committee chairs and liaisons to confirm their willingness to continue in the role. We are pleased to report that nearly all committee chairs will stay on, but need to point out that three critical committees are unstaffed: Fundraising, Membership, and Nominations.

We have also been reminded by several committee chairs that the committees need committed members. Help is needed! If you have an interest, for example, in the Newsletter, then contact the committee chair and offer to take on one of the empty editorial roles!

Please take a minute to look over the committee and liaison list. Note that the current list of Liaisons is incomplete. Liaisons are important because they help forge links to state and national heritage organizations with a shared connection to the SCA's vital interests. *Are you a member of a state or national association and want to serve as an SCA liaison? Contact us at [SCAOffice@csuchico.edu](mailto:SCAOffice@csuchico.edu).*

## Legislative Liaison Report

Stephen Byrne  
stephen\_bryne@dot.ca.gov

### Federal Legislation—109<sup>th</sup> Congress

#### S.39 — National Ocean Exploration Program Act

Introduced by Senator Ted Stevens (R-AK), this bill would establish a coordinated national ocean exploration program within the National Oceanic and Atmospheric Administration (NOAA). The purposes of the program include efforts “to explore the physical, biological, chemical, geological, archaeological, temporal, and other related characteristics of the oceans to benefit, inform, and inspire the American people” and “to create missions and scientific activities of discovery that will improve our understanding, appreciation, and stewardship of the unique marine ecosystems, organisms, chemistry, and geology of the world’s oceans, and to enhance knowledge of submerged maritime historical and archaeological sites.”

*Status: Referred to Subcommittee on Fisheries and Oceans.*

#### S.RES.468 – Continued Administration of Channel Islands National Park

Senator Dianne Feinstein (D-CA) introduced this resolution supporting the continued administration of Channel Islands National Park, including Santa Rosa Island, in accordance with the laws and policies of the National Park Service. Channel Islands National Monument was expanded to include additional islands and redesignated Channel Islands National Park in 1980 to protect the nationally significant natural, scenic, wildlife, marine, ecological, archaeological, cultural, and scientific values of the Channel Islands. There have been recent proposals to remove Santa Rosa Island from the administration of the National Park Service or to direct management of the island in a manner inconsistent with existing legal requirements and the

sound management of Park resources.

*Status: Hearings held in Subcommittee on National Parks.*

#### S.1897 – Amend the Forest and Rangeland Renewable Resources Planning Act of 1974

Senator Jon S. Corzine (D-NJ) introduced this bill to amend the Forest and Rangeland Renewable Resources Planning Act of 1974 and related laws to strengthen the protection of natural biodiversity and to ban clearcutting on Federal land, and to designate certain Federal land as Ancient Forests, roadless areas, watershed protection areas, and special areas where logging and other intrusive activities are prohibited.

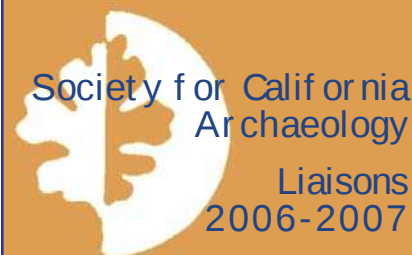
The bill finds that the harm of clearcutting on the natural resources of the United States and the quality of life of the people of the United States is substantial, severe, and avoidable. The concomitant damage to cultural resources is not mentioned, per se. The bill would also add land to the Giant Sequoia National Monument and add parts of Sequoia National Forest that are not included in the Monument to Sierra National Forest and Inyo National Forest.

*Status: Referred to the Committee on Energy and Natural Resources.*

#### H.R. 3534 – Piedras Blancas Historic Light Station Outstanding Natural Area Act of 2005

A bill to designate the Piedras Blancas Light Station and the surrounding public land as an Outstanding Natural Area to be administered as a part of the National Landscape Conservation System was introduced by Representative Lois Capps (D-CA-23).

As part of this bill, Congress finds, among other things, that (a) the publicly owned Piedras Blancas Light Station has nationally recognized historical structures that should be preserved for present and future generations; (b) the Light Station tells an important story about California’s coastal prehistory and history in the context of the surrounding region and communities; (c) the coastal area surrounding the Light Station was used



*California Council for the Promotion of History Liaison*  
Shelly Davis-King  
Tel: (209) 928-3443;  
e-mail: shellydk@wildblue.net

*Information Center Liaison*  
open

*Legislation Liaison*  
Stephen Byrne  
E-mail: stephen\_bryne@dot.ca.gov

*Native American Heritage Commission Liaison*  
Stephen Horne  
Tel: (541) 923-7778  
E-mail: shorne@hotmail.com

*Publicity Liaison*  
open

*OHP Liaison*  
Michael McGuirt  
Tel: (916) 653-8920  
E-mail: mmcguirt@ohp.parks.ca.gov

*Society for Historical Archaeology Liaison*  
R. Scott Baxter  
Tel: (209) 223-2790  
E-mail: scott@pastforwardinc.com

*Society for American Archaeology Liaison*  
open

*State Historical Resources Commission Liaison*  
Stephen Horne  
Tel: (541) 923-7778  
E-mail: shorne@hotmail.com

**Join a Committee!**

**Be an SCA Liaison!**

**Contact the SCA  
Business Office for  
more information!**

SCA Business Office  
Christa Frazer-Kerley  
Ph (530) 898-5733  
Ex (530) 898-4220  
SCAoffice@csuchico.edu

traditionally by Native American people, specifically the Chumash and Salinan tribes; and (d) statutory protection is needed for the Light Station and its surrounding Federal lands to ensure that it remains a part of our historic, cultural, and natural heritage and to be a source of inspiration for the people of the United States.

*Status: Referred to the Committee on Resources.*

### State Legislation: 05-06 Session

#### **A.B. No. 2641—An Act to amend Sections 5097.91 and 5097.98 of the Public Resources Code, relating to burial grounds.**

*Author: Joe Coto (D-23<sup>rd</sup>)*

Existing law establishes the Native American Heritage Commission and authorizes the commission to bring an action to prevent damage to Native American burial grounds or places of worship. This bill would require a landowner to consult with the Most Likely Descendants, as determined by the commission, and would require the landowner to ensure that a site is not further disturbed until prescribed conditions are met.

Specifically, this bill:

- 1 Specifies that the recommendations that the descendants of deceased Native Americans whose remains are discovered may make recommendations to the Commission that may include preservation of the human remains and associated items in place, relinquishment of the human remains and associated items to the descendants for treatment, or other culturally appropriate treatment.
- 2 Requires the landowner to consult with the descendants concerning the descendants' recommendation.
- 3 Makes the discovery of a Native American burial ground during a ground-disturbing land development activity a significant unanticipated discovery requiring additional consultation.

- 4 Defines "consultation" as the meaningful and timely process of seeking, discussing, and considering carefully the views of others, in a manner that is cognizant of all parties' cultural values, and where feasible, seeking agreement, that includes recognizing the tribes' potential needs for confidentiality.
- 5 Requires the landowner, or his or her authorized representative, to consult with the most likely descendants, as designated by the Commission, and address every feasible option for preservation of the burial ground in place, including, but not limited to, any items associated with a Native American grave, before the landowner may re-inter the human remains and items associated with Native American burials with appropriate dignity, as defined.
- 6 Requires that, upon the discovery of possible Native American remains, the landowner must ensure that the site is not damaged or disturbed by further development activity until a determination is made whether the site is a burial ground, and the process set forth in statute is completed.
- 7 Defines "Native American burial ground" as a place containing multiple Native American graves, and a "Native American grave" as a place, whether originally below, on, or above the surface of the earth, where the remains of a Native American, whether an inhumation or cremation, and in any state of decomposition or skeletal completeness, are located.
- 8 Requires that the physical relationship of the graves shall be such that it may be reasonably concluded that the site constitutes, or constituted in the past, a contiguous Native American burial ground, and specifies that disturbances to the site that may have moved human remains and items associated with the human remains from their original context, prior to the time of discovery do

not disqualify the site from classification as a Native American burial ground.

- 9 Requires that the determination whether a burial ground exists be based upon archaeological, ethnographical, and historical evidence and information obtained from a culturally affiliated Native American tribe, the descendants, and other expert opinion, and, in case of dispute, specifies that the final determination whether a burial ground is present shall be made by the Commission.
- 10 Exempts actions taken by a landowner, or his or her authorized representative, to implement these provisions and any action taken to implement an agreement between a landowner and appropriate Native American groups, from the requirements of the California Environmental Quality Act (CEQA) and the California Coastal Act.

*Status: Referred to Committee on Rules.*

#### **SB 1846 — An act to amend Sections 6309, 6313, and 6314 of the Public Resources Code, relating to public resources.**

*Author: Senate Natural Resources and Water Committee*

Section 6309 in the Public Resources Code gives the State Lands Commission (Commission) the authority to administer the Shipwreck and Historic Maritime Resources Program which is established in Sections 6313 and 6314. 1. Section 6309(d) requires that a salvage permit be obtained when locating or removing a submerged object. According to the Natural Resources and Water Committee analysis, many of the proposed amendments clarify provisions in the Shipwreck and Historic Maritime Resources Program that the State Lands Commission determined were not sufficiently clear during the salvage of the *Brother Jonathan* off the coast near Crescent City. This bill:

- 1 Specifies that vessels, aircraft, or any other cultural object are subject to the program.

- 2 Specifies that a permit can only be renewed if there have been activities undertaken related to the permit.
- 3 Assures that the Commission's observer can be in communication with the office of the Commission while at a salvage site.
- 4 Deletes reference to a permit type that has never been requested and clarifies that the Commission can issue permits for a particular phase of a salvage operation.
- 5 Clarifies that the executive officer of the Commission can issue a stop work order when the terms of a permit are being violated and establishes the hearing procedure to evaluate the alleged violations.
- 6 Adds a requirement for the permit holder to assure that they have sufficient funds to cover the Commission's reimbursable costs on a project. If fees are to be with a bond, the bond will be held by the Commission and is sufficient to cover all costs.
- 7 Clarifies that a "submerged archaeological site" and "submerged historic resource" can also refer to submerged aircraft.
- 8 Adds the California Register of Historical Resources as a reference to determine historical significance.
- 9 Clarifies that any investigation or recovery activities permitted by the Commission must have educational, scientific, or cultural purposes or must be for the protection of the resource.
- 10 Codifies the permit requirements currently existing in the application guidelines.
- 11 Clarifies that Commission may have a permit application for the salvage of a historic resource peer reviewed.
- 12 Clarifies that proof of ownership must be provided in order to recover confiscated items.

*Status: In Assembly. Read first time. Held at desk.*

### **SB 1395 – Environmental Quality: Native American Sites**

*Author: Denise Moreno Ducheny (D-San Diego)*

This bill would require a lead agency that determines that a project is exempt from the California Environmental Quality Act and may affect a California Native American prehistoric, archeological, cultural, spiritual, or ceremonial place to consult with the California Native American tribe on the contact list maintained by the California Native American Heritage Commission, and provide notice to that tribe of the exemption at least 45 days before acting on the project. According to the author's office, if an exempt project may impact a Native American site of significance, the only option for the tribe for whom the site holds significance is to file suit to stop the project.

The bill is opposed by California Central Valley Flood Control Association, Valley Ag Water Coalition, American

Planning Association, California Chapter (unless amended), and Sempra Energy (unless amended).

*Status: To third reading.*

### **Websites**

<http://thomas.loc.gov/>

<http://www.leginfo.ca.gov>

## **IC Report**

*Eric Allison, OHP CHRIS Coordinator  
ealli@parks.ca.gov; 916.653.7278 phone; 916.653.9824 fax*

Info Centers are developing GIS and basic data standards to adopt for all ICs. Some ICs currently have GIS capability, some do not. No specific timeline for adoption of these standards, but they are being finalized and development of the standardized interface is already underway. The data standards deal primarily with administrative/basic info about resources and study reports, not an in-depth database that will capture all the data from a typical DPR 523 (for resources). The IC GIS and database systems will not be online (there will be no network/remote access for users), but will be used onsite at the ICs only.

OHP is working on a GIS system for the California Desert area (MDCUP project) to be tested and used by federal agencies with land/responsibilities in that area. This system will be set up to allow for data transfer to and from the standalone IC systems via CD or other similar means. Security is a significant issue, of course, and OHP is implementing the best level of access/authentication controls and encryption that it can reasonably afford at this time. Given that this is seen as a pilot system, we expect to improve upon it in the future, and to discuss the implications and user needs and concerns relating to this system.

No plans exist to transfer ICs from using standalone systems to the MDCUP system. This possibility is an open and ongoing issue of discussion.

The second (previous one was last year) THPO / SHPO summit meeting was hosted by the Agua Caliente Band of Cahuilla Indians on 2/15-2/17 in Palm Springs. SHPO Wayne Donaldson, Native American Liaison Dwight Dutschke, and CHRIS Coordinator Eric Allison of OHP attended. Also attending were Tom Gates, Yurok Tribe THPO and North Coastal IC Coordinator, and Matt Hall, Eastern IC Coordinator. A presentation was made regarding the history and function of the CHRIS, and the current goings-on regarding GIS in CHRIS. A tentative date of 5/11/2006 was set for a tribal/IC/OHP workshop to discuss GIS and access and use of CHRIS data by THPOs and THPO tribes, other federally recognized tribes, and tribes not federally recognized. Current protocols exist for non-GIS-based access, but the aim is to discuss the existing and future protocols and to increase tribal/IC/ OHP coordination and communication with regards to info management and sharing. A series of meetings of this nature will most likely occur. It is also

hoped that other meetings on similar topics with interest groups will be set up in the near future. Funding is extremely tight for OHP at this time, and DPR has firm restrictions in place on travel (including meetings) and purchases.

With new SHRC members Trish Fernandez and Donn Grennda in place as ICPAC members, this SHRC subcommittee will be active again after a period of dormancy. No ICPAC meeting is scheduled yet, but Fernandez, Grennda, and OHP and IC personnel will soon be discussing where and when to meet. Other existing ICPAC members are to be contacted as well.

## Student Membership Change

The SCA can trace its origins to student activism and has long served student needs by providing a forum for professional papers and publications, meetings to communicate ideas, discoveries, and new research, a venue to seek and find job opportunities, and a place to meet and get to know your peers. Student members receive all the benefits of regular members except the Annual Proceedings.

In order to encourage and support student participation the SCA requires a fee of just \$30.00 for student membership, less than one-half the regular member rate. All members joining at the student rate must provide a copy of a current student ID card with the membership form.

Because this is a new requirement, SCA Student Liaison Shannon Tushingam will pass the word to campus student representatives that a copy of a current student ID card will now be necessary in order to receive the student rate. The SCA Business Office will also send an e-mail to all members currently listed as students notifying them of the change. Any student applications received after February 8, 2006, will be checked for student ID, and those without an ID will be contacted and asked to provide it.

## First Call for Papers—the (Extreme) Southern California Data-Sharing Meetings

*Andy York, Southern Vice-President*

The 2006 Southern California Data-Sharing meeting will be held this fall in the original southern California—Ensenada, Mexico. Why in Baja? For a number of years, the SCA, BLM, and the Instituto Nacional de Antropología e Historia (INAH) have nurtured a binational partnership to promote both research and effective management of cultural sites in the border region. A data-sharing meeting in Ensenada, just 90 minutes south of San Diego, is a great way to foster dialog and cooperation among archaeologists on both sides of the border. Co-sponsored by BLM and INAH, the meeting will include a series of presentations on southern California and northern Baja archaeology and site tours conducted by INAH archaeologists. The date and venue in Ensenada is still being finalized and will be announced shortly on the SCA website

([www.scahome.org](http://www.scahome.org)). Look for details on the Meetings & Events page or contact Southern VP Andrew York at [yorka@edaw.com](mailto:yorka@edaw.com).

## Northern Data-Sharing Meeting

*Michael Newland, Northern Vice-President*

The 2006, Northern Data-Sharing meeting will be held on October 7, 2006 at Sonoma State University. In order to be inclusive to the full range of research conducted by our Northern California members, this NDSM will have no specific topic. The exact venue and schedule has yet to be established. Watch the SCAHome.org website for further information.

## CASSP Committee Report

*Beth Padon*

We send a big thank you to volunteer site stewards Beth Armstrong, Katherine Douglass, and Bonita McGrath who handled the CASSP table at the annual SCA meetings in Ventura (facing page). Beth volunteers with James Barnes at the BLM Folsom Field Office and Bonita and Katherine volunteer with Don Storm, now with the BLM Ridgecrest Field Office. These volunteers spoke to many SCA members and signed-up several potential volunteers. This past year, CASSP volunteers have contributed over 4000 hours and continue to visit over 150 sites and districts throughout the state on public lands. We greatly appreciate the efforts made by each volunteer and each coordinating archaeologist with site stewardship. Without this help, our cultural heritage would be suffering much greater impacts.

The annual CASSP committee meeting was held Friday morning at the SCA meetings. It covered several topics, including recent training workshops, program ideas, funding sources, and new directions for site stewardship. Wanda Raschkow and Bill Sapp gave a brief review of the most recent CASSP training held in the Palm Springs Field Office for the Santa Rosa and San Jacinto National Monument. This workshop drew fourteen new volunteers and involved three agencies (BLM, USFS, and Bureau of Reclamation), a first for CASSP. Ken Wilson provided a review of the State Parks Off-Highway Motor Vehicle Recreation Commission and its current financial position. The BLM is still planning to support CASSP in the next grant cycle for 2007. Russ Kaldenberg suggested that one way agencies could handle small payments is through credit cards for fee payments. Other funding sources were discussed and committee members will send ideas to committee chairs by June 28, when they will be shared at the next SCA Board meeting.

The California Archaeological Site Stewardship Program (CASSP) recruits and supports volunteers who regularly visit assigned sites on public lands and report on their condition to the appropriate agency archaeologist. The goals of CASSP are to protect sites, help archaeologists who work in public agencies, and provide meaningful recreational experiences

Volunteers at the CASSP information table in the bookroom at the SCA meetings in Ventura.

CASSP



for volunteers. Since it began in 1999, almost 500 people have participated in CASSP volunteer *training workshops* and *advanced training* workshops. Volunteer training workshops are open to anyone with a sincere interest in helping to protect cultural resources. *Advanced* workshops give CASSP volunteers additional skills and experiences that they can use in their site stewardship experiences.

Training workshops for new CASSP volunteers were offered in February and in March, at the Sequoia National Forest at Lake Isabella and in the Palm Springs BLM Field Office respectively. Additional training workshops are planned for northern California locations. Specific locations and dates are published on the CASSP web site ([www.cassp.org](http://www.cassp.org)) as soon as they are confirmed. You also can receive notices by e-mail by signing up for the CASSP

listserv (visit <http://groups.yahoo.com/group/cassp-events/>).

The advanced workshops continue to have strong support from our volunteers. Liz Clevenger and Sannie Osborn of the Presidio Trust voiced interest to develop new directions for their Presidio Trust workshop. Beth Armstrong agreed to help with this effort. In each January since 2003, CASSP has conducted laboratory workshops at the Presidio Archaeological Lab, and we look forward to further programs at the Presidio. Sandy and Fran Rogers, with the Maturango Museum, expressed interest in holding another rock art recording workshop in Ridgecrest. We had over 20 volunteers attend the two-day rock art recording session in Ridgecrest in 2003, and it was a great way to see some very exciting sites and to learn recording techniques. Stephen Horne tentatively agreed to conduct another advanced mapping workshop for



Volunteers and sponsors at the site stewardship workshop for the Santa Rosa and San Jacinto Mountains National Monument hosted by the BLM Palm Springs Field Office, the San Bernardino National Forest, and the Bureau of Reclamation.

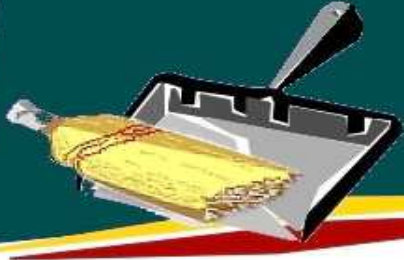
## SCA 2006 Data-Sharing Meetings

### SoCal DSM

**Place:** Ensenada, Mexico,  
**Date/ Time:** TBA  
**Contact:** Andy York, SoCal V-P  
<yorka@edaw.com>

### NoCal DSM

**Place:** Rohnert Park, CA  
**Date/ Time:** 10-07-06, Time/ Venue TBA  
**Contact:** Michael Newland, NoCal V-P  
<newland@sonoma.edu>



CASSP: The two previous mapping workshops that Stephen held proved very popular and interesting. Bob Bryson and Kirk Halford talked about developing restoration programs for historic structures as advanced workshops for CASSP volunteers. Additional funding may be available for these specific types of projects. Please watch the CASSP web site as details develop for these programs. Anyone can send comments and suggestions for advanced workshops to Beth Padon at (562) 432-1801 or by e-mail at bpadon@discoveryworks.com.

Tentatively, the next initial training workshop for site stewardship will be held in northern California, probably at the BLM Redding Field Office, in October, 2006. If you would like to attend this training workshop or if you or a friend are interested in site stewardship, please contact Beth or Chris Padon, CASSP coordinators, at the phone number or e-mail address above.

## CASSP at Palm Springs

*Amy Commendador-Dudgeon*

On March 18 and 19, 2006, CASSP held a training workshop in Palm Springs. This workshop, sponsored by the Society for California Archaeology, the Bureau of Land Management, the San Bernardino National Forest, and the Lower Colorado Regional Office of the Bureau of Reclamation, focused on the Santa Rosa and San Jacinto Mountains National Monument (SRSJ). The various speakers during the Saturday classroom session provided an excellent overview of the Monument and its cultural resources. Wanda Raschkow, archaeologist at the BLM Palm Springs Field Office, provided the general overview of the Monument, and discussed its historical aspect. Dan McCarthy, archaeologist with the San Bernardino National Forest, discussed prehistoric plant use in the Colorado Desert, and related archaeological site types. Eric White, environmental assistant with the Bureau of Reclamation, talked about his ongoing

work with the prehistoric fish traps along Ancient Lake Cahuilla. And Laurie Perry, an archaeologist with the Bureau of Reclamation, discussed the alternating episodes of the rising and falling of Ancient Lake Cahuilla, as well as an overview of the current federal and state laws concerning cultural resources. Two other members of the San Bernardino National Forest also attended the workshop, including Bill Sapp, Forest Archaeologist, and Jim Russell, Partnership Coordinator.

The Sunday session consisted of a field trip to two archaeological sites at the base of the SRSJ National Monument. The first was Coral Mountain, an amazing site with numerous petroglyphs ranging from prehistoric and historic, into modern times. This site is also interesting for its geological aspect, as the tufa on the rock walls provides a dramatic marker for the last stand of Ancient Lake Cahuilla, perhaps 20 feet above the present ground level. Our second trip was to RIV-4, a buried prehistoric campsite first recorded by Clement Meighan in 1949. During our visit here, Maurice Chacon with the Agua Caliente Band of Cahuilla Indians provided a view into the Native American traditions and history in the area, during a question and answer dialogue with the new volunteer site stewards. At this site the volunteers also obtained a firsthand view of why site stewardship is so important and necessary for protecting our cultural resources. Here we encountered a group of individuals riding on ATV vehicles through the sand dunes that overlay the site. The site area is identified as a limited use area, in which no mechanized vehicles are allowed, but it is clear that many people do not understand what that term means. Our stewardship of sites like these will provide both a means to monitor the condition of the sites through time, as well as information on where more public awareness of BLM policies and the value of protecting cultural resources is needed.

## Society for California Archaeology Summary Profit and Loss Statement

|                   |                          | <u>Beginning Equity</u> | <u>2004</u> | <u>2005</u> |
|-------------------|--------------------------|-------------------------|-------------|-------------|
| <b>Equity</b>     | Checking Account         | 22,979.26               | 30,305.04   |             |
|                   | Money Market             | 40,736.86               | 12,064.56   |             |
|                   | Prudent Reserve          | 42,505.05               | 43,840.17   |             |
|                   | Bennyhoff Fund           | 6,969.29                | 6,008.19    |             |
|                   |                          | 113,190.46              | 92,217.96   |             |
| <b>Income</b>     | Annual Meeting           |                         | 55,243.46   | 54,694.68   |
|                   | Dividends                |                         | 1,564.43    | 1,962.39    |
|                   | Donations                |                         | 7,990.35    | 33,185.12   |
|                   | Grants                   |                         | 12,251.22   | 77,827.47   |
|                   | Members Dues             |                         | 36,530.00   | 44,495.00   |
|                   | Other                    |                         | -           | 43.90       |
|                   |                          |                         | 113,579.46  | 212,208.56  |
| <b>Expense</b>    | Meetings and Proceedings |                         | 53,271.79   | 44,002.89   |
|                   | Newsletter               |                         | 9,562.86    | 26,413.28   |
|                   | Programs and Services    |                         | 51,133.56   | 49,708.66   |
|                   | Business Office          |                         | 15,297.90   | 54,419.59   |
|                   | Other Administration     |                         | 5,285.85    | 5,692.76    |
|                   |                          |                         | 134,551.96  | 180,237.18  |
| <b>Net Income</b> |                          |                         | (20,972.50) | 31,971.38   |
| <b>Equity</b>     | <u>Ending Equity</u>     |                         |             |             |
|                   | Checking Account         |                         | 30,305.04   | 34,074.44   |
|                   | Money Market             |                         | 12,064.56   | 39,167.27   |
|                   | Prudent Reserve          |                         | 43,840.17   | 45,079.43   |
|                   | Bennyhoff Fund           |                         | 6,008.19    | 5,868.20    |
|                   |                          |                         | 92,217.96   | 124,189.34  |

## SCA Executive Board Meeting, April 1, 2006

9:04 am-11:38am, Ventura, California

### Board Members Present:

Frank Bayham, President  
Steve Horne, President-Elect  
Shelly Davis-King, Immediate Past-President  
Mike Newland, Northern Vice President  
Ted Jones, Treasurer  
Risa Huetter, Secretary  
Greg White, Business Office Manager

### Board Members Absent:

Andrew York, Southern Vice President

The meeting was called to order by Frank Bayham at 8:25 a.m.

### 1. Announcements

*Southern Annual Meeting.* Shelly Davis-King reported that the Annual Meeting was an overall success and well attended. There were 550-600 paid meeting registrants. She attributed the high attendance to the appeal of the Santa Cruz Island Tour, pre-meeting workshops, and the Doug Owsley banquet speech. The silent auction, the banquet, and the field trips were well attended.

### 2. 2006-2007: Executive Board Meetings

The Board agreed upon the dates, times, and locations for the 2006-2007 Board meetings.

### 3. Local Arrangements/Program Chairs

*Program/Local Arrangement Chair.* Frank Bayham confirmed that Mark Hylkema has agreed to serve as Program Chair for the 2007 San Jose Annual Meeting and Jennifer Farquhar agreed to serve as Local Arrangements Chair. Names of potential volunteers can be provided to these individuals who have already begun their planning efforts.

### 4. Archaeology Month

Greg White proposed that Archaeology Month be moved from May to the Fall. White made the case that the move will facilitate Archaeology Month awareness and increase public participation. The California school history and prehistory curriculum takes place in autumn. By moving Archaeology Month to the Fall, the SCA would be creating a marketing opportunity.

*Archaeology Month Action.* Steve Horne motioned to shift Archaeology Month to October or November with the stipulation that Greg White check on grade school curriculum. Shelly Davis-King seconded the motion.

The board unanimously voted to move Archaeology Month from May to October or November depending upon which month would be more suitable aligned with the California school history curriculum. Greg White was tasked with

| Date             | Time    | Location     | Associated Event   |
|------------------|---------|--------------|--------------------|
| June 29-30, 2006 | 9:00 am | Chico        | None               |
| October 6, 2006  | TBD     | Rohnert Park | NorCal DSM         |
| January 6, 2007  | TBD     | Sonora       | None               |
| March 22, 2007   | 1:00 pm | San Jose     | SCA Annual Meeting |

*Dates, times, and locations for the 2006-2007 SCA Executive Board meetings.*

researching the contingent variables and reporting to the board via e-mail. The board also agreed that the poster would be produced and distributed in conjunction with the annual meeting to facilitate distribution and allow participation in the Society for American Archaeology poster competition.

### 5. SCA Directory

Frank Bayham opened a discussion of the SCA Member Directory. White reported that the previous Boards had stipulated that Directory be produced once every two years. The Board discussed Directory issues and determined the following:

- Many members are concerned with privacy, and they have requested an electronic copy not be distributed. Greg White will include a statement in the address member's privacy concerns in future membership mailings.
- The directory costs about \$1800 to produce.
- The directory is not in the current Business Office budget, but will be included in the next budget submitted and the Business Office will produce and mail the Directory by September, 2006.
- To save distribution costs the Directory will continue to be sent out every two years and will be coordinated with other mailings.

### 6. Other

*Financial.* Ted Jones stated that the SCA is currently in a good financial position (see inset, p. 10), but the Board should be more aware of the SCA whole financial picture. By defining the SCA's fixed costs, the Board would know how much is needed to cover the SCA operations and how much of the prudent reserve is available for discretionary spending on improving existing programs or starting new undertakings.

Frank Bayham stated he is looking forward to a productive year. Bayham also reiterated his election position statement: that he is concerned about and will attempt to increase awareness of ethical standards and guidelines in cultural resource management practices. He viewed the 'Open Forum' held the day before as a first step in this direction.

*Shelly Davis-King moves to adjourn the meeting.*

*Ted Jones seconds.*

*Meeting adjourned at 11:38am*

*Transcribed by SCA Secretary Risa Huetter*



# 2006 Annual Meeting

*Shelly Davis-King, SCA Past-President  
Clay Lebow, Program Chair  
with contributions from Greg White, Barry  
Price, Johnell Lytle-Davis, Janet Eidsness,  
and Jon Erlandson*

## Meeting Wrap and Awards Summary

**T**he 40<sup>th</sup> Annual Meeting of the Society for California Archaeology was held 29 March-1 April, 2006 on the sunny California coast at the Marriot Ventura Beach. More than 600 people attended, a near high for southern California meetings. Pre-meeting workshops included a well-attended session on geoarchaeology taught by D. Craig Young and Jeff Rosenthal of Far Western Anthropological Research Group and Jack Meyers of Sonoma State University, and the popular Working with CEQA workshop taught by Dana McGowan and Brian Ramos from Jones & Stokes. In keeping with the general theme of the meetings, the public lecture this year was put on by the Institute for Canine Forensics who discussed how their trained dogs detect human remains, followed by the dogs giving a demonstration in the auditorium.

### The SCA Thanks Underwriters and Annual Meeting Volunteers!

Without the generous donation of volunteer time and underwriter money, the SCA would have a difficult time putting on our Annual Meeting. We are appreciative of your generous donation that helped make this year's 40<sup>th</sup> Annual Meeting such a success. Please take a look at the sidebar on the opposite page and look for an opportunity to single-out these individuals and corporations for a special "thanks" for all they have done for the SCA.

Thursday morning's opening session began with a Traditional Blessing from the spiritual leader for the Santa Ynez Band of Chumash, Adelina Alva-Padilla, who encouraged us to study the past with wisdom and sensitivity. This being the 40<sup>th</sup> year of the SCA, we asked where you

were in 1966 when our organization was born? Minimum wage was a dollar, and the average salary was \$4,700.00. Mini skirts, bouffant hairdos, and Nehru jackets. Johnson was president, we were in the height of Viet Nam, the Beatles were coming to America to change our music, and the first Superbowl was also in 1966. And change was in the air. No longer content to be images of the generation that preceded them, young people of that age wanted change. The changes affected education, values, lifestyles, laws, and entertainment.

Many of the revolutionary ideas which began in the sixties are continuing to evolve today. One of these was the concept of a statewide archaeological organization that began to take form in the mid 1960s, mostly in reaction to the accelerating pace of site destruction caused by land development, rampant pot hunting, and the elitist control of site records at UC Berkeley. If you talk with the *Young Turks* of the time such as Rob Edwards, Mike Moratto, or Tom King, it was the students of Davis, UCLA, and San Francisco State who started our nascent society in 1966, with the support of some seasoned veterans. The more seasoned veterans like Charles Rozaire, Bob and Melva Orlins, or the late Bill Wallace, will recall that student "twits" had crashed the meeting and were tolerated until Al Spaulding finally shut them up.

The history of the society began in a conference room at UCLA, with Bob Heizer and his students notably absent, ending with Dave Fredrickson agreeing to serve as President until formal elections could be held. The following May, with some 95 voters, Al Spaulding of UCSB was elected as SCA's first president. While they could not do much about their

## **Underwriters/Contributors 2006 SCA Annual Meeting, Ventura**

### **Program and Activities Fund Donors**

---

Applied EarthWorks, Inc.  
 ASM Affiliates, Inc.  
 Basin Research Associates  
 Bonterra Consulting  
 Cogstone Resource Management Inc.  
 Lynn Compas  
 CompassRose Archaeological, Inc.  
 Coyote & Fox Enterprises  
 Cultural Resource Management Services  
 Davis-King & Associates  
 Discovery Works, Inc.  
 EDAW, Inc.  
 Far Western Anthropological Research Group, Inc.  
 Foothill Resources, Ltd.  
 Gallegos and Associates  
 Galvin Preservation Associates  
 Garcia & Associates  
 Greenwood and Associates  
 Holman and Associates/Matthew Clark  
 Keith L. Johnson  
 Legacy 106, Inc.  
 LSA Associates, Inc.  
 Daniel and Sannie Osborn  
 Pacific Legacy, Incorporated  
 Past Forward, Inc.  
 Sentinel Archaeological Research, LLC  
 Sierra Valley Cultural Planning/C. Kristina Roper  
 Statistical Research, Inc.  
 SWCA Environmental Consultants  
 Maggie Trumbly  
 URS Corporation  
 William Self Associates, Inc.

### **Native American Scholarship Fund Donors**

---

Blue Lake Rancheria  
 Gregg and Elonda Castro  
 Ms. Curiel  
 Monache Inter-Tribal Association  
 Smith River Rancheria  
 Donald Storm  
 Michelle Vilava

ancestors, these SCA founders influenced their descendants enormously. Forty-year members were acknowledged in the audience, followed by a spectacular show created by Trudy Haversat and Past-President Gary Breschini who put together a 10 minute "Multimedia Tribute to the SCA on the Occasion of its 40th Anniversary." This musical and visual tribute to the history of SCA was replayed at the banquet and may soon be seen on our web page.

The plenary session, "Understanding Culture and Behavior through Mortuary Population Analyses" was exceptionally well attended. Beyond the opening session and plenary, the meeting included nine symposia, six general sessions, and four poster sessions. Symposia were well organized and innovative, including an all-day session of paper contributions inspired by Mike Glassow, an examination of the San Dieguito Complex from a transborder perspective, and a look at the natural and cultural environment of Lake China at the late Pleistocene/early Holocene transition. Papers in the general sessions this year had a definite southern California bent. We wonder if folks from northern California cannot attend meetings in southern California, and vice versa?

Douglas Owsley, Curator of Physical Anthropology in the Department of Anthropology at the Smithsonian's National Museum of Natural History in Washington, was our extremely popular banquet speaker this year. Dr. Owsley was one of the lead plaintiffs in Robson Bonnichsen et al. v. U.S. et al. Civil Case No. 96-1481, the successful litigation to allow for the scientific study of the Kennewick Man, the 9600-year-old human skeleton found eroding from the bank of the Columbia River in Kennewick, Washington in 1996. His after-banquet speech addressed recent taphonomic analysis of Kennewick Man.

### **The SCA Thanks Silent Auction Contributors**

The SCA and Silent Auction Organizer Barry Price (Applied Earthworks) would like to acknowledge and give special thanks to the following individuals and companies for their involvement, help, and donations. This sold out and popular event was a wonderful success with some 300 meeting registrants tasting wine, swilling beer, and eating the abundant food. Auction proceeds totaled about \$6300, with ticket sales netting a similar amount. This is our major fundraiser for the year, and we are very appreciative to all those who participate.

By all accounts, Thursday night's reception and silent auction was a resounding success. A sellout crowd (buy your tickets early next year!) enjoyed Buenaventura Catering's excellent fare, which featured locally grown produce and delicacies. Local Arrangements Chair Colleen Delaney-Rivera was instrumental in identifying more than a dozen possible venues for the reception and auction. The Ventura County Museum of Art and History proved to be the perfect choice, combining a warm and friendly setting with many interesting exhibits on local history and archaeology. An added benefit of this location was the Albinger Archaeological Museum, across the street, where members were treated to a special exhibit on the original excavations

at the Ventura Mission. Several members saw themselves and their friends in the slide show and photos from 30+ years ago!

### SCA Thanks Annual Meeting Team

In terms of acknowledging people that contributed to the Annual Meeting, we would start with Colleen Delaney-Rivera who did a phenomenal job with the local arrangements, and particularly negotiating and working with the Marriott, and arranging for Doug Owsley as the banquet speaker. Barry Price did a great job raising money and organizing the silent auction. Ann Munns put together wonderful tour to Santa Cruz Islands that sold out long before the meetings even started. Lynn Compas did an excellent job managing the exhibitors and vendors, an especially difficult task given the limited room available. Dina Ryan organized a great banquet. The registration desk was exceptionally smooth this year, thanks to the efforts of Chris Ryan, Greg White, Robin Hogan, and the help of numerous volunteers. SCA's returning volunteer coordinators, Debbie McLean and Terri Fulton of LSA, should be acknowledged for their ability to get the volunteers organized and in place to help run

*Banquet speaker this year, Dr. Douglas Owsley, Curator of Physical Anthropology in the Department of Anthropology at the Smithsonian's National Museum of Natural History in Washington, D.C. All photographs in this article by Trudy Haversat and Gary S. Breschini. Copyright 2006 by Trudy Haversat and Gary S. Breschini.*



Trudy Haversat and Gary S. Breschini

smooth meetings. Marianne Elcar and Carly Handy coordinated publicity with the local events, especially important for the Wednesday evening public session. This appears to be the year in which the scale tipped from slide projectors to multi-media presentations and LCD projectors. Maggie Trumbly did an excellent job of managing the technological evolution and coordinating the audio-visual aspect of the annual meeting. Applied EarthWorks, Inc. not only helped underwrite the meetings, but also contributed a substantial amount of labor to prepare the program and organize the silent auction, and provided the LCD projectors that were used in the general sessions. A special note of thanks is due to Catherine Girod and Lisa Barnett-Thomas, who worked tirelessly before, during, and after the event to secure refreshments and ensure that the catering, beverages, and auction ran smoothly. Thanks also are due to Joan Brandoff-Kerr, who solicited many of the central coast vintners and wineries that donated their wares to the event. Other Applied EarthWorks staff who were instrumental in the success of the meeting included Susan Rapp, who produced the program, and Carolyn McElroy, who carried out myriad crucial administrative support tasks. John Lytle donated the artwork used Annual Meeting Program cover.

### 2006 Lifetime Achievement Award: Michael A. Glassow

It was fitting that the Lifetime Achievement Award this year was presented to Professor Michael A. Glassow on the southern California coast, the location of his life's work, by four of his former students. Mike, upon accepting the award, was quick to remind the audience that he is not stopping his research, but merely retiring soon from active teaching, and is still working on a number of projects with his students, and writing about number of research topics.

Mike Glassow has practiced archaeology on the southern California coast for more than forty years, has had an enormous impact on California archaeology and the lives of his numerous students, has made played an important role in the emergence of public archaeology and cultural resource management in California and the USA, and has advocated tirelessly and selflessly for the development of high archaeological standards, ethics, and conservation principles. Throughout he has been a mentor, a friend, and a shining example of a dedicated archaeologist and man of integrity and principle. His former and current students were quick to stand in the banquet audience acknowledging the contribution of Mike Glassow to their own careers.

Mike Glassow earned BA, MA, and PhD degrees from UCLA in 1963, 1965, and 1972, respectively, joining the faculty of the Department of Anthropology at UCSB in 1969, where he has been for the past 36 years. Over the years, Mike has taught classes in North American Archaeology, North American Indians, California and Great Basin Archaeology and Ethnography, Theory and Method in Archaeology, Methods and Techniques of Field Archaeology, Laboratory Techniques in Archaeology, Ecological Perspectives in Archaeology, and Method and Technique of Subsistence Analysis. Throughout his career, Mike has been heavily involved in academic archaeology, cultural resource management, museum studies, and the conservation and

preservation of California archaeological sites. Since 1969 he has directed the Museum of Anthropology at UCSB and since 1975 he has also been the regional coordinator for the California Central Coast Information Center. He served as President of the Society for California Archaeology in 1988-89 and as Southern California Vice-President from 1976 to 1978 and 1982-83. Mike was active in the Society for Professional Archaeologists (SOPA) for more than a decade, serving as its California Coordinator from 1978 to 1980 and President-Elect in 1997-98. He also served as President of the Register of Professional Archaeologists from 2002 to 2004.

Along with a strong commitment to teaching and public service, Mike Glassow has a distinguished research career. He was a pioneer in the application of processual approaches to archaeology in California and shell middens in general. He has continued to have a strong impact on issues ranging from the development of ecological and demographic approaches to archaeology, the sampling and interpretation of shell middens, cultural and technological evolution, paleoecology and environmental change, dietary reconstruction, and chronology building. Although most of his research has been focused in Chumash territory and the Santa Barbara Channel area, he has also conducted field work elsewhere in California, the American Southwest, Alaska, Mexico, Guatemala, and Russia. He served as Associate Editor for the *Journal of California and Great Basin Anthropology* from 1993 to 2000, was instrumental in establishing the *Proceedings of the Society for California Archaeology*, and was an Associate Editor for the *Proceedings of the Sixth California Islands Conference*. He has also written or edited five books or monographs, including volumes on the archaeology of the Vandenberg region of northern Santa Barbara County, the archaeology of the northern Channel Islands, the archaeology of the California Coast during the Middle Holocene, a book on agricultural peoples of the American Southwest, and an edited volume entitled *Man in the Coastal Zone: Experience of Centuries*. He is currently completing a synthesis of his work on red abalone middens on the Channel Islands. Over the years, he has also published six papers in *American Antiquity*, more than 50 other journal articles or book chapters, eight book reviews, and numerous technical reports. He has also presented 62 papers at professional archaeological, anthropological, or scientific meetings in a variety of regional, national, and international settings.

### 2006 California Indian Heritage Award: Julia Parker

The 2006 California Indian Heritage Preservation Award that this year was presented to Julia Parker, a

woman who has nurtured millions of people – literally millions of people— about traditional Indian values. Born in 1929 of Coast Miwok and Kashaya Pomo ancestry, orphaned at the age of six, and raised in a German foster home, Julia Domingues Parker's story demonstrates that considerable adversity and hardship do not have to overcome the positive values of being a California Indian woman in the 20th and 21st centuries. Julia did not grow up in a traditional Indian family, but her German foster mother told her, "don't forget you are an Indian girl." Ironically, her first substantive contact with other natives was at the Stewart Indian School in Nevada, where students were coerced to put aside their Indian ways and adopt mainstream white values. There she met Ralph Parker whom she married in 1948. Although Indian by blood, the young bride didn't know traditional ways when she moved with Ralph to his family's Sierra Me-wuk-Paiute village in Yosemite Valley. There, Julia and Ralph raised their four children—Virginia, Louis, Allen and Lucy.

Over time, Julia was accepted by Ralph's relatives and she learned traditional ways by helping the elders and through observation. Julia spent hours learning how to gather and prepare materials and to make baskets from Ralph's grandmother, the renowned weaver Lucy Telles, who had been a cultural demonstrator in Yosemite until her death in 1956. In 1960, with the encouragement of Ralph's great-aunt

Trudy Haversat and Gary S. Breschini



*2006 Lifetime Achievement Award winner  
Professor Michael A. Glassow, University  
of California, Santa Barbara*

Tina Charlie, Julia also began working for Yosemite National Park, demonstrating basketweaving. For nearly 50 years Julia has positively represented traditional California Indian values to millions (and several generations) of Yosemite visitors, patiently answering questions asked time and time again. She has passed on her philosophy, "The old people taught us, take from the earth, give back to the earth, and never forget to say please and thank you," teaching young and old alike to respect the earth, the family (especially elders) and rules, and to recognize that we are all the same.

Julia's greatest accomplishment, in her own words, has been her desire and passion to make something of life when circumstances didn't look so great. Not only has she graciously served as a Native American cultural demonstrator at one of the world's most visited parks, Julia is known throughout the United States and the world for her basketry arts, especially how she interprets and blends traditional materials and techniques with her own vision and style. To name but a few—her baskets are among those in permanent collections of the Smithsonian Institution and the royal collection of Queen Elizabeth II. In 2004, she was a featured contemporary Indian artist in a special exhibit at the George Gustav Heye Center of the Museum of the American Indian in New York City, the predecessor of the widely acclaimed Museum of the American Indian which opened last year in

Washington DC. Also in 2004, four decades of her basketry arts were exhibited at the Bedford Gallery in Walnut Creek. That exhibit, entitled "The Past in Present Tense" displayed Julia's working chair, which is the centerpiece SCA's Archaeology Month poster this year. Julia has taught weaving in California and to venues across the country, and has passed the values, knowledge and passion on to her daughter Lucy Parker and granddaughter Ursula Jones, and great-granddaughter Naomi Jones. How frequently and impressive it is to see four generations of basketweavers attending various gatherings and conferences around the state! Lucy, Ursula, and Naomi were all present at the banquet when the award was presented to a surprised and pleased Julia Parker.

### **2006 Martin A. Baumhoff Special Achievement Award: Jack Meyer and Jeff Rosenthal**

Among archaeologists nationwide California has certainly earned its reputation as the epicenter of important movements that eventually sweep through other corners of the U.S.; certainly true for the development of CRM, Native American consultation, and recently, economic intensification theory. But, in one respect our State has been slow to contribute and slower still to act and that is in the field of Geoarchaeology, the application of geomorphic principles to archaeological inquiry.

In honor of the late Marty Baumhoff's myriad contributions to scholarship and original thinking in California archaeology, the SCA's Martin A. Baumhoff Special Achievement Award is given for a distinct, noteworthy effort, or for cumulative efforts on topics such as specialized analyses.

Today's Martin A. Baumhoff Special Achievement Award awardees, Jack Meyer and Jeffrey Rosenthal, are recognized here not only for delivering geoarchaeology statewide as a new and innovative package of methods and methodology, but also for realizing its full potential in three ways still poorly realized in other regions:

- (1) by integrating geoarchaeological observations thoroughly with other avenues of paleoenvironmental research;
- (2) by coordinating the approach with archaeological chronology-building and a component-based systematics, and;
- (3) by making geoarchaeology an effective and meaningful planning tool at the regional scale.

This award recognizes these two scholars for three spectacular recent studies, the *Geoarchaeological Study and Sensitivity Model for the Southern Santa Clara, Hollister and San Juan Valley*, the *The Prehistory of the*



*2006 California Indian Heritage Preservation Award winner Julia Parker with her Granddaughter, Ursula Jones and great Grand-Daughter, Naomi Jones.*



Trudy Haversat and Gary S. Breschini

Director of the California Department of Forestry and Fire Protection, Chair of the State Board of Fire Services, Chief Ruben Grijalva (L) and CDF Northern Regions Archaeologist Richard Jenkins (R) accept the 2006 Mark Raymond Harrington Award for Conservation Archaeology on behalf of the California Department of Forestry and Fire Protection

of Forestry and Fire Protection, for their Fire Archaeology Program. CDF is responsible for the protection of more than 31 million acres of California's privately-owned wildlands and its workforce responds annually to an average of 5700 wildland fires. While all Californians are acutely aware and appreciative of CDF's valiant fire-fighting efforts, most are unaware of the agency's parallel efforts to protect cultural resources threatened by fire.

Developing from events that transpired during the Pines Fire Incident in 2002, CDF archaeologists and long-time SCA members Rich Jenkins, Dan Foster, Chuck Whatford, Steve Grantham, Gerrit Fenenga, and Linda Pollack responded by creating a model incident-specific fire-response cultural resource preservation plan. CDF archaeologists developed the program that is now a regular component of

incident response activity and they are active on every major fire incident in the State. Consequently, between May and October they are on-the-go, traveling to all corners to respond to wildfire incidents.

CDF's fire-response cultural resource program is distinguished by three solid years of success marked by increased integration with incident response command and control, and increased influence in moment-to-moment decision making critical to heritage preservation. In 2004 alone, the fire archaeology team responded to 139 incidents involving more than 220,000 acres, in fire zones that contained 471 previously recorded sites and 72 newly encountered sites, all that were managed in the course of the fire incident.

To accomplish their innovative and integrative approach, the fire archaeologists devised a program featuring five major components that include (1) Critical Training at the Firefighter I Academy so that they, in turn, can work directly on the fire-line; (2) Incident Management training to provide information and guidance in the planning stages of suppression to protect resources from impacts by fire fighting equipment operating ahead of the burn; (3) Coordination with Federal and other State Agencies, including the Information Centers to develop protocols for emergency access to IC records along with monitoring known sites for effects of fire and/or suppression activities; (4) Conducting inventory to

***Sonora Region: Archaeological and Geoarchaeological Investigations for Stage I of the East Sonora Bypass Project, State Route 108, Tuolumne County, California, and Geoarchaeological Study: Landscape Evolution and the Archaeological Record of Central California.*** It should be noted that Jack and Jeffrey, along with Bill Hildebrandt and Jay King, were recipients of a 2005 PRESERVATION DESIGN AWARD from the California Preservation Foundation for the *Geoarchaeological Study and Sensitivity Model for the Southern Santa Clara, Hollister and San Juan Valley* report.

In science there are no movements like substantive movements, which tend to impact the field, lab, and research design in equal measure. The shift to geoarchaeological perspectives that Jack and Jeff have engineered is significant and fundamental. These gentlemen have taught us that archaeology is not draped upon the landscape but built into the landscape, and that the landscape is not a static backdrop on which site formation occurs, but that the formation, preservation, and destruction of archaeological deposits were influenced by the same dynamic processes responsible for the evolution of the landscape itself.

#### **2006 Mark Raymond Harrington Award for Conservation Archaeology: CDF Fire Archaeologists**

This year the Mark Raymond Harrington Award for Conservation Archaeology went to the California Department

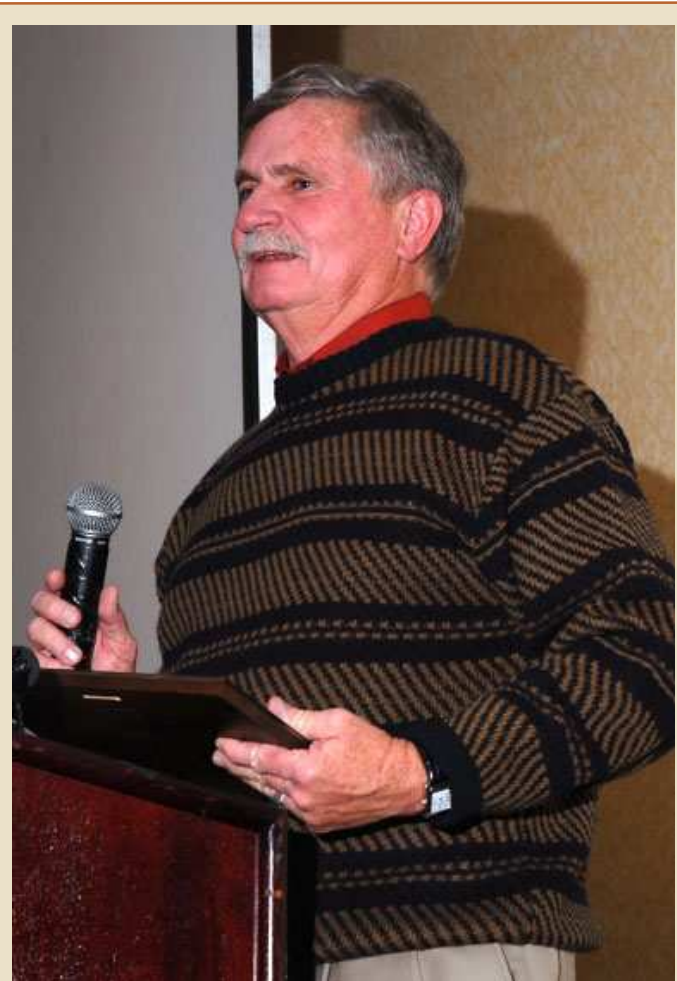
identify new resources that might have been exposed by vegetation removal or other activities related to fire suppression ; and (5) coordination with Native American communities. CDF fire archaeologists are regularly joined by California Natives who assist with fire-line surveys and post-suppression inventory.

The CDF fire archaeologists face a daunting task, with a few hours to gather information about archaeological and other cultural resources in the fire area, travel sometimes hundreds of miles to the incident, coordinate with fire personnel, and then hit the ground with the goal of finding and flagging known sites and assisting CDF equipment operators in avoiding sites. If there is time, the archaeologists also put themselves even further in harm's way by surveying ahead of the fire for unrecorded sites. CDF fire archaeologists have chalked up many small accomplishments which together are having a big, cumulative impact on California heritage preservation. They have redirected fire-suppression drops to avoid petroglyph panels, identified alternate fire-break routes to avoid cultural resources, and conducted inventory on burned lands during post-suppression incident management.

The 2006 Mark Raymond Harrington Award for Conservation Archaeology recognized CDF fire archaeologists Rich Jenkins, Linda Pollack, Gerrit Fenenga, Chuck Whatford, Steve Grantham, and Dan Foster, and was presented to the Director of the California Department of Forestry and Fire Protection, Chair of the State Board of Fire Services, Chief Ruben Grijalva. Chief Grijalva came to the SCA banquet to honor the CDF Fire Archaeology team, and by accepting the award for the team, he sends a clear signal that his agency respects and honors the Fire Archaeology team's notable heritage preservation accomplishments.

### Other Awards and Special Recognitions

Several other awards were presented. Stan Berryman received the 2006 Thomas F. King Award for his 35 years of leadership in cultural resources management, and especially for his oversight of the Camp Pendleton cultural resources management program. The Ventura County Archaeological Society received the 2006 Helen C. Smith Award given by the SCA to an avocational society. VCAS was recognized for nearly 35 years of archaeological research, education, and preservation leadership in Ventura County. Two student awards were also given out. The 2006 Bennyhoff Memorial Award was presented to Elizabeth Sutton for her work on a typological, chronological, and functional study of California digging stick weights. The SCA Annual Meeting Student Paper Award is given for a research paper on an original topic, competitively judged by a select panel. Victoria Stosel, a graduate student in anthropology at California State University, Los Angeles was recognized for her research



*Top: Stan Berryman, Recipient of the 2006 Thomas F. King Award for Excellence in Cultural Resource Management.*

*Bottom: Hersh Davis, Recipient of a 2006 Presidential Commendation Award.*

paper "An Examination of Three Contemporaneous Sites on San Nicolas Island Through Meat and Protein Analysis." We look forward to hearing much more from these two student awardees.

Shelly: I also had the honor of presenting two Presidential Commendations at the banquet. The first recognition was given to Herschel D. Davis, nominated by the Bureau of Land Management and the United States Forest Service. The nomination form prepared by Ken Wilson (Past President and BLM State Archaeologist), singles out "Hersh" Davis:

"for the outstanding job he has accomplished as a volunteer in the BLM's archaeological, site stewardship, and cultural resources program in Southern California... with .... his dedication to cultural resources and archaeology in Northern California with the Forest Service in Lake Tahoe, and [who] epitomizes volunteerism and the value it has in managing and protecting the archaeological resources within California."

For me, it was an especially welcome tribute to Hersh Davis, who also happens to be my father, and whose curiosity, dedication to inquiry, and scientific approach encouraged me to follow my childhood dream of becoming an archaeologist.

The second Presidential Commendation was awarded to Greg White for his outstanding service and commitment to the Society. Greg has been the wheelhorse of the SCA for a long time. A wheelhorse is the steady and effective work horse whose position is closest to the wheels of the structure and whose consistency allows the vehicle to move in tandem. The wheelhorse is never complaining (at least not so the other horses can hear) and has that endless energy to look out for the other team members in the actions taken. Greg made my tenure as your president so much easier and pleasant, keeping me out of hot water often and providing me with sound, scholarly, and sensitive advice. His dedication extends also to his research, his students, his remarkable commitment to the SCA membership, and to the people he works with, like the Mechoopda Indian Tribe. Greg was thanked for his gentle reminders, ethical guidance, and his commitment to the Society by a rousing, standing ovation from the membership.

And finally, to my co-author on this column, Clay Lebow, who braved program duties while physically and violently ill, and yet managed to keep everything on an even keel, my heartfelt gratitude and appreciation. You did a wonderful job of coordinating, remembering SCA's mission, and making sure that all was organized and on time. Thank you so much and thanks to the entire annual meeting team that made the Ventura meetings successful and fun.



## Meetings

### Great Basin Anthropological Conference, October 19-22, 2006, Golden Nugget, Las Vegas, Nevada

The 30<sup>th</sup> biennial Great Basin Anthropological Conference will be held October 19 – 22, 2006 at the Golden Nugget Hotel in Las Vegas, Nevada. All anthropological sub-disciplines and related fields are welcome. Registration, a welcome ceremony, and the Plenary Session will be held Thursday afternoon, October 19<sup>th</sup>. Presentations begin Thursday and will continue through the weekend. Friday's schedule includes an evening reception with a cash bar and hors d'oeuvres, and on Saturday, there will be a banquet and dancing following presentations and business meetings. Field trips are planned for Sunday morning.

Please visit our website for information, news, submission instructions, links to the Golden Nugget, visitor information, and much more as the conference approaches (<http://www.gbac.whsites.net>). Address inquiries to: Barb Roth, GBAC Co-Chair, Anthropology Department, UNLV, Las Vegas, NV 89154. Phone (702) 895-3640, email: [barbara.roth@unlv.edu](mailto:barbara.roth@unlv.edu).

### Professional Anthropologists Needed to Serve as Mentors to Students During the 2006 AAA Annual Meeting to be held at the San Jose Convention Center, San Jose, CA, November 15-19, 2006.

The National Association of Student Anthropologists (NASA) would like to invite anthropologists to participate as mentors at our Annual Mentor Workshop co-sponsored by the American Anthropological Association (AAA) at the annual meeting in San Jose. During a two hour period, mentors are asked to meet individually with up to three students for thirty minutes each to give research and career advice. Mentors will

be matched with registered students according to similar interests. If you are interested in volunteering for the Annual Mentor Workshop please send an email to Marcy Hessling, NASA Undergraduate Representative-at-Large at [anthromarcy@hotmail.com](mailto:anthromarcy@hotmail.com). In your email please include your name, affiliation, and a description of your area(s) of study/research/interest. Please use key words in order to be as brief as possible so that your description can be included unedited on the list to the students. Thank you, your willingness to volunteer is greatly appreciated.

## 2006 California Indian Conference

The 2006 California Indian Conference will be held October 13-15, 2006, at Dominican University, San Rafael, California. Please visit our web site for more information (<http://bss.sfsu.edu/calstudies/CIC/default.htm>). If you have ideas for sessions, artists and publishers, or abstracts for papers, please contact the conference organizer:

Arthur Kane Scott  
Humanities Dept.  
Dominican University of California  
50 Acacia Ave.  
San Rafael, CA 94901  
w) 415-482-3545  
AScott@dominican.edu

---

### On-Line Resources

---

## CDF Archaeology Web Resources

**Colleagues in California Archaeology:** In case you haven't seen it yet, the CDF Archaeology Program has a web site containing a number of items that might interest you. These include a wide variety of topics for a wide-ranging audience. Some are technical manuals, rules, forms, procedures and training guides intended for those conducting archaeological survey work supporting CDF projects. Others are news stories for the general public. Others still are written primarily for professional archaeologists and through posting on our web pages we are utilizing a method to broadly circulate studies and reports at little or no cost. Four such articles have recently been posted in professional report format I encourage you to review them. The first three are hot-off-the-press and have been produced in HTML and PDF formats. The PDFs were created to provide a printable, paginated version of the reports. In addition to the top four articles which are new, we've also included a list of other articles available on our web site which were posted in the past year or two.

The CDF Archaeology Team is grateful for the excellent web-production work provided by Indiana University, Far Western Anthropological Research Group, California State University Bakersfield, and ASM Affiliates. We also thank numerous friends and colleagues who contributed to the research and report writing.

- A Charmstone Discovery in the Redwood Forests of Mendocino County, California
- The Plantation Cache Charmstone
- The Identification and Description of Cuyamaca Oval Basin Metates
- The Archaeology of Volcan Mountain
- San Bernardino National Forest Hazard Tree Removal Project and CDF Bug-Kill Grant Projects
- The Archaeology of CA-PLA-689: The Dad Young Spring Site
- The Identification of Clorox Bottles
- History of CDF and History of the CDF Archaeology Program
- Enterprise Mill Historic Site
- Rock Basins in Mountain Home State Forest
- CDF's San Diego Unit Receives the Golden Trowel Award for Protecting Archaeological Sites During Wildfire Suppression Work
- General Information on the Golden Trowel Award
- The Archie Brown Artifact Collection
- The Effects of Burning on Flaked Stone Artifacts
- Suggestions For Recognizing Sites
- Techniques for Discovering Prehistoric Sites
- Suggestions For Preparing Site Records and Maps
- Procedures for an Archaeologist Assigned to a CDF Wildfire
- Fire and Archaeology: A Review of the 2004 Fire Season

To further explore the contents of the CDF Archaeology Program Web Site, the link below will connect you to our home page. You can also get to our home page from links on CDF's main home page at [www.fire.ca.gov](http://www.fire.ca.gov) by selecting **Resource Management**, then **Archaeology**.

Dan Foster  
Program Manager, Senior State Archaeologist  
CDF's Archaeology and Historic Preservation Programs  
California Department of Forestry and Fire Protection

## A Guide to Wildlife Habitats of California (Mayer and Laudenslayer, 1988) Now Online With Updates

The habitat classification system developed for CWHR is now fully online. The original publication in its entirety is accessible as a series of \*.pdf files. Users may also easily determine which sections of the habitat guide have been updated since 1988 and access these as well.

Updates include a 2004 revision of the habitat classification rules, crosswalks to major vegetation classification schemes (1998) and ecological subregions (2004), field forms not included in the 1988 volume, and descriptions of agricultural and barren habitats (1999).

Also included on the web page is a "Preliminary Revision to Marine and Estuarine Habitats of the California Wildlife Habitat Relationships System" (2002) and a link to habitats by county.

Regular users of the CWHR System and its software may want to bookmark this page for future reference:

[http://www.dfg.ca.gov/whdab/html/wildlife\\_habitats.html](http://www.dfg.ca.gov/whdab/html/wildlife_habitats.html).

## San Diego State University Publication of Fort Guijarros Archaeology Field Report and Architectural Analysis Available Online

Ronald V. May  
San Diego, California

The long awaited publication of the archaeology field report and architectural analysis of the 18<sup>th</sup> century Spanish cannon battery at the entrance to San Diego Bay is now available at the new online publication series by San Diego State University at <http://SOAP.sdsu.edu/Volume1/volume1index.htm> and a limited run of hard copies will be released for institutional libraries through the Department of Anthropology.

Seth Mallios edited the new online publication series, which he believes will have a far wider national and international audience than a simply hard copy publication. He and his staff are in the process of scanning all back issues of the earlier San Diego State Occasional Papers as additional links. They also scanned all back issues of the 1987-1990 Fort Guijarros Quarterly and plan in the near future to scan the 1995 Fort Guijarros Journal. In essence, Mallios picked up the unpublished second issue of the Fort Guijarros Journal and inserted it as Part 3 of the current online "SOAP," as he likes to call the new online publication.

Test excavated between 1981 and 1995, this large architectural fortification may be the last surviving Spanish cannon battery in California. Previous work at Monterey appears to be a Mexican era reconstruction of an 18<sup>th</sup> century Spanish cannon battery. The battery at San Francisco extinguished with the construction of the Golden Gate Bridge. All searches for a legendary fort at Santa Barbara have failed to find ruins. Previous papers and publications concerning the investigations by the Fort Guijarros Museum Foundation have focused on a later 19<sup>th</sup> century whaling company midden or the forensic mechanics of on-going excavations. This publication is actually a set of three papers by Milford Wayne Donaldson, Ronald V. May, and C. Fred Buchanan.

Analysis revealed the Fort Guijarros investigations uncovered ruined portions of a cannon port that faced the center of San Diego Bay. The walls proved to be absolutely massive and at least forty feet wide at the base. The gun deck rested on top of twenty feet of earth, cobble, and adobe architecture. This massive deck spanned at least 100-feet north south and faced the lower beach to the east. A massive cobblestone ramp buttress formed the outer wall. Inside layers of cobbles, sand, and mud-mortared cobblestone retaining walls firmly held the deck in place. Between the edge of the cobblestone ramp and center of the deck, some twenty feet or more back, sat another huge architectural construction called a *merlone* that protected the cannons and soldiers from in-coming artillery fire.

Perhaps the greatest contribution of this publication, the forensic methodology of excavation of the collapsed *merlone* and detailed analysis of the Spanish tiles, adobes, and cobblestones has resulted in a remarkable series of architectural renderings showing how some of the key pieces fit together. C. Fred Buchanan, retired a civil engineer, devoted 1986 through 1995 in the careful drawing of each tile fragment, mortared cobble and tile articulation, and compared these pieces with a 1772 publication on how Spanish batteries should appear to interpret in a series of sketches the appearance of the gun port and *merlone* architecture. Mallios intends for all Buchanan's meticulous drawings to be attached to the publication for scholarly reference.

After years of architectural study, May and Buchanan selected key tiles and cobble/mortar articulations for long-term storage at the humidity and temperature-controlled Ballast Point Repository at Naval Base Point Loma. The smaller less informative pieces were reburied at the ruins of the 1796-1835 fort battery and the location marked with U.S. cent pennies. Those curated artifacts are wrapped in acid-free tissue and padding and set in heavy wooden boxes coated with 2-ply Epoxy paint set on heavy earthquake shelves in the Ballast Point Repository, along with nearly 400 other artifact boxes from the investigation.

Armed with Buchanan's drawings, historical maps, the 1772 fortification publication and other information, Donaldson created a hypothetical shape for the battery and applied his skills as a master architect to interpret the orientation of the fort. He also studied the layout of the bay as it probably appeared in the 18<sup>th</sup> century; based on shallow water, sand shoals, and the routes of ship's passage. This analysis resulted in a hypothetical orientation of the walls for the ten bronze and iron cannons that defended the harbor during the March 22, 1803 "Battle of San Diego Bay" between the American merchant brig *Lelia Byrd* and soldiers of the fort.

Following a series of meetings between May, Buchanan and other members of the Fort Guijarros Museum Foundation team, fine artist Jay Wegter painted a series of water color illustrations of how Fort Guijarros appeared at various times in its history. The Spanish government, United States Navy, and foundation financed four lithograph prints for public sale and museum interpretation. These depict a bird's eye view from above, an angle from the beach viewing

the fort above, an angle down the gun deck, and a close up of the gun deck. Copies of some of these prints are hanging in the City of San Diego, School District, Fourth Grade History Program School in Old Town in a permanent exhibit.

Dale May used Wegter's paintings to richly illustrate the San Diego State University online publication. In one instance, she cloned-out the upper *merlones* to provide a comparison with how the walls looked before and after collapse. Photos of the field crew, archaeological features, and entire investigation were used in the archaeology field report. Although hundreds of people volunteered their time over twenty-five years to excavate, analyze, photograph, catalog, and curate the collection, the field report only memorialized the crew of the 1981 investigation. Today, the collection is monitored and used by scholars in on-going research projects.

## Rocky Mountain Institute of Anthropology On-line Newsletter

The Rocky Mountain Institute of Anthropology is launching a new OnLine magazine "dedicated to providing a bridge between Archaeologists and Anthropologists and the general public." We hope to have it up and running in May or June. We have an access webpage up already with a "Coming Soon" notice (<http://www.evrcanada.com/rmia/>).

I would like to invite archaeologists to submit all kinds of material (short articles, photos, video clips or whatever) to us. The material should be aimed at the general public. We do not have guidelines established yet as we want to be as flexible as possible. There are no limits with regard to content or format. We cannot pay for these materials as we are a voluntary staff and are using webspace donated by an archaeological consulting firm. The submission if accepted will be posted on our magazine main pages for roughly 1 month and then it will be permanently archived on our "back" pages. This new ezine will be experimental in nature as we do not want to limit ourselves in terms of content (except that we hope to maintain a fairly high quality). Interactive items are most welcome. For more information, interested archaeologists should contact me at [shaley@evrcanada.com](mailto:shaley@evrcanada.com). I would also invite all archaeologists to pass on the word to (a) colleagues who might want to contribute and (b) to members of the public who would like to sign up.

Shawn Haley, EVR Canada  
275 Glendale Blvd  
Red Deer AB T4P 3L3

## Effigy Mounds Case Study Available On-Line

Effigy Mounds NM Case Study Added to Archeology Program Distance Learning Course Ranger Merle Frommelt and Chief Ranger Ken Block, Effigy Mounds NM, have contributed a new case study to the "Interpretation for

Archeologists" distance learning course case study gallery. In the study, Frommelt describes some of the ways that Effigy Mounds NM assists teachers in interpreting American Indian culture and midwestern cultural landscapes for students ([www.cr.nps.gov/archeology/IforA/caseEffigy.htm](http://www.cr.nps.gov/archeology/IforA/caseEffigy.htm)). The Archeology Program welcomes new examples of effective interpretation of archeological resources to the "Interpretation for Archeologists" case study gallery. Those interested in submitting a case study should see "Submit your own story" in the left-hand navigation column for the map in Section 7, "Use What You Know" [www.cr.nps.gov/archeology/IforA/nationalMap.htm](http://www.cr.nps.gov/archeology/IforA/nationalMap.htm).

## NPS Archeology Program adds African Burial Ground NM Profile to Website

The National Park Service Archeology Program has added the newly-established African Burial Ground NM to the growing list of national monument profiles on the program website. President Bush established the African Burial Ground NM on February 27, 2006, under the authority of the Antiquities Act. In the proclamation, President Bush said, "African Burial Ground National Monument will promote understanding of related resources, encourage continuing research, and present interpretive opportunities and programs for visitors to better understand and honor the culture and vital contributions of generations of Africans and Americans of African descent to our Nation." Learn more about the African Burial Ground at [www.cr.nps.gov/archeology/sites/antiquities/profileAfricanBurialGround.htm](http://www.cr.nps.gov/archeology/sites/antiquities/profileAfricanBurialGround.htm).

---

### Announcements

---

## Important Reminder: Comments Needed on ACHP Draft Policy on Human Remains

During the past year, the Advisory Council on Historic Preservation has given high priority to revising the 1988 "Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects." On March 14, 2006, the Council published its revisions of the 1988 policy in the Federal Register, a revision that took into account comments from governmental, non-governmental and tribal groups last year.

The published revisions are now open for comments through on June 28, 2006. Without suggestions of revised text, the regs, as written, will become final.

While it is of great importance that the archaeological organizations comment, it is also important that individual companies—especially those doing Section 106 reviews—read through the revisions and comment if there are areas of concern. If you believe the new regs are more geared to tribal remains than non-tribal remains, your comments will be invaluable.

## The Navy Honors Carolyn Shepherd and Russell L. Kaldenberg for their Meritorious Efforts at China Lake Naval Air Weapons Station

Prior to leaving as commanding officer here at the Naval Air Weapons Station, China Lake, Capt. Mark Storch made sure he took the time to recognize some key people who helped make his command noteworthy with Navy Meritorious Civilian Service awards. The award, which is the third highest Navy honorary award and recognizes meritorious civilian service or contributions that have resulted in high value or benefits to the Navy, went to Carolyn Shepherd, Head of the Environmental Planning Office at China Lake, and Russell L. Kaldenberg, Base Cultural Resources Manager. The Department of the Navy Meritorious Civilian Service Award is one of the highest awards given by the federal governments to civilian employees. The awards were for superior accomplishments in managing cultural resources. The award comes with a certificate, a letter, a badge and service bars.

**Kaldenberg** was credited with outstanding contributions to the Navy as the cultural resources management program manager at China Lake. "In particular, your special talents for motivating and guiding people have resulted in the formation of a hugely successful Volunteer Program comprised of a group of dedicated and talented people - the Friends of China Lake Archaeology," Storch said in the citation.

"In 2004 and 2005, this group dedicated 2,000 hours recording rock art, 4,000 hours developing and maintaining the Curation Facility and Archaeological Laboratory, 320 hours for Archaeology Month projects, 2,200 hours on petroglyph tours for public outreach. This is an impressive record for any size program," reads the citation.

Due to the creation and maintenance of the Curation Facility, the Navy saves in excess of \$500,000 per year in artifact curation fees. In November 2005,

Kaldenberg and the Friends of China Lake Archaeology were awarded the Governor's Historic Preservation Award for excellence in historic preservation for these noteworthy achievements.

Outstanding management of the overall environmental program at China Lake resulted in the award for **Shepherd**. "Your superb leadership resulted in state and federal government recognition of your personal accomplishments and the many programs under your cognizance," reads the citation.

"Ever decreasing budgets and manpower amid ever increasing regulatory requirements have necessitated innovative approaches in order to keep this Command's environmental posture viable. Your extensive experience in all aspects of environmental management gave you the unique perspective to meet these challenges. Your innovative leadership approach has resulted in unprecedented accomplishments in the field of cultural resource management."

Shepherd's accomplishments include the rededication of the Coso Rock Art National Historic Landmark, the only one on Department of Defense lands; as well as a public access program that promotes volunteer participation in educating the public about the magnificent and unique resources found at China Lake. In 1979, she established a Memorandum of Agreement that allows local Native Americans to access the Coso Hot Springs, the first agreement put in place under the American Indian Religious Freedom Act; established consultation protocols and data sharing agreements with Native American tribes that resulted in improving Command's Government-to-Government relationship and



*John O'Gara, Sandy Forrest, Pat Warden, Carolyn Shepherd, Judy Rodriguez, Russ Kaldenberg, and (not pictured) Bill Deem and Melissa Finnell were all recognized with Navy Meritorious Civilian Service Awards for outstanding service by Captain Mark Storch, NAWS China Lake commanding officer.*

streamlining the consultation process. In 2003, China Lake received the Governor's Historic Preservation Award recognizing the outstanding commitment Shepherd made to historic preservation. In 2004, China Lake received the Chief of Naval Operations Award for cultural resources management, and Shepherd was also recognized by the Society for California Archaeology with the Mark Harrington Award, which afforded her the recognition of her peers for contributions made to archaeological preservation efforts. In 2005, China Lake won another CNO Award for cultural resources management, the Secretary of Navy Award, and the Secretary of Defense Award.

"Your exemplary management efforts are proof that the Navy can balance protection and management of our environmental resources in a manner that is compatible with China Lake's vital national defense mission," reads the citation. "You can be proud of your performance and unselfish dedication to the mission of Naval Air Weapons Station China Lake and the United States Navy."

Peggy A. Shoaf, Public Affairs  
Naval Air Weapons Station China Lake  
peggy.shoaf@navy.mil

### ***From the President (continued from page 3)***

marshaled to buttress this position and could be drawn from all across the state. But that is not my intent here. I will say that nearly every professional archaeologist who I have talked to concurs that there is a problem. In truth, there have been a number of professionals and SCA members over the years who have taken up the charge of improving ethical practices and establishing the professional standards that are now ensconced in the by-laws of the SCA (<http://www.scahome.org/about/bylaws.html#16>). I encourage everyone to read them over or review them again. The SCA 'Code of Ethics' parallels that of the Society for American Archaeology and the Register of Professional Archaeologists. While different in some details, there is considerable agreement on guiding principles associated with education, training and practice.

In an effort to further dialogue on the nexus of factors contributing to this unacceptable state of affairs, the SCA sponsored an Open Forum on *Ethical Standards and Practices in California Archaeology* on March 30 at the Annual Meetings SCA in Ventura. I moderated this forum, and particularly welcomed the presence of our two new State Historic Resources Commissioners, Trish Fernandez and

Donn Grenda. The forum was well-attended given the short notice and competing schedule, and allowed a number of SCA members to share their perspectives. Several long-standing SCA members acknowledged the huge disparity between standards of professionalism adhered to under federal guidelines and regulations and those allowed by the state; this appeared to be particularly troubling. The sheer number of projects under the CEQA umbrella bereft of any sort of review or oversight was alluded to several times, and was an area of concern. Additionally, this lack of review and oversight has contributed to the concomitant crisis in analysis and curation. That archaeological materials can be dutifully excavated, bagged and sorted, and then go unanalyzed and get discarded for the sake of expedience is one egregious illustration of the problem. Perhaps most poignantly, several members of the Native American community expressed their frustration not only with the conduct of archaeology in certain regions but also with the fact that their views on the quality of local archaeological work could so readily be ignored and dismissed.

In a sentiment that I expressed at the *Open Forum*, I have no delusion that mere recognition of this problem is going to be enough to change the situation. There seems to be an evolved constellation of forces creating a degree of inertia that is almost immovable. I say this because many have expended considerable effort and capital over the years to develop broader policies to elevate the practice of archaeology in California. Several local efforts have been successful in effecting changes in policy and practice but they are not widespread. What I do know is that the first and most fundamental step in bringing about a change and improving adherence to ethical standards and guidelines in California archaeology is acknowledging that there is a problem. Certainly, I am heartened to see in the draft Historic Preservation Plan that OHP recognizes that it is charged with the task of identifying and managing California's heritage, that it has a leadership role and that it is committed to improving the quality of archaeological work throughout the state.

I encourage each of you to review the SCA 'Code of Ethics,' and consider the validity of the statements I have made and the position I have taken in this column. Reflect on your own experiences. Finally, I would like to end this column with a question. And yes, while I have no time to personally respond to each, I would like to hear from you. Why does there exist such a disparity in archaeological projects conducted under federal regulations and those conducted under state policies in California? Why is this the case and why as the situation persisted for so long?

— Frank Bayham

#### **Contact Your Representatives**

|                                |                                                                                                                    |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------|
| California State Assembly      | <a href="http://www.assembly.ca.gov">www.assembly.ca.gov</a>                                                       |
| California State Senate        | <a href="http://www.senate.ca.gov">www.senate.ca.gov</a>                                                           |
| U.S. House of Representatives  | <a href="http://www.house.gov">www.house.gov</a>                                                                   |
| U.S. Senate                    | <a href="http://www.senate.gov">www.senate.gov</a>                                                                 |
| Governor Arnold Schwarzenegger | <a href="http://www.governor.ca.gov/state/govsite/gov_homepage">www.governor.ca.gov/state/govsite/gov_homepage</a> |
| President George W. Bush       | <a href="http://www.whitehouse.gov">www.whitehouse.gov</a>                                                         |

#### **Websites**

<http://www.leginfo.ca.gov>  
<http://thomas.loc.gov>  
<http://acra-crm.org>

**Contact Your SCA Legislative Liaison**  
[sbryne@garciaandassociates.com](mailto:sbryne@garciaandassociates.com)



# WEB SITES OF INTEREST

## **SAA's Council of Affiliated Societies Web Resources page**

<https://ecommerce.saa.org/saa/staticcontent/staticpages/adminDir/committeeDisplay.cfm?Committee=COMMITTEE%2FCOC>

## **NPS: Managing Archaeological Collections Module**

[http://www.cr.nps.gov/archeology/collections/intro\\_course01.htm](http://www.cr.nps.gov/archeology/collections/intro_course01.htm)

## **Tom King's CRMplus Blog**

<http://crmplus.blogspot.com/2004/12/introduction-to-blog.html>

## **NPS: Archaeological Collections and the Public**

<http://www.cr.nps.gov/archeology/pubs/techBr/tch19.htm>

## **New York State Archaeology Association**

<http://nysaaweb.bfn.org/>

## **Computer Applications and Quantitative Methods in Archaeology**

<http://www.caaconference.org/>

## **Institute for Canine Forensics**

<http://www.k9forensic.org/>

## **Hood Canal Bridge - Port Angeles Graving Dock Report On-Line**

<http://www.wsdot.wa.gov/accountability/hcbgravingdock/>

## **Projectile Point Petroglyphs of the Coso Range**

[http://www.petroglyphs.us/article\\_dating\\_coso\\_projectile\\_point\\_petroglyphs.htm](http://www.petroglyphs.us/article_dating_coso_projectile_point_petroglyphs.htm)

## **The Edge: Indirect Reciprocity**

[http://www.edge.org/3rd\\_culture/sigmund04/sigmund04\\_index.html](http://www.edge.org/3rd_culture/sigmund04/sigmund04_index.html)

## **UConn's Virtual Pathology Museum**

<http://pathweb.uchc.edu/>



This series offers an annotated bibliography of recently published and some unpublished literature pertinent to current debates and methods in Californian archaeology. Prehistoric and historical archaeology will appear in alternate issues. If you have any news or ideas about how this section can better fit the needs of its audience feel free to email the author: [djaffke@parks.ca.gov](mailto:djaffke@parks.ca.gov). Please limit contributions to those that can be easily accessed by all members of the SCA and have appeared within the last five years.

Cheshier, J. and R.L. Kelly

2006 Projectile Point Shape and Durability: The Effect of Thickness:Length. *American Antiquity* 71(2):353-363.

The authors report their findings from an experiment that tests the hypothesis that projectile points with high thickness:length ratios are more durable compared to those that have low ratios. As they point out, projectile point design requires the manufacturer to consider concurrent, and often competing, design characteristics such as range, accuracy, energy and durability. The question posed by Cheshier and Kelly is, to what extent is durability a significant concern in projectile point design? They state, "If an experimental program could demonstrate which attributes of a point were most closely linked to a point's durability, then we would have an empirical basis on which to argue whether a particular projectile point type was designed with durability in mind" (2006:354).

An experienced flintknapper manufactured 50 arrow points that were divided into four groups: short/thick, short/thin, long/thin and long/thick. The triangular, side-notched experimental points were manufactured from high quality obsidian. The lengths and widths within the four groups remained consistent with coefficients of variation close to Eerkens and Bettinger's (2001) theoretical maximum of 1.6 percent. The points were mounted on 5/16" diameter wooden dowel foreshafts, cut to 6.5 cm in length with tapered proximal ends. Arrow shafts were made of lightweight cedar and weighed 20.5 grams including the plastic nocks and feather fletching. The points were shot into a female road kill white deer until each point broke. In total, 111 shots were fired.

Of the 50 original points, practically half ( $n=21$ ) broke after the first hit, 12 points broke after two shots, eight after three shots, six after four shots and three points survived five, six and seven shots. Expectedly, point durability is directly related to the hardness of the material the point struck (e.g., bone). Controlling for hardness, points with a high thickness:length ratio ( $>.121$ ) were more durable than those with a low ratio. Size or shape of the point was not a significant predictor of durability.

Orchard, T.J.

2005 The Use of Statistical Size Estimations in Minimum Number Calculations. *International Journal of Osteoarchaeology* 15:351-359.

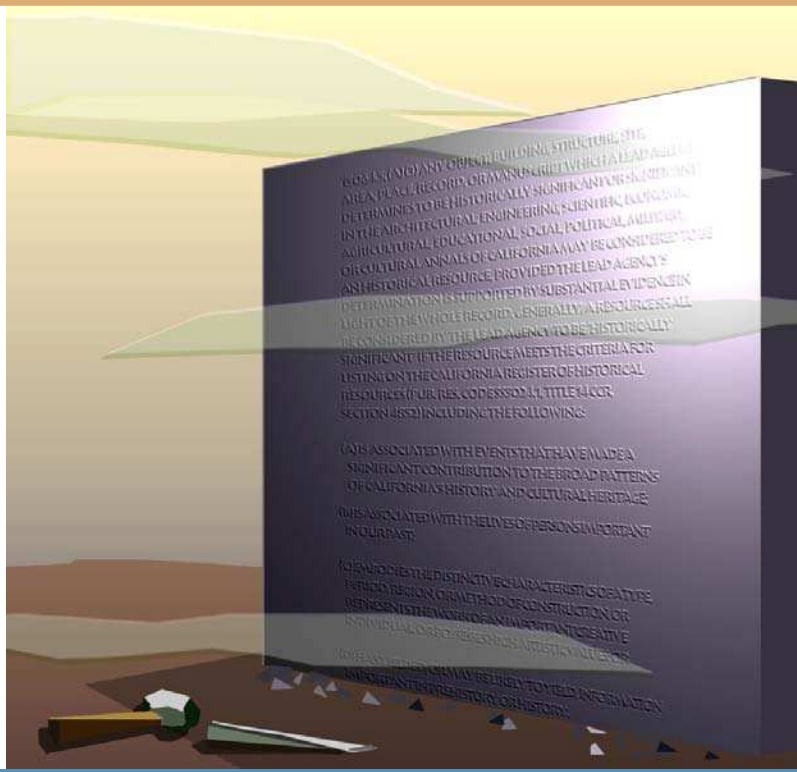
Zooarchaeological information is increasingly used to address human environmental impacts, serve a baseline data for contemporary ecosystem management and provide long-term data for studying the effects of overexploitation. These studies require detailed reconstructions of the size and age structures of harvested faunal populations. A general practice of assemblage quantification involves calculating the minimum number of individuals (MNI) for each taxa represented for the purpose of comparing relative frequencies. MNI is usually estimated by separating elements into left and right components and using the most common sided element as the MNI. The major criticism of this approach is that the method produces an extremely conservative estimate. Orchard suggests that the increasing importance of detailed size estimations requires a revised approach to calculating MNI. Orchard's technique—referred as "modified MNI"—uses allometry, an approach relating the size of a whole animal to the dimensions of a part.

The paper outlines and tests the regression approach to calculate MNI values for several fish taxa recovered from five archaeological sites in the central and western Aleutian archipelago. For each taxon (Atka mackerel, greenling, Pacific cod, rockfish, and walleye pollock), a selection of skeletal elements was chosen based on their prevalence in the faunal assemblage. A standardized set of ten elements was analyzed for all sample taxa. For each comparative element that corresponded to a selected archaeological element of each taxon, the simple linear regression function of MINITAB® was used to generate formulae comparing measurements of the selected skeletal elements to the original live length and weight of the comparative specimens. Regression formulae calculated by Orchard (2003) were used to generate length estimates and 95% confidence intervals for each of the archaeological specimens, and these estimates were then used to determine MNI values.

Although the modified MNI approach requires additional effort, Orchard reports that this method produces significantly increased MNI values compared to values calculated using traditional MNI techniques. Orchard suggests that the use of the regression approach to aid in the determination of MNI is a more powerful technique in that it facilitates the comparison of different skeletal elements within each taxon and expands the range of skeletal elements available for determining MNI while increasing the accuracy of MNI estimates.

# Mea Culpa: How I Infected Cultural Resource Management With Archaeobias

Thomas F. King  
April, 2006



## California, the SCA, and Archaeobias

**I**n legend – and as usual, there's truth behind the legend – California tends to be on the leading edge of social change, notably including change in the way the environment is managed. What California does tends to influence, for good or ill, how things are done throughout the nation and the world.

In the last 40 years – coincidentally the lifespans of the Society for California Archaeology (SCA) and the National Historic Preservation Act (NHPA) – much has changed in the ways we manage the impacts of progress on cultural resources; indeed the very term “cultural resource” is a product of this period. As are NHPA's Section 106 process, project review under the National Environmental Policy Act (NEPA), and in California, project review under the California Environmental Quality Act (CEQA). It's easy to be pretty self-satisfied about this – we've accomplished a lot in terms of protecting cultural resources, instituting processes that balance development and preservation, and incidentally creating a roughly \$500 million cultural resource management (CRM) industry that has kept many of us employed.

But there are reasons for dissatisfaction, if one is more interested in good public policy and giving cultural resources a fair shake than in the dollar value of the CRM industry. In my opinion one of the biggest problems with contemporary CRM (as though there were any other kind) is what I've called *archaeobias* – a tendency to define the business as being all about taking care of archaeological sites, for archaeological purposes, and implicitly for the betterment of archaeologists.

I'm still an archaeologist of sorts, so I have no problem with taking care of archaeological sites, or with the betterment of archaeologists, but I also believe that there's a good deal else in the cultural universe that needs consideration in land-use planning, and a good many other legitimate public interests that ought to be reflected in our project review systems. I also know that politically, archaeology can't go it alone for long. Eventually the public is going to question why so much time and treasure is devoted to preserving, or more often paying archaeologists to dig up, prehistoric shell middens and historic privies. Neither answer “the law requires it” nor “it's our sacred patrimony” is likely long to be a satisfactory answer to this question.

In California I see rampant, almost mindless archaeobias at work. Under CEQA, virtually all the rules and standard operating procedures that environmental consultants follow are deeply archaeobias. Most “CRM” consultants are archaeologists. Historic buildings, cultural landscapes, and traditional cultural properties get some attention, but the attention is often given them only by archaeologists. Even Indian tribes have bought into archaeobias notions — like the premise that construction monitoring is a good way to take care of resources in the ground, and the idea that physical site avoidance and impact avoidance are the same thing. And the archaeology that's done under CEQA isn't even necessarily well-done archaeology. To judge from what I've seen and read, it's often a rote performance – field surveys to find things, followed by excavation of some percentage of each site, followed by monitoring during construction.

Thomas F. King, PhD, PO Box 14515, Silver Spring MD 20911  
Society for California Archaeology Newsletter 40(2):29-31

I've wondered why this is, and when I look back over the last 40 years – or more specifically over the last 33 – I realize that to a not inconsiderable extent, it's my fault.

### The Mammoth Decision and the SCA's Response

In 1972, the California Supreme Court handed down a decision in a case brought under CEQA—*Friends of Mammoth v. (Mono County) Board of Supervisors* (8 Cal.3d. 247 (1972))—that transformed the face of environmental planning throughout the state. The *Mammoth* decision held in essence that CEQA applied not just to projects carried out by state agencies and local governments, but to actions *approved* by such entities. Hence local approval of a subdivision plan, a curb cut, or a general plan amendment required review for its environmental impacts. The Environmental Impact Report (EIR) industry was born in California.

At the time, I was 30 years old, working on my dissertation at the University of California Riverside, and wondering where and how I was going to get a job to support my family. I'd spent the previous several years helping put together or operate the Archaeological Research Unit at UCR, the Archaeological Survey at UCLA, and the similar operation at what was then San Francisco State College. I'd taken part in forming the SCA, and held various offices in the organization. In the *Mammoth* decision I saw an opportunity to advance the interests of archaeological site protection and archaeological research, and to solve my employment problem at the same time—to do well by doing good.

I realized that there was going to be a period of ferment in the environmental impact report game, as local governments and land developers struggled to cope with the suddenly expanded scope of CEQA compliance. Everyone would be looking for guidance, direction, a helping hand. If the SCA could provide it, we could influence CEQA practice in favor of archaeology.

I was not alone in recognizing the opportunities inherent in the situation; others in the SCA's leadership got the picture too. So we quickly put out an “emergency memorandum” to all state agencies involved somehow in CEQA implementation, advising them to make sure that archaeology was included in EIRs, and a request for guidance from the State's Secretary for Resources gleaned a supportive opinion. Then Mike Moratto (then at SF State), Nelson Leonard (at UCLA), and I put together a modest SCA publication called *Recommended Procedures for Archaeological Impact Evaluation*<sup>1</sup>. We rushed the *Recommended Procedures* into print – in, I believe, the latter part of 1973 (oddly, they carry no publication date). They are still available from the SCA—I bought a copy at the 2006 Annual Meeting in Ventura.

And they worked. Boy oh boy, did they work. This isn't to say that the *Recommended Procedures* were solely responsible for embedding archaeology in CEQA EIR practice; it might have happened anyway. But there's little doubt that they were influential. If nothing else, they provided the gospel that SCA proselytizers throughout the state used in promoting our version of CEQA compliance.

And they had no competition as an ostensibly authoritative source of guidance. The rest, as they say, is history.

### What the *Recommended Procedures* Recommended

Re-reading the *Recommended Procedures* today is a sobering experience. They're sixteen pages long with a short appendix listing and mapping the twelve SCA “District Clearinghouses”—progenitors of today's “Information Centers”—but their message boils down to this: one should always have professionally qualified archaeologists physically inspect any parcel of land that's going to be disturbed. Where they can't reliably find and describe everything through surface inspection, they should dig. Any archaeological site found should be avoided by construction and preserved in place, or if that won't work, should be excavated in a proper professional manner, with provision for analysis and publication of results.

All pretty unexceptionable, you may say, and I'll agree up to a point. There are few sins of commission in the *Recommended Procedures*. Sins of omission are quite another matter. There are at least three biggies.

**Fieldwork *uber alles*.** We didn't even give lip service to doing background historical, oral historical, and/or ethnographic research. We told people to check the site files in what were then the SCA Clearinghouses, but that's about as far as we went. What were we thinking of? How did we expect

---

*Eventually the public is going to question why so much time and treasure is devoted to preserving, or more often paying archaeologists to dig up, prehistoric shell middens and historic privies.*

---

people to predict where things would be, what they would be? How were they to understand what they found?

**It's all about sites, all about research.** We didn't acknowledge that anything other than archaeological sites might be historically or culturally important, or that historical or cultural importance might be based on anything other than archaeological research. Oh yes, there are passing references to public interpretive value, and to “shrines,” but these are passing, slighting references indeed. There's little mention of historic buildings and structures, and nothing about districts, landscapes, or what we now call “traditional cultural properties.”

**Mum's the word.** Perhaps most reprehensibly, we never suggested that anyone other than archaeologists might have interests in archaeological sites, so we said nothing about consulting, coordinating, or otherwise talking with anybody

other than archaeologists, about anything other than archaeology. The notion that it might be a good idea to chat with tribes, local communities, long-term residents, historians, or minority communities was quite foreign to us.

In short, the impression we conveyed with the *Recommended Procedures* was that all would be well on the cultural side of CEQA if the preparers of EIRs would just hire professional archaeologists to get out and walk the project areas, find archaeological sites, and either arrange for them to be avoided by earthmoving equipment or dig them up.

Which, strange to say, seems to be a pretty good description of much practice under CEQA today.

### Caveats

We can protest—Mike and Nelson and I—that we didn't pretend to be providing recommended procedures for dealing with cultural resources<sup>2</sup> writ large. We were, after all, the Society for California Archaeology, and it's unreasonable to expect us to have troubled ourselves with other kinds of places and things, or with non-archaeological values. We can thus protest, but I think it's a dodge. Failing to promote background research and to understand the broad cultural context in which one is working are the hallmarks of rotten archaeology – never mind CRM – and failing to acknowledge the interests of others is both irresponsible and politically naïve.

### Why did it happen?

In retrospect, I think a big part of our blindness – mine, at least – was grounded in insecurity. We were more or less afraid of Indian tribes, and we felt like low men on the historic preservation totem pole relative to the much more suave, well-heeled historians and architectural historians we were beginning to meet. I imagine we thought—to the extent we thought about it—that it would have been presumptuous for us to speak for their interests.

What happened, though, was that relative to the tribes, the historians, the architectural historians, and other cultural interests, we got into CEQA—with apologies to General Forrest—fustest with the mostest. As a result our vision, such as it was, came very quickly to dominate the way CEQA studies were—and unfortunately still are—done. The tribes at least have to some extent made up for lost ground, but even they suffer from the impression that CEQA practice is an archaeologist's game. Hence their acceptance of physical site avoidance and construction monitoring as the ways to manage impacts on their ancestors' places of residence and burial. As far as I can see, historians and architectural historians—to say nothing of cultural anthropologists, sociologists, cultural geographers, and just plain folks concerned about preserving their cultural resources—are still odd people out in CEQA practice.

### Is there hope for the future?

I fear that CEQA “cultural” practice following the *Recommended Procedures* has become so ingrained in the way California archaeologists do business, and that

archaeology has become so ingrained in California as the *sine qua non* of CRM, that there is little hope for improvement until and unless the state's legislators or voters decide to stop paying for nonsense archaeology in the guise of environmental impact management. But maybe I'm just getting old, tired, and unimaginative. Maybe somebody—

---

*we said nothing about consulting, coordinating, or otherwise talking with anybody other than archaeologists, about anything other than archaeology. The notion that it might be a good idea to chat with tribes, local communities, long-term residents, historians, or minority communities was quite foreign to us.*

---

California's State Historic Preservation Officer, perhaps, or the new generation that's taking over CRM in the state—will have the gumption and sense of responsibility to correct the errors that my colleagues and I made back in the '70s. For what it's worth, this co-author of the *Recommended Procedures* wants to urge that they, and the practices they have spawned, are not written in stone; they can be changed and they should be. CRM under CEQA need not follow a 33-year-old model dreamed up by a trio of fieldwork-besotted archaeologists.

### (Endnotes)

- 1 The *Recommended Procedures* were, according to the publication itself, based on an SCA study conducted in cooperation with the UCLA Survey. My recollection is that this was simply a legitimizing device; the “study” comprised discussions among various members of the SCA leadership, and a summary of pertinent laws and policies that Mike Moratto and I put together and the SCA published, also in 1973, under the catchy title *Laws and Policies Pertinent to Archaeological Impact Evaluation*.
- 2 The term “cultural resource” was invented at about this time by others. Louis Wall, late of the Advisory Council on Historic Preservation and the U.S. Navy, then with the National Park Service, says he invented the term to label places of historical significance not yet included in the National Register. My impression has long been that the term was invented by Southwestern archaeologists to mean places they wanted to save or dig. Whichever is the origin of the term, its broader but more accurate definition – as a *resource* of any kind having *cultural* value – is a more recent phenomenon in the context of technical jargon, though it has probably been used informally for many decades when referring to opera houses, libraries, and the like.

# Obsidian Bifaces of the Eastern Sierra: The Portuguese Bench and Cactus Flat Biface Cores

*Alan P. Garfinkel, Jeanne Day Binning, Craig Skinner,  
Alexander K. Rogers, Russell Kaldenberg, and Thomas Chapman*

## Introduction

**R**ecently three of us (AG, JB, and CS) authored a study on a remarkable cache of 26 obsidian bifaces collected at Little Lake in eastern California (Garfinkel et al. 2003). While making a formal presentation, discussing the cache at the Maturango Museum in Ridgecrest, a collector approached the senior author and said that he had a similar biface to those in the Little Lake cache in his possession. He indicated his wish to donate the specimen to the Museum. This provided us with an opportunity to study this new biface. It had been discovered in the vicinity of Portuguese Bench, and collected from a surface context, between Fine Canyon and Portuguese Canyon at an elevation of 4300 feet on the eastern scarp of the Sierra Nevada.

Later, a second biface came to our attention; it was collected by Thomas Chapman in 1961, over 45 years ago. That artifact was also found lying on the surface of the ground. This biface however was identified near the Cactus Flat obsidian source, a subsurface within the Coso Volcanic Field. It was discovered at the Cactus Flat village site (CA-Iny-274) at an elevation of about 5,000 feet.

For this study, Craig Skinner, of the Northwest Obsidian Laboratories provided the hydration analysis (determining the obsidian hydration measurements) and sourcing analysis (determining the geographical source of obsidian) via chemical characterization for both bifaces.

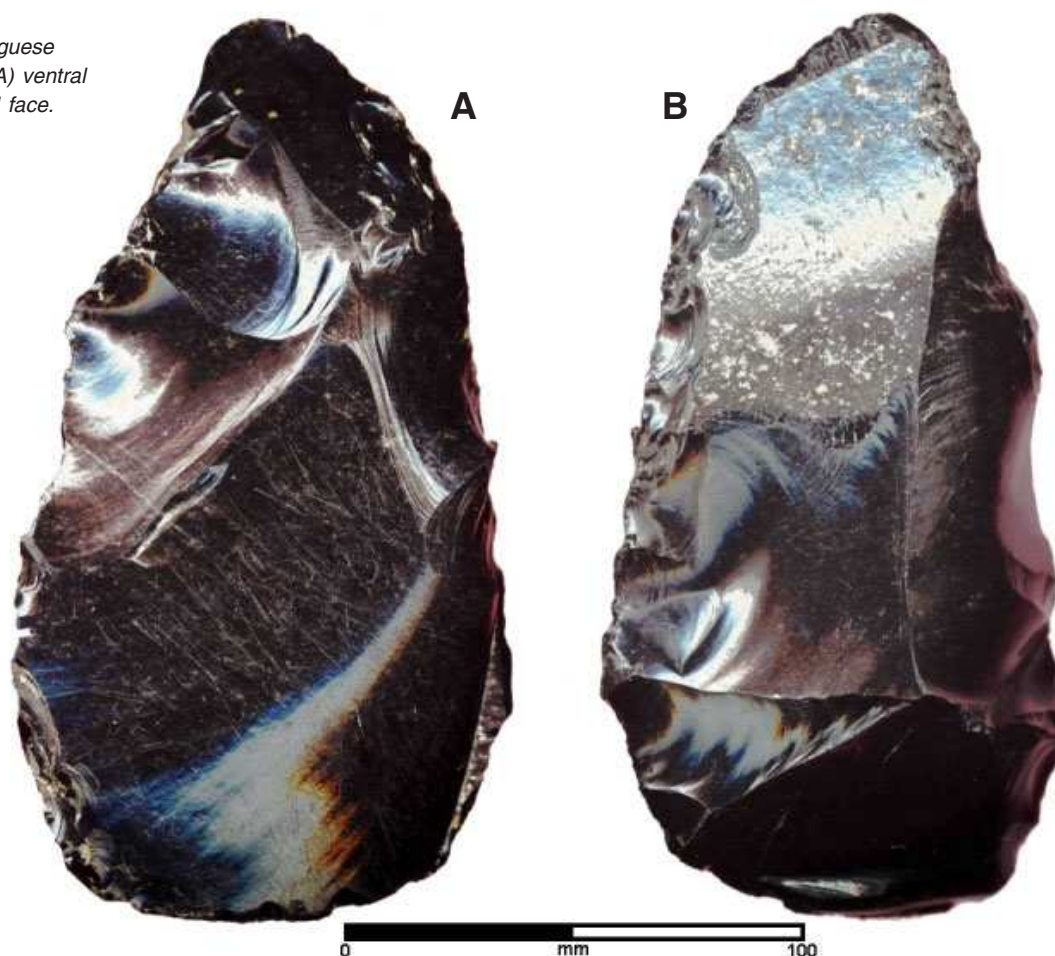
## Portuguese Bench Biface

### *Description*

The first biface specimen is a massive core, one of the largest ever recovered in the region (Figure 1). The Little Lake cache specimens were large but this specimen is even more massive. The biface weighs more than twice as much as the heaviest biface in the Little Lake group (see Table 1). As with those in the Little Lake cache, this is a biface core made on a flake. The biface appears to be manufactured with a hammerstone based on some of the observed flake scars. A ventral remnant is found on the dorsal surface of the flake indicating that the preform flake was removed from a larger flake. The ventral remnant is covered with scratches. These may indicate that the original, larger flake was carried in some type of bag with items that could scratch the flake prior to it being spalled or sectioned. The preform flake was removed in a different direction than that of the original flake from which it was detached. Three to four major flake removals occurred on both the dorsal and ventral faces of the flake/biface. Edging (platform positioning) is exhibited on both biface faces and is most pronounced on the ventral side. The ventral face (dorsal surface of original flake) retains a very flat old weathered surface exhibiting pitting. This old surface covers about 20% of the current ventral face of the flake/biface.

*Alan P. Garfinkel, Ph.D., Department of Transportation, Fresno, California; alan\_gold@dot.ca.gov  
Jeanne Day Binning, Ph.D., Department of Transportation, Fresno, California; Jeanne\_binning@dot.ca.gov  
Craig Skinner, Ph.D. (Candidate), Northwest Research Obsidian Studies Laboratory, Corvallis, Oregon; Cskinner@obsidianlab.com  
Alexander K. Rogers, M.A., Curator of Prehistory, Maturango Museum, Ridgecrest, California; Matmus1@maturango.org  
Russell Kaldenberg, Base Archaeologist, China Lake Naval Air Weapons Station; Russell.kaldenberg@navy.mil  
Thomas Chapman, Retired, China Lake Naval Air Weapons Station  
Society for California Archaeology Newsletter 40(2):32-36*

Figure 1: Portuguese Bench Biface (A) ventral face, (B) dorsal face.



#### Age and Geographical Source

The biface was quarried at West Sugarloaf Mountain, a subsource of the Coso obsidian source cluster located in the Coso Range of eastern California within the confines of the China Lake Naval Weapons Station north of Ridgecrest. The obsidian hydration measurement reading obtained for the artifact was 4.1 microns.

A revised lowland Coso hydration rate equation:

$$Y = 659.21 - 516.04x + 155.02x^2 - 4.56x^3$$

was proposed by Basgall and Hall (2000). This equation translates the micron reading of the biface into an age within the Haiwee Period (A.D. 600-1300, 3.7-4.9 microns) of ca. AD 1115 or 835 uncalibrated radiocarbon years before present (present = AD 1950).

Onken (2001:117) recently proposed an alternative source and temperature specific lowland Coso hydration equation for the Coso Volcanic Field that provides calendar dates based on calibrated radiocarbon determinations and associated suites of Coso hydration measurements. That equation is  $24.45 \mu\text{m squared}/1000 \text{ years}$  and provides a calendar date of ca. AD 1263 or 687 years before present (present = AD 1950). The age provided by that rate is very close to those of the Basgall and Hall (2000) equation (as reported above).

#### Interpretation

The only known location within the Coso aboriginal quarries that has hydration rims of this small size is Maggie's Site (Elston and Zeier 1984; Garfinkel et al. 2003; Gilreath and Hildebrandt 1997). As with the Little Lake cache, the biface was, most likely, quarried from this general area; mining of this area is indicated by bench and pit mines. It is quite curious that aboriginal flint knappers should have been quarrying such large and massive biface cores so late in time. During the period, when both the Portuguese Bench biface and the Little Lake cache were manufactured, arrow points were exclusively in use. Most eastern California researchers have consistently averred that by this date big biface cores were on the wane and had been replaced by expedient flake tools often scavenged from earlier materials. In the eastern Mojave it has been noted that chert bifacial cores become reduced in size after the advent of the bow and arrow (Binning et al. 1986:175, 2004:5). Perhaps changes in the character of biface-core use over time are in need of re-examination.

#### Cactus Flat Biface Core

##### Description

The Cactus Flat specimen (Figure 2) is a more reduced and finished biface core than any of the Little Lake or

Portuguese Bench artifacts. This percussion biface was thinned with a hammerstone. Six major flake removals are evident on the ventral face and 11 on the dorsal face of the core. Edging (platform positioning) is exhibited on both faces and is most pronounced on the ventral face. Three flake scars run almost completely across the entire face of the biface (nearly an outrepasé or overshot flake was removed), two on the dorsal side of the biface and one on the ventral. This approach to biface reduction has been noted as a technique used by Clovis flint knappers (see Bradley 1991:370; Collins 1999:46; Frison and Bradley 1999:65; Gramly 1999:63, 2004:37; Wilke et al. 1991:265-266). Wilke and his colleagues have noted that part of an overall pattern for Clovis age lithic reduction is:

“...the detachment by percussion of thinning flakes from one margin of the biface and stopping them at the other margin with maximum efficiency and minimum loss of material or symmetry through overshot...” (Wilke et al. 1991:266).

The Cactus Flat biface core is also consistent with other elements of the Clovis pattern in being a relatively large bifacial core of oval or leaf shape. Besides the overall morphology of the Cactus Flat artifact, also the length, width, and thickness of the biface compare favorably with several “Clovis point blanks” that were part of the Anzick site Clovis cache from Montana (Wilke et al. 1991: Figures 3, 4, and 6). Those bifaces similarly exhibited a minimum number of flake detachments with a minimum loss of useful toolstone. The Cactus Flat artifact would be considered as a “late middle” stage biface when compared to the other recently discussed Coso bifaces (Little Lake and Portuguese Bench) that represent earlier stages in the reduction sequence.

#### *Age and Geographical Source*

It was anticipated that this biface would have originated from the nearby Cactus Flat or Sugarloaf Mountain obsidian sources. Hence it was a great surprise to have determined that the biface actually was manufactured from Bodie Hills obsidian. That source is about 130 miles to the northeast of the discovery site. Such a determination is improbable but not impossible as artifacts of exotic obsidians occasionally turn up in prehistoric sites in the Coso Volcanic Field. For example, artifacts made from Casa Diablo obsidian, a source near Mammoth Lakes, California, have routinely been identified within the Coso region. The Casa Diablo source is located 150 miles north of the Coso area.

A surprisingly large obsidian hydration measurement of 8.8 microns was obtained for the Cactus Flat biface. One of us (CS) has developed a database of obsidian hydration measurements for Bodie Hills’ obsidian artifacts and out of 1,018 hydration measurements only ten are larger than this rim (Craig Skinner personal communication 2006). Rosenthal and McGuire (2004) have completed the most ambitious and extensive study evaluating the rate of hydration rim development for Bodie obsidian. They suggest their “Model C” as most compatible with current radiometric dates and the associated suites of obsidian hydration measurements. That power function equation produces calibrated radiocarbon ages

Figure 1: Cactus Flat Biface, dorsal face.



0 mm 100

(calendar dates) that best fit the current data (Rosenthal and McGuire 2004:124). That equation is:

$$Y=86.021x^{2.28}$$

where “Y” equals the age in calibrated radiocarbon years before present and x equals the number of microns, with the present equal to AD 1950. Using their lowland rate equation, developed for sites of nearly similar elevation (4,000 feet or less), a calendar date of 12,280 cal BP was calculated based on the 8.8 micron rim size. The upland rate, if applied, would produce a far greater and unreasonably ancient age.

#### *Interpretation*

The early age and exotic location for the Cactus Flats obsidian biface core is consistent with, what some have suggested are, the mobility patterns of late Pleistocene

hunter-gatherers. Recent research (Jones et al. 2003) suggests that during the Paleoindian Period the early occupants of the central Great Basin traversed very large subsistence areas with extensive foraging ranges. In alignment with that model are mobility tactics requiring moves of up to 400-km north south and 100-km east west.

During the late Pleistocene, effective moisture was greater than in any subsequent interval in the prehistory of central Nevada and “travelers” (sensu Bettinger and Baumhoff 1982) operated in small groups and had low population densities. According to Jones and others (2003), these groups had little competition for resources and made only brief residential stays. They appear to have migrated, on their annual rounds, between resource-rich patches that were rapidly depleted (Bettinger 1991, 1994, 1999). Most likely the Cactus Flat biface of Bodie Hills obsidian was procured as an “embedded” activity rather than through formal exchange, although informal reciprocal trade cannot be completely ruled out (Basgall 1989).

Given the obsidian hydration measurement of the Cactus Flat biface it is likely that the artifact is of Clovis age and might be associated with some of the earliest colonizers of the Americas. It has been noted that Clovis assemblages contain large amounts of exotic toolstone (Basgall 1989; Collins 1999:40; Frison and Bradley 1999:65). This may indicate that these hunter-gatherers had limited knowledge of the locations of toolstone sources (although it has also been argued Clovis people had knowledge of sources of high quality stone) that lay ahead of them during their moves across the landscape. They did this to ensure that they carried ample high quality toolstone with them in the form of portable bifacial cores. Such would seem to be the case in the present instance in which Bodie Hills obsidian was carried 130 miles from its source to another location containing ample high quality volcanic glass—the Coso Volcanic Field.

## Conclusion

The two bifaces discussed here reflect behavior from two very disparate time periods. The Portuguese Bench biface core fits well with the Little Lake cache discussed in our previous report. As with the Little Lake cache bifaces it is an early stage biface exhibiting limited evidence of reduction. The biface was most

likely intended as a handy package of toolstone useful in the production of informal flake tools and arrow points. The Little Lake cache and the Portuguese Bench biface core have similar hydration rim measurements that date to the very end of the Haiwee Period or the earliest years of the Marana era (ca. AD 1100-1400). The later stage Cactus Flat biface is a result of human behavior that occurred 12,000 years ago or earlier.

The only commonalities of these two bifaces are 1) both were found in the Coso area and 2) both are percussion bifaces made of obsidian. The obsidian used to make the Cactus Flat biface was originally quarried 130 miles to the northeast and carried to the Coso area. The manufacturing stage of the Cactus Flat biface suggests that further thinning and finishing occurred in the interim. Once the biface was brought to the Coso Range, the hunter-gatherers found themselves in an area with a wealth of obsidian. In this context, the value of the biface diminished and thus it was discarded. Obsidian toolstone could now be quarried and made into bifacial cores to meet future needs. Finally, the Cactus Flat biface exhibits many characteristics in overall morphology and reduction strategy and is similar in age to those found in Clovis contexts.

*Table 1. Comparison of Obsidian Biface Cores from the Eastern Sierra (S.D.= Standard Deviation, C.V.= Coefficient of Variation, N= Sample Size, Cal. = calibrated, bp = before present (AD 1950), rc = radiocarbon)*

### **Portuguese Bench Biface**

Hydration measurement and age: 4.1+ .2; 835 rc years bp; ca. AD 1115 (Basgall & Hall 2000 rate)  
687 cal. yrs bp; ca. AD 1263 (Onken 2001)

Length: 210 mm  
Width: 120 mm  
Thickness: 50 mm  
Weight: 1065 gm  
Source: West Sugarloaf Mountain (Coso)

### **Little Lake Biface Cache**

Mean hydration measurement and age: 3.8 + .2; 686 rc years bp; ca. AD 1264 (Basgall & Hall 2000 rate)  
590 cal. yrs bp; ca. AD 1359 (Onken 2001)

|            | Range      | Mean    | S.D. | C.V. |
|------------|------------|---------|------|------|
| Length:    | 117-160 mm | 139 mm  | 11.4 | .08  |
| Width:     | 77-94 mm   | 85.4 mm | 4.0  | .05  |
| Thickness: | 22-40 mm   | 30.9 mm | 4.6  | .15  |
| Weight:    | 243-529 gm | 348 gm  | 68.6 | .20  |

Source: West Sugarloaf Mountain (Coso)

N=27; Hydration Range: 3.5-5.6 microns; Mean = 3.8; S.D. .37; CV .09

N=26 (all complete bifaces with fragmentary outlier removed)

Hydration Range: 3.5-3.8 microns; Mean 3.7; S.D. .07; CV .01

### **Cactus Flats Biface**

Hydration measurement and age: 8.8+ .2; 12,280 cal. years bp; ca. 10,330 BC

Length: 182 mm  
Width: 74 mm  
Thickness: 15 mm  
Weight: 268 gm  
Source: Bodie Hills, California

It is obvious that much remains unknown and perhaps unknowable regarding the aboriginal activities in the Coso region both in the late Pleistocene and the more recent past. Nevertheless, the obsidian artifacts scattered about the landscape compel our attention and interest and provide us with insight into both unique and common behaviors of past hunting and gathering cultures of the Coso region. This is certainly true of the two artifacts discussed here.

### Acknowledgements

We thank the Maturango Museum for permission to study the two obsidian bifaces from the Coso Region. Both bifaces have been accessioned and are permanently curated at that facility. Michael Rondeau, California Department of Transportation, provided several important insights regarding Clovis flaked stone assemblages. Jerry Hopkins, Tulare Archaeological Research Group, added helpful information on Clovis technology and the composition of Clovis flaked stone assemblages. Jeffrey Rosenthal, Far Western Anthropological Research Group, Inc., aided the study by presenting further details on the manner of the hydration process for Bodie Hills obsidian. Sarah Johnston, California Department of Transportation, provided the authors with much reference material and important insights regarding the character of the early peopling of the Americas and Clovis culture in general. Barry Price, Applied Earthworks, allowed access to their research library and guided the researchers to a number of useful references important to this study.

### References Cited

- Basgall, Mark E.  
1989 Obsidian Acquisition and Use in Prehistoric Central-Eastern California: A Preliminary Assessment. In *Current Directions in California Obsidian Studies*, R. E. Hughes, editor, pp. 111-126. *Contributions of the University of California Archaeological Research Facility* 48. Berkeley.
- Basgall, Mark E., and Matthew C. Hall  
2000 Morphological and Temporal Variation in Bifurcate-Stemmed Dart Points of the Western Great Basin. *Journal of California and Great Basin Anthropology* 22(2):237-276.
- Bettinger, Robert L.  
1991 *Hunter-Gatherers: Archaeological and Evolutionary Theory*. New York: Plenum.  
1994 How, When, and Why Numic Spread. In *Across the West: Human Population Movement and the Expansion of the Numa*, D. B. Madsen and D. Rhode, editors, pp. 44-55. Salt Lake City: University of Utah Press.  
1999 What Happened in the Medithermal? In *Models for the Millennium: Great Basin Anthropology Today*, C. Beck, editor, pp. 62-74. Salt Lake City: University of Utah Press.
- Bettinger, Robert L., and Martin A. Baumhoff  
1982 The Numic Spread: Great Basin Cultures in Competition. *American Antiquity* 47(3):485-503.
- Binning, Jeanne D., R. S. Brown, N. Meek, and E. B. Weil  
1986 *Intermountain Pacer Project (IPP): The Cultural Resources Studies of the Coyote Ground Electrode Project at Coyote Lake San Bernardino County, California*. Report on file with the City of Los Angeles Department of Water and Power.
- Binning, Jeanne D., R. S. Brown, L. Franklin, and J. Schmidt  
2004 Prehistoric Change in the Coyote Lake Basin, San Bernardino County, California. Paper presented at the 29<sup>th</sup> Great Basin Anthropological Conference, Sparks, Nevada.
- Bradley, Bruce  
1991 Lithic Technology. In *Prehistoric Hunters of the High Plains*, George C. Frison, pages 369-396. San Diego: Academic Press.
- Collins, M. B.  
1999 *Clovis Blade Technology*. Austin: University of Texas Press.
- Elston, Robert G., and Charles D. Zeier  
1984 The Sugarloaf Obsidian Quarry. *Naval Weapons Administrative Center, Publication 313*, China Lake, California.
- Frison, George and Bruce Bradley  
1999 *The Fenn Cache: Clovis Weapons and Tools*. Santa Fe: One Horse Land and Cattle Company.
- Garfinkel, Alan P., Jeanne D. Binning, Elva Younkin, Craig Skinner, Thomas Origer, Robert Jackson and Tim Carpenter  
2003 The Little Lake Biface Cache, Inyo County, California. *Proceedings of the Society for California Archaeology* 17:87-101.
- Gilreath, Amy J., and William R. Hildebrandt  
1997 Prehistoric Use of the Coso Volcanic Field. *Contributions of the University of California Archaeological Research Facility* No. 56. University of California, Berkeley.
- Gramly, R. M.  
1999 *The Lamb Site: A Pioneering Clovis Encampment*. Kenmore: Persimmon Press.  
2004 The East Wenatchee Clovis Site (Richey-Roberts Site): Summary of Findings and Current Status. *The Amateur Archaeologist* 10:37-38.
- Jones, G. T., C. Beck, Eric E. Jones, and R. E. Hughes  
2003 Lithic Source Use and Paleoarchic Foraging Territories in the Great Basin. *American Antiquity* 68(1):5-38.
- Onken, Jill A.  
2001 Chronosequencing (Section 3.0). In *Metropolitan Water District of Southern California Eastside Reservoir Project, Final Report of Archaeological Investigations, Volume IV: Prehistoric Archaeology, Synthesis of Findings*. Prepared by Applied Earthworks, Inc. Report on file with the Eastern Information Center, University of California, Riverside.
- Rosenthal, Jeffrey, and Kelly R. McGuire  
2004 *Middle Holocene Adaptations in the Central Sierra Nevada Foothills: Data Recovery Excavations at the Black Creek Site, CA-CAL-789*. Technical Reports. Salinas: Coyote Press.
- Wilke, Philip J., J. Jeffrey Flenniken, and Terry L. Ozbun  
1991 Clovis Technology at the Anzick Site, Montana. *Journal of California and Great Basin Anthropology* 13(2):242-272.

# An Improved Method for Computing Effective Hydration Temperature of Obsidian

Alexander K. Rogers

*This article describes a method for calculating obsidian effective hydration temperature (EHT) for the practicing archaeologist, based on a technical paper presented at the 2006 Annual Meeting of the Society for California Archaeology (Rogers 2006). A worksheet is provided which can be implemented in Excel and will give EHT within 0.1°C of the rigorous solution. Data demonstrating the inadequacy of the Lee equation for this purpose are also given.*

## Introduction

Optical microscopy is still the method of choice for obsidian hydration dating by practicing archaeologists, primarily because of its ease and low cost. It is well known that correction for temperature at a site is necessary for valid chronological reconstructions, but techniques for making the corrections have been the subject of controversy (see e.g. Hull 2001; Ridings 1995). Rogers (2006) presented an analysis which characterized systematically the effect of real-world temperature variations at an archaeological site on the observable hydration rim of an obsidian artifact, with guidelines for practical chronological analyses and an analysis of the probable errors and limits of validity of the technique. This article presents an abbreviated summary of those findings, with an Excel-based worksheet to aid computation. It replaces the sheet (which contained typos) handed out at the 2006 Annual Meeting of the Society for California Archaeology.

The use of obsidian hydration measurements for archaeological chronometry, which is now a standard practice, was first proposed by Friedman and Smith (1960). It is based on the principle that, when a freshly-exposed surface of obsidian - a rhyolitic or aluminosilicate glass (Doremus 1999, 2002) - is exposed to water, either liquid or vapor, water molecules diffuse into the glass at a predictable rate

(Doremus 2002; Stevenson et al. 1998). As the water diffuses into the glass it causes a change in refractive index in the hydrated layer; if a small cross-sectional sample is cut from the obsidian, mounted on a microscope slide and polished to transparency, the interface between hydrated and unhydrated volumes (the "hydration front") can be observed under a polarizing microscope (Anovitz et al. 1999; Scheetz and Stevenson 1988). The hydrated volume is referred to as the hydration rim, and its thickness in most archaeological cases is of the order of microns. If the rate of hydration is known or can be inferred, the time since the surface was exposed can be estimated. The rate of hydration is dependent on the obsidian chemistry (Friedman and Smith 1960; Friedman and Trembour 1978, 1983), the intrinsic water content of the glass (Stevenson et al. 2000), temperature and relative humidity (Friedman and Long 1976; Friedman et al. 1994; Mazer et al. 1991; Stevenson et al. 1993, 2000), and the chemistry of the diffusing water (Morgenstein et al. 1999). The most comprehensive treatment of water diffusion and chemical reaction in silica and aluminosilicate glasses is that of Doremus (2002), who characterized the process as a diffusion-reaction process.

The visibility of the hydration front is caused by mechanical stress due to chemical changes within the hydrated layer (Doremus 2002; Morgenstein et al. 1999), in which alkali ions, which are minor elements in the glass matrix, are replaced by incoming hydronium ions in the diffusing water. This process is not isovolumetric and thus it leads to the development of mechanical stress, which is observed optically as a birefringent phenomenon known as a Becke line (Anovitz et al. 1999). Thus the development of the optically-detectable hydration rim, caused by a chemical reaction, proceeds with the process of water diffusion into the glass.

Alexander K. Rogers, M.A., Curator of Archaeology and Staff Archaeologist,  
Maturango Museum, Ridgecrest, California; Matmus1@maturango.org  
Society for California Archaeology Newsletter 40(2):32-36

|                     |                      |      |           |
|---------------------|----------------------|------|-----------|
| Site                | Upper Centenial Flat |      |           |
| Altitude (ft)       | 6560                 | H =  | 6.56 kft  |
| Surrogate Site Name | Haiwee               |      |           |
| Altitude (ft)       | 3825                 | Hs = | 3.825 kft |

#### Surrogate Site Temperature Data

| Month   | Max    | Min    |
|---------|--------|--------|
| J       | 51.9   | 28.7   |
| F       | 56.8   | 32     |
| M       | 62.8   | 36.3   |
| A       | 70.2   | 42.4   |
| M       | 79.3   | 50.1   |
| J       | 89.2   | 58.5   |
| J       | 95.6   | 64.7   |
| A       | 93.8   | 63.1   |
| S       | 87     | 56.6   |
| O       | 76.3   | 46.7   |
| N       | 62     | 35.8   |
| D       | 52.7   | 29.4   |
| Total   | 877.6  | 544.3  |
| Average | 73.133 | 45.358 |
| Ann Ave | 59.246 | Deg F  |
| Tas =   | 15.137 | Deg C  |

| Hot Month Temperature Data |      |  |           |         |  |
|----------------------------|------|--|-----------|---------|--|
| Deg F                      |      |  | Deg C     |         |  |
| Max                        | Min  |  | Max       | Min     |  |
| 95.6                       | 64.7 |  | 35.333    | 18.167  |  |
|                            |      |  | Variation | Average |  |
|                            |      |  | 17.167    | 26.750  |  |

| Cold Month Temperature Data |      |  |           |         |  |
|-----------------------------|------|--|-----------|---------|--|
| Deg F                       |      |  | Deg C     |         |  |
| Max                         | Min  |  | Max       | Min     |  |
| 51.9                        | 28.7 |  | 11.056    | -1.833  |  |
|                             |      |  | Variation | Average |  |
|                             |      |  | 12.889    | 4.611   |  |

| Annual Average Temperature at site    |       |
|---------------------------------------|-------|
| $T_a = T_{as} - 1.9^{\circ}(H - H_s)$ |       |
| Ta =                                  | 9.940 |

| Model Parameters, deg C |        |
|-------------------------|--------|
| Ta                      | 9.940  |
| Va                      | 22.139 |
| Vd                      | 15.028 |

| Variation factor |         |
|------------------|---------|
| y =              | 715.965 |

| Depth |          | Depth attenuation factor |
|-------|----------|--------------------------|
| z =   | 0 meters | $\exp(-.66^{\circ}z) =$  |
|       |          | 1                        |

| Corrected Variation Factor |         |
|----------------------------|---------|
| y =                        | 715.965 |

| EHT Computation                              |        |
|----------------------------------------------|--------|
| $EHT = T_a(1 - 3.8e^{-5y}) + 0.0096y^{0.95}$ |        |
| EHT =                                        | 14.618 |

Figure 1: Example Worksheet.

Further chemical reactions may take place within the hydrated volume of the glass. In the hydration process, molecular water partially dissociates as it diffuses into the glass, and some of the resulting hydroxyl ions bind to silicon sites in the glass matrix to form silanol (SiOH); they are then no longer able to diffuse further (Doremus 1968, 1995, 2002). Stevenson et al. (2004) argued that, in the archaeological case, the diffusion process proceeds more rapidly than the silanol reaction, and hence can be considered separately. Rogers (2006) reported calculations based on published data which suggest that the silanol reaction will not be practically observable under archaeological conditions.

The rate of hydration is temperature dependent, as discussed further below, and temperature at an archaeological site varies both diurnally and annually. The effect of this varying temperature is summarized by the concept of Effective Hydration Temperature (EHT), which is defined as a constant temperature which yields the same hydration results as the actual time-varying temperature over the same period of time. Due to the mathematical form of the dependence of hydration rate on temperature, discussed further below, EHT is always higher than the arithmetic mean temperature.

## Prior Methods

Various methods have been used in the past to estimate EHT: the Lee equation (Lee 1969), temperature cells (sometimes coupled with the method of Norton and Friedman [1981] and Trembour et al. [1988]), and numerical estimates based on temperature histories (Ridings 1995). The Lee equation (Lee 1969:430, equation 12) is attractively simple, requiring only two input parameters, average temperature and range of temperature variation for a site. Although often cited in obsidian studies, it was originally designed for estimating mean temperature for soil science and forestry monitoring and is not appropriate for obsidian. The equation was developed based on the Pallmann cell, a device which measures an effective temperature based on a chemical reaction, the hydrolysis of sucrose into glucose and fructose. Since it depends on a chemical reaction, which, in turn is governed by the Arrhenius equation, it actually measures the effective reaction temperature for the sugar solution. Lee (1969) developed his equation to correct the effective temperature of the Pallmann cell to mean temperature, the reverse of the way it is typically applied in archaeology. The chief limitation of Lee's equation, fully discussed in Lee (1969), was that it is based on a single period of variation, typically construed as some combination of diurnal and annual; Lee attempted to account for annual variation by summing

the two, but admitted it was not really successful, and suggested the use of the cells within a single season. For obsidian analysis it has a second limitation, in that the activation energy of the sucrose solution is not the same as the activation energy of obsidian; thus, effective temperatures derived from the Lee equation should not be applied directly to obsidian.

Temperature cells, buried at a site, have also been used to estimate EHT. Two types of cells are in general use, the Pallmann cell, discussed above, and the Ambrose cell, which is based on diffusion of water through a membrane (Trembour et al. 1988). Both cells are simple, cheap, and do not require external power. However, again the activation energies are not the same as that of obsidian, and their readings cannot be used directly for obsidian EHT (see, for example, Ridings 1995:139, Fig. 3; see also the curves in Norton and Friedman 1981:10ff, Fig. 1).

Norton and Friedman (1981; see also Trembour and Friedman 1984) proposed a more rigorous procedure, based on Lee's work and calibrated temperature cells. They computed a set of curves relating EHT to temperature variation at various average temperatures for the Pallmann

cell, the Ambrose cell, and for obsidian. Effective reaction temperature for the cell could be converted to mean temperature based on estimate of temperature variation, and then the average temperature and the (same) variation could be used with the obsidian curves to estimate EHT. The weakness of this technique, again, is that there is only one periodic variation accounted for rather than two.

Finally, average temperature and EHT can be computed numerically from temperature histories, either from meteorological records or from electronic temperature sensors. Ridings pioneered the method in her 1995 paper, but only applied it to one case and did not explore its potential. Furthermore, she did not point out its underlying theoretical basis and range of validity, nor address the problem that the short time histories from buried electronic cells make them inadequate stand-alone data sources for EHT calculations.

### Diffusion Theory of Hydration

The obsidian hydration process is modeled physically as a diffusion-reaction process in a homogeneous medium in one dimension (Doremus 1999, 2002), which is described by a second-order partial differential equation (Crank 1975: 4; Doremus 2002:12). In the general diffusion case there is no analytic (closed-form) solution to the diffusion equation, which can only be solved by two-dimensional numerical integration for specific cases. However, if the diffusion coefficient (known to archaeologists as the hydration coefficient) is assumed to be constant, there is a solution for the movement of the hydration front of the form familiar to archaeologists ever since Friedman and Smith (1960):

$$x^2 = kt, \quad (1)$$

where  $x$  is the thickness of the hydration rim,  $k$  is the hydration coefficient, and  $t$  is time. This solution is also valid for the case of  $k$  proportional to water concentration (Rogers 2006).

However, in the archaeological case,  $k$  is not actually constant in time. This arises because  $k$  is a function of temperature through the familiar Arrhenius equation for reaction kinetics (Friedman and Long 1976; Levine 2002:554 ff.),

$$k = k_0 \exp [E/(RT)], \quad (2)$$

where  $k_0$  is a constant with units of [length<sup>2</sup>/time],  $E$  is the activation energy of the diffusion reaction in J/mol,  $R$  is the universal gas constant (8.314 J/mol °K), and  $T$  is absolute temperature in °K. Thus, since the temperature undergoes both annual and diurnal variation,  $k$  varies as well, which invalidates the assumption on which equation 1 is based (a fact which archaeologists have generally ignored).

It turns out that, for a diffusion coefficient which varies only in time, the diffusion equation can be solved by a single integral of the diffusion coefficient over time, a much less difficult problem to solve than the two-dimensional integration otherwise required (Crank 1975:104ff.; Rogers 2006). The result is that equation 1 is valid after all, provided

$k$  is replaced by  $k_{\text{eff}}$ , the effective value obtained by integration of  $k$  over time. It can be further shown that the integral for the effective hydration temperature (EHT) can be approximated by

$$\text{EHT} = -(E/R)/\{\ln\{(1/N) \cdot \exp[E/RT(t_i)]\}, \quad (3)$$

where again the sum is taken over the hydration time in  $N$  increments of " $t = t_{i+1} - t_i$ ". The value of  $N$  can be increased to provide any desired degree of accuracy. Thus, if a time-varying temperature history  $T(t_i)$  can be modeled numerically an effective hydration temperature can be computed by equation 3. Furthermore, the resulting EHT is a rigorous solution, not an approximation like the Lee equation. (see Rogers 2006 for details of the mathematical argument).

Finally, it can be shown that a change in EHT of DEHT leads to a change in hydration rim thickness of

$$Dx/x = -\frac{1}{2} (E/[R \times \text{EHT}^2]) \text{ DEHT},$$

where the relative change in rim thickness ( $Dx/x$ ) is related to the change in EHT. Note that in evaluating this equation, EHT must be expressed in °K (i.e. °C + 273). For cases of archaeological interest (effective hydration temperatures of the order of 10°C -20°C and  $E/R$  between 9,600°K and 11,000°K), the change in rim thickness is approximately 6.3% per degree C (or K).

If the  $k$  value in equation (1), and the EHT, are known for a reference site, rim thicknesses from sites with other EHT values can be corrected to the reference site conditions by multiplying them by a rim correction factor (RCF) of  $\exp[-\frac{1}{2} (E/[R \times \text{EHT}^2]) \text{ DEHT}]$ , or approximately

$$\text{RCF} = \exp(-.06 \text{ DEHT}). \quad (4)$$

Here DEHT is defined as EHT for the site of interest minus EHT for the reference site; DEHT can be either positive or negative.

Temperature variation at the earth's surface can be modeled as a Fourier series of sinusoidal terms (Carslaw and Jaeger 1959). For the present analysis the first-order terms describing diurnal and annual variation are used as an approximation for the complete series, yielding a temperature model of

$$T(t_i) = T_a + \exp(-.66z)\{0.5V_a \sin\{[2p/(24 \times 365)] t_i\} + 0.5V_d \sin[(2p/24) t_i]\}, \quad (5)$$

where  $T(t_i)$  is the temperature at time  $t_i$ ,  $T_a$  is annual mean temperature,  $V_a$  is annual temperature variation (July mean – January mean),  $V_d$  is diurnal temperature variation, and  $t_i$  is in hours. The exponential factor in equation 5 gives an decrease of temperature variation with depth  $z$  (in meters) for buried artifacts, and has a numerical coefficient typical of dry soil (Carslaw and Jaeger 1959:81; Stevenson et al. 1989:200; Ridings 1996:148).

The empirical parameters  $T_a$ ,  $V_a$ , and  $V_d$  are derived from measured meteorological data. Conventional wisdom among

meteorologists holds that at least 10 years of data are required to give a reasonable approximation to weather conditions at a site. Such data are available free from the web sites of the Regional Climate Centers. Electronic sensors emplaced at a site do not give adequate time history, and are only valid for temperature differences between levels.

As is well known, however, even the annual average temperature is not constant from year to year, but varies over centuries- or millennia-long cycles (e.g. Stine 1990; Graumilch 1993; Jones et al. 2004 and references cited therein). Thus, projecting climatic conditions into the past is error-prone, although sites which are relatively nearby probably experienced similar climatic patterns. In the archaeological case the interest lies not in the actual magnitude of EHT at a site, but in the EHT difference between sites, since EHT difference is used in equation 4 to adjust rim thicknesses to achieve comparability. Error magnitudes  $\sim \pm 1.0^\circ\text{C}$  are likely in using present climate as a surrogate to calculate EHT. However, EHT *differences* computed based on modern conditions are probably a valid measure of *differences* over archaeological time spans, since nearby sites have probably experienced similar climatic histories. Within a given region, where sites are exposed to similar weather patterns, EHT *differences* may be valid to  $\pm 0.1^\circ\text{C} - 0.2^\circ\text{C}$ .

### Equation for Archaeological Use

A computer program to perform the numerical integration was written in Matlab®; BASIC or FORTRAN are equally applicable, although Excel is not. Data were generated to explore the behavior of EHT with variation of average temperature, annual variation, diurnal variation, and temperature sensitivity.

Analysis of numerical cases shows that EHT has a strong dependence on average annual temperature, as one would expect. It also has significant dependence on annual and diurnal variation, while dependence on the activation energy of the obsidian, although computationally observable, is negligible in a practical sense. It was also found that the numerical values of annual and diurnal temperature variation can be interchanged in the calculation without affecting EHT; however, adding them into a single number causes a significant change in EHT, so both must be treated explicitly and separately. (This observation may explain why earlier techniques such as the Lee equation and the use of temperature cells frequently yielded inconsistent results.) It was also found that the decreased diurnal temperature variation inside a rock shelter significantly reduces EHT and hydration rate, suggesting that archaeological analyses must take note of whether obsidian artifacts were recovered from sheltered or open areas. A similar effect is found with buried objects, in which the decrease in EHT with depth tends to counteract the expected age-related increase in rim thickness with depth; this may in part account for the weak dependence of rim thickness on depth found by Yohe at Rose Spring, CA-INY-372 (Yohe 1992, 1998).

As a straight-forward technique for practical use, an algebraic equation was developed to fit the computer output

data. Analysis of a large number of cases of EHT, over a range of parameters, showed that the significant variables are the annual average temperature and the sum of the squares of the annual and diurnal variations. An algebraic fit is

$$\text{EHT} = T_a(1 - 3.8 \times 10^{-5}y) + 0.0096 y^{0.95} \quad (6a)$$

where  $T_a$  is annual average temperature, and  $y$  is the sum of the squares of the annual and diurnal temperature variation constants, modified for depth, or

$$y = \exp(-1.32z) (V_a^2 + V_d^2), \quad (6b)$$

with  $z$ ,  $V_a$ , and  $V_d$  defined as above. These equations give estimates of EHT which agree with the computer program to within  $\pm 0.1^\circ\text{C}$  over a range of  $T_a$  between  $1^\circ\text{C}$  to  $25^\circ\text{C}$ ,  $V_a$  between  $0^\circ\text{C}$  and  $25^\circ\text{C}$ , and  $V_d$  between  $0^\circ\text{C}$  and  $25^\circ\text{C}$ . The value of  $E/R$  was taken as  $10,000^\circ\text{K}$ , mid-range for reported obsidians; as noted above, the variation of EHT with  $E/R$  is small enough to be negligible in this approximation. Although slightly less accurate than the computer program, this is still more accurate than methods using the Lee equation, Pallmann cells, or Ambrose cells.

Equation 6 may be compared with the Lee equation, which is

$$\text{EHT} = (T_a + 1.2316 + 0.1607R_T)/1.0645, \quad (7)$$

where  $T_a$  is as defined previously and  $R_T$  is the temperature range. Equation 7 was derived by a least-squares fit between a calculated value and laboratory data for the Pallmann cell, in which a single sinusoid described the temperature variation; note that the equation fails the test of physics, since it does not reduce to  $\text{EHT} = T_a$  when  $R_T = 0$ .

To verify the accuracy of equation 6, effective hydration temperatures were calculated for six areas of archaeological interest in the southwest Great Basin and Upper Mojave Desert, plus one area in the Sierra Nevada (Huntington Lake). Table 1 compares the values computed by the computer program with those of equation 6. Note that the agreement between the two methods is within  $0.1^\circ\text{C}$ , which is better than the accuracy with which the climate can be characterized.

Table 2 shows the same six locales, with the EHT computed from the computer program of compared with results from the Lee equation. The Lee equation depends on a single variable to describe temperature variation,  $R_T$ , while actual temperature variation depends on two variables,  $V_a$  and  $V_d$ . Since it is not clear which to use for temperature range, Table 2 presents three cases:  $R_T = V_a$ ,  $R_T = V_d$ , and  $R_T = V_a + V_d$ . As can be seen, the results do not agree with the rigorous calculation; furthermore, the errors are not consistent, except that using combined variation for  $R_T$  consistently overestimates EHT, while the other cases usually underestimate it. In short, the Lee equation is not a suitable form for estimating EHT in obsidian.

Based on the above, the following procedure is suggested for use by the archaeologist who needs to compute EHT. Note that all computations are in  $^\circ\text{C}$ .

1. Verify that the obsidian specimens to be compared have similar chemistry - geochemical sourcing methods should be used. If practical, the method of compensating for structural water content of Stevenson et al (2000) may also be applied, although it may be omitted with due caveats.

| Site            | Altitude (m.) | T <sub>a</sub> | V <sub>a</sub> | V <sub>d</sub> | EHT    | Approx. (eq. 8) | Met Data Source    |
|-----------------|---------------|----------------|----------------|----------------|--------|-----------------|--------------------|
| Barstow         | 659           | 17.7           | 21.8           | 17.8           | 22.662 | 22.609          | WRCC               |
| El Paso Mtns    | 1088          | 17.0           | 21.5           | 13.3           | 21.087 | 21.043          | WRCC, Randsburg    |
| Haiwee          | 1166          | 15.1           | 22.1           | 15.0           | 19.717 | 19.673          | WRCC               |
| Junction Ranch  | 1725          | 11.0           | 17.4           | 18.3           | 15.254 | 15.171          | Navy               |
| Lubkin Creek    | 1250          | 15.5           | 22.3           | 16.6           | 20.424 | 20.378          | WRCC, Independence |
| Superior Valley | 960           | 16.0           | 19.2           | 19.1           | 20.642 | 20.572          | Navy               |
| Huntington Lake | 2134          | 7.4            | 14.9           | 12.6           | 10.043 | 9.965           | WRCC               |

Table 1: Comparison of computer-generated EHT with approximate equation 8.

2. Find the altitude of the site being investigated, in thousands of feet.
3. Access the web site for one of the Regional Climate Centers (RCC) and find a surrogate site in the same weather patterns and within a few thousand feet of the same altitude. For example, the Western Regional Climate Center (WRCC) is at [www.wrcc.dri.edu](http://www.wrcc.dri.edu). The surrogate site should have at least 10 years of meteorological data history. Down-load the summary sheet for the site, giving monthly average maximum and minimum temperatures.

4. Using the RCC data sheet, compute the diurnal temperature variation for January and July:

$V_d$  = (average daily maximum temperature – average daily minimum temperature)

Average the two and use the average for  $V_d$  below.

5. If the artifact was found within a rock shelter, the  $V_d$  from meteorological data is too large; in this case use  $V_d \gg 5^\circ\text{C}$  unless direct measurements are available (see Everett-Curran et al. [1991] for rationale).
6. Using the same RCC data sheet, calculate the annual temperature variation:

$V_a$  = (July average temperature – January average temperature)

If monthly averages are not reported on the data sheet, compute them as

Monthly average = (monthly maximum + monthly minimum)/2

7. Estimate the annual average temperature  $T_a$  for the site being investigated:

- a) If the surrogate site is at the same altitude as the site being investigated, compute  $T_a$  from the RCC data sheet for the surrogate using monthly maxima and minima and use it for the site being investigated.

Table 1: Comparison of computer-generated EHT with the Lee equation.

| Site            | EHT    | EHT per Lee equation |                     |                                      |
|-----------------|--------|----------------------|---------------------|--------------------------------------|
|                 |        | Rt = V <sub>a</sub>  | Rt = V <sub>d</sub> | Rt = V <sub>a</sub> + V <sub>d</sub> |
| Barstow         | 22.662 | 21.075               | 20.472              | 23.653                               |
| El Paso Mtns    | 21.087 | 20.373               | 19.135              | 22.210                               |
| Haiwee          | 19.717 | 18.678               | 17.606              | 20.426                               |
| Junction Ranch  | 15.254 | 14.117               | 14.253              | 16.384                               |
| Lubkin Creek    | 20.424 | 19.084               | 18.224              | 21.105                               |
| Superior Valley | 20.642 | 19.086               | 19.071              | 21.952                               |
| Huntington Lake | 10.043 | 10.358               | 10.011              | 11.574                               |

- b) Otherwise correct the  $T_a$  thus calculated for the surrogate site by the adiabatic lapse rate of  $-1.9^\circ\text{C}$  per thousand feet increase in altitude:  $T_a = T_{as} - 1.9 (H - H_s)$ ,

where  $T_{as}$  is the annual average temperature at the surrogate site,  $H$  is the altitude in thousands of feet of the site being investigated, and  $H_s$  is the altitude in thousands of feet of the surrogate site. Note that RCC data base does not include site altitude, so a map is needed to find the altitude of the surrogate.

8. Calculate the variation factor  $y = V_a^2 + V_d^2$
9. If the artifact was buried at a depth  $z$  (in meters), multiply  $y$  by  $\exp(-1.32z)$  and use the result in place of  $y$  in the next step.
10. Calculate EHT as  $\text{EHT} = T_a(1 - 3.8 \cdot 10^{-5}y) + 0.0096 y^{0.95}$

This procedure, which can be conveniently implemented in a Excel spreadsheet such as Figure 1, will give consistent EHT values.

In a typical archaeological case, the hydration coefficient for a given obsidian is based on archaeological correlations at a reference site. The technique described above should be used to compute the EHT at both the type site and the site being investigated, and the difference used to correct rim thickness at the site being investigated via equation 4. The corrected rim thicknesses can then be used in equation 1 to estimate age, with the  $k$  being the value from the reference site.

## Conclusions

This article has described a numerical solution of the optically-measured obsidian hydration process for archaeologically variable temperatures. The solution describes the rate of progression of the optically-detected hydration front and is mathematically rigorous, subject to the assumptions of the physical model. Hydration of glass is a diffusion-reaction phenomenon, but the silanol reaction probably does not measurably affect the hydration process under archaeological conditions.

The climatic models employed in this analysis are simple ones, with single sinusoids for annual temperature variation and diurnal temperature variation. More complex models, incorporating higher order sine terms or factors such as paleoclimatic change, can be accommodated as well; however, the single sine terms are deemed sufficiently accurate for practical purposes, since climatic history is not known to great accuracy. The effects of a sheltered site such as a rock shelter can be included, and the method can also estimate the variation of EHT with depth for a buried artifact.

Error sources affecting the accuracy of the output data arise primarily from the climatic models, and are exacerbated by projecting present conditions into the past. Although absolute values of EHT computed based on modern conditions are likely poor representations of those computed from archaeological conditions, EHT *differences* are probably valid to  $\pm 0.1^\circ\text{C} - 0.2^\circ\text{C}$  for sites within the same weather patterns.

The algebraic equation presented herein gives a good fit to the computer-generated data for use in archaeological analyses. The equation can be implemented on a scientific calculator or an Excel spreadsheet, and takes into account annual average temperature, annual and diurnal variation, and burial depth of an artifact. Input data can be obtained from meteorological records, available from many sources, as long as they include at least 10 years of history.

It is my hope that use of the technique described herein, and recognition of the physics and chemistry on which it is based, may reduce some of the inconsistencies in hydration data and interpretation which have plagued the field for years.

## References Cited

- Anovitz, Lawrence M., J. Michael Elam, Lee R. Riciputi, and David R. Cole  
1999 The Failure of Obsidian Hydration Dating: Sources, Implications, and New Directions. *Journal of Archaeological Science* 26(7):735-752.
- Carslaw, H. S., and J. C. Jaeger  
1959 *Heat Conduction in Solids*. Oxford: Clarendon Press.
- Crank, J.  
1975 *The Mathematics of Diffusion*. Oxford: Oxford University Press.
- Doremus, R. H.  
1968 The Diffusion of Water in Fused Silica, in: *Reactivity of Solids, Proceedings of the 6<sup>th</sup> International Symposium on the Reactivity of Solids*, J. W. Mitchell, R. C. DeVries, R. W. Roberts, and P. Cannon, eds., pp 667-674. New York: Wiley-Interscience.
- 1995 Diffusion of Water in Glass. *Journal of Materials Research* 10(9):2379-2389.
- 1999 Diffusion of Water in Rhyolite Glass: Diffusion-reaction Model. *Journal of Non-Crystalline Solids* 261 (1):101-107.
- 2002 *Diffusion of Reactive Molecules in Solids and Melts*. New York: Wiley Interscience.
- Everett-Curran, Linda, Richard G. Milo, and Duane Quiatt  
1991 Microgeographic Comparisons of Climate Today Afford Inferences Concerning Past Behavior: An Overview of Data and Applications from a Study of Chapin Mesa (Mesa Verde National Park) Climate. In: *Anasazi Symposium 1991*, Art Hutchinson and Jack E. Smith, eds., pp. 109-116. Mesa Verde: Mesa Verde Museum Association.
- Friedman, Irving, and R. Smith  
1960 A New Method of Dating Using Obsidian; Part 1, the Development of the Method. *American Antiquity* 25 (4):476-522.
- Friedman, Irving, and William Long  
1976 Hydration Rate of Obsidian. *Science* 191(1):347-352.
- Friedman, Irving, and Fred W. Trembour  
1978 Obsidian: The Dating Stone. *American Scientist* 66(1):44-51.
- 1983 Obsidian Hydration Dating Update. *American Antiquity* 48(3):544-547.
- Friedman, Irving, Fred W. Trembour, Franklin L. Smith, and George I. Smith  
1994 In Obsidian Hydration affected by Relative Humidity? *Quaternary Research* 41(2):185-190.
- Graumilch, Lisa J.  
1993 A 1000-year Record of Temperature and Precipitation in the Sierra Nevada. *Quaternary Research* 39:249-255.
- Hull, Kathleen L.  
2001 Reasserting the Utility of Obsidian Hydration Dating: A Temperature-Dependent Empirical Approach to Practical Temporal Resolution with Archaeological Obsidians. *Journal of Archaeological Science* 28:1025-1040.
- Jones, T. L., G. M. Brown, L. M. Raab, J. L. McVickar, W. G. Spaulding, D. J. Kennett, and P. L. Walker  
2004 Environmental Imperatives Reconsidered: Demographic Crises in Western North America during the Medieval Climatic Anomaly. In: *Prehistoric California: Archaeology and the Myth of Paradise*, L. Mark Raab and Terry L. Jones, pp. 12-32. Salt Lake City: University of Utah Press.
- Lee, Richard  
1969 Chemical Temperature Integration. *Journal of Applied Meteorology* 8:423-430.

- Levine, Ira  
2002 *Physical Chemistry*, 5<sup>th</sup> ed. New York: McGraw-Hill.
- Mazer, J. J., C. M. Stevenson, W. L. Ebert, and J. K. Bates  
1991 The Experimental Hydration of Obsidian as a Function of Relative Humidity and Temperature. *American Antiquity* 56(3):504-513.
- Morgenstein, Maury E, Carolyn L. Wickett, and Aaron Barkett  
1999 Considerations of Hydration-rind Dating of Glass Artefacts: Alteration Morphologies and Experimental Evidence of Hydrogeochemical Soil-zone Pore Water Control. *Journal of Archaeological Science* 26:1193-1210.
- Norton, D. R., and I. Friedman  
1981 *Ground Temperature Measurements, Part I*. U. S. Geological Survey Professional Paper 1203. Washington: U.S. Geological Survey.
- Ridings, Rosanna  
1996 Where in the World Does Obsidian Hydration Dating Work? *American Antiquity* 61(1):136-148.
- Rogers, Alexander K.  
2006 *Effective Hydration Temperature of Obsidian: A Diffusion Theory Analysis of Time-Dependent Hydration Rates*. Paper presented at the 40<sup>th</sup> Annual Meeting of the Society for California Archaeology, Ventura. Paper available from the author.
- Scheetz, Barry E., and Christopher M. Stevenson  
1988 The Role of Resolution and Sample Preparation in Hydration Rim Measurement: Implications for Experimentally Determined Hydration Rates. *American Antiquity* 53(1):110-117.
- Stevenson, Christopher M., J. Carpenter, and B. E. Scheetz  
1989 Obsidian Dating: Recent Advances in the Experimental Determination and Application of Hydration Rates. *Archaeometry* 31(2):1193-1206.
- Stevenson, Christopher M., E. Knauss, J. J. Mazer, and J. K. Bates  
1993 The Homogeneity of Water Content in Obsidian from the Coso Volcanic Field: Implications for Obsidian Hydration Dating. *Geoarchaeology* 8(5):371-384.
- Stevenson, Christopher M., J. J. Mazer, and B. E. Scheetz  
1998 Laboratory Obsidian Hydration Rates: Theory, Method, and Application. In: *Archaeological Obsidian Studies: Method and Theory. Advances in Archaeological and Museum Science*, Vol. 3, M. S. Shackley, ed., pp.181-204.
- Stevenson, Christopher M., Mike Gottesman, and Michael Macko  
2000 Redefining the Working Assumptions for Obsidian Hydration Dating. *Journal of California and Great Basin Anthropology* 22(2):223-236.
- Stevenson, Christopher M., Ihab. M. Abdelrehim, and Steven W. Novak  
2004 High Precision Measurement of Obsidian Hydration Layers on Artifacts from the Hopewell Site Using Secondary Ion Mass Spectrometry. *American Antiquity* 69(4):555-568.
- Stine, Scott  
1990 Late Holocene Fluctuations of Mono Lake, Eastern California. *Palaeogeography, Palaeoclimate, Palaeoecology* 78:333-381.
- Trembour, Fred, and Irving Friedman  
1984 Obsidian Hydration Dating and Field Site Temperature, in: *Obsidian Studies in the Great Basin*, Richard E. Hughes, ed., pp. 79-90, Contributions of the University of California Archaeological Research Facility No. 45. Berkeley: University of California.
- Trembour, Fred, F. L. Smith, and I. Friedman  
1988 Diffusion Cells for Integrating Temperature and Humidity over Long Periods of Time. *Materials Research Society Symposium Proceedings* 123:246-251.
- Yohe, Robert M. II  
1992 *A Reevaluation of Western Great Basin Cultural Chronology and Evidence for the Timing of the Introduction of the Bow and Arrow to Eastern California Based on New Excavations at the Rose Spring Site (CA-INY-372)*. Unpublished PhD dissertation, Department of Anthropology, University of California, Riverside.
- 1998 The Introduction of the Bow and Arrow and Lithic Resource Use at Rose Spring (CA-INY-372). *Journal of California and Great Basin Anthropology* 20(1):26-52.



*would reach heritage specialists  
throughout the west.*

#### Advertising Rates

|                 |       |
|-----------------|-------|
| 1/4 page .....  | \$70  |
| 1/2 page .....  | \$100 |
| Full page ..... | \$175 |

*Ads that run three or more consecutive  
issues receive a 15% discount.*

Contact:  
SCA Business Office  
CSU-Chico, Bldg 25, Suite 101  
Chico, CA 95929-401  
Ph (530) 898-5733  
Fx (530) 898-4220  
SCAOffice@csuchico.edu



## NORTHWEST RESEARCH OBSIDIAN STUDIES LABORATORY

Obsidian and Basalt Trace Element Studies  
Obsidian Hydration Measurements  
Obsidian Source Studies  
GIS Applications in Archaeology

1414 NW Polk • Corvallis, Oregon 97330

Phone/Fax: 541-754-7507

E-mail: [info@www.obsidianlab.com](mailto:info@www.obsidianlab.com)

[WWW.OBSIDIANLAB.COM](http://WWW.OBSIDIANLAB.COM)

[WWW.SOURCECATALOG.COM](http://WWW.SOURCECATALOG.COM)

## National Preservation Institute

2006

### Seminars in Historic Preservation & Cultural Resource Management

Professional training for the management, preservation, and stewardship of our cultural heritage. *Archaeological Curation, Conservation, and Collections Management* (Seattle) • *Decisionmaking for Cultural and Natural Resources in the Legal Environment; Traditional Cultural Places; Integrating Cultural Resources in NEPA Compliance; Section 106: Agreements* (San Diego) • *GIS: Practical Applications for Cultural Resource Projects; Section 106: An Introduction* (Sacramento) • *Native American Cultural Property Law* (Santa Fe) • plus more. Please contact us for a seminar schedule.

703.765.0100 [info@npi.org](mailto:info@npi.org) [www.npi.org](http://www.npi.org)  
P.O. Box 1702. Alexandria. Virginia 22313



## Jones & Stokes

## Comprehensive Cultural Resources Services Throughout the Western United States

- ❖ Regulatory Compliance
- ❖ Prehistoric and Historical Archaeology
- ❖ Architectural History
- ❖ Ethnography
- ❖ Mitigation and Monitoring
- ❖ Public Interpretation

Offices in California, Oregon, Washington and Utah

[www.jonesandstokes.com](http://www.jonesandstokes.com)

## Calendar of Events

**July 22-30, 2006.** The 3<sup>rd</sup> Annual Stanley J. Olsen Eagle Lake Zooarchaeology Conference. <http://www.csuchico.edu/~bayhamf/zooarch.htm>.

**August 10-13, 2006.** 2006 Pecos Conference. [http://www.swanet.org/2005\\_pecos\\_conference/misc.html](http://www.swanet.org/2005_pecos_conference/misc.html).

**August 23-28, 2006.** The International Council of Archaeozoology (ICAZ). International Conference in Mexico City. Contact Joaquin Arrote-Cabral and Oscar J. Polac ICAZ2006@yahoo.com.mx or [http://www.nmnh.si.edu/anthro/icaaz/meetings\\_conferences.html](http://www.nmnh.si.edu/anthro/icaaz/meetings_conferences.html).

**October 5-11, 2006.** The National Trust for Historic Preservation will hold its annual conference in Pittsburgh. The conference theme is "Making History Work!" For more information visit: [www.nthpconference.org](http://www.nthpconference.org).

**October 13-15, 2006.** California Indian Conference 2006. Dominican University, San Rafael, CA. Conference Organizer Arthur Kane Scott, [AScott@dominican.edu](mailto:AScott@dominican.edu).

**October 26-28, 2006.** The California Council for the Promotion of history will hold its annual conference in San Jose, CA. For more information, visit: [www.csus.edu/org/ccph](http://www.csus.edu/org/ccph).

**November 1-5, 2006.** The Department of Anthropology at the College of William and Mary, together with the Colonial Williamsburg Foundation and Jamestown-Yorktown Foundation will hold the 2006 Meeting of the American Society for Ethnohistory. For more information: [ethnohistory.org/2006-call\\_for\\_papers.html](http://ethnohistory.org/2006-call_for_papers.html).

**November 15-19, 2006.** 105<sup>th</sup> AAA Annual Meeting. Held at the San Jose Convention Center, San Jose, CA. <http://www.aaanet.org/mtgs/mtgs.htm>.

**January 4-7, 2007.** Archaeological Institute of American (AIA) has scheduled their 108<sup>th</sup> Annual Meeting in San Diego, CA.

**January 9-14, 2007.** The Society for Historical Archaeology's 40<sup>th</sup> Annual Conference will be held in conjunction with the 400<sup>th</sup> anniversary of the settlement of Jamestown. The theme is, "Old World/New World: Cultural Transformation." To be held in Williamsburg, VA.

## Upcoming Meetings

**Fall, 2006.** Society for California Archaeology, Southern Data-Sharing Meeting, Ensenada, Mexico. Watch [www.SCAHome.org/events/index.html](http://www.SCAHome.org/events/index.html) for details.

**October 7, 2006.** Society for California Archaeology, Northern Data-Sharing Meeting, Sonoma State University, Rohnert Park, CA. Watch [www.SCAHome.org/events/index.html](http://www.SCAHome.org/events/index.html) for details.

**March 23-25, 2007.** Society for California Archaeology, Annual Meeting, Doubletree Hotel, San Jose. Watch [www.SCAHome.org/events/index.html](http://www.SCAHome.org/events/index.html) for details.

**April 17-20, 2008.** Society for California Archaeology, Annual Meeting, Hilton Burbank Airport and Convention Center, Burbank CA.

**November 19th, 2008-November 23<sup>rd</sup>,** AAA Annual Meeting. San Francisco, CA.

### Society for California Archaeology 2006-2007 Executive Board Meetings:

| Date             | Location     | Associated Event    |
|------------------|--------------|---------------------|
| June 29-30, 2006 | Chico        | None                |
| October 6, 2006  | Rohnert Park | NorCal DSM          |
| January 6, 2007  | Sonoma       | None                |
| March 22, 2007   | San Jose     | 2007 Annual Meeting |

For information about Data-Sharing Meetings, Annual Meetings, publications, Board Meetings, and other SCA activities, visit our web site at [www.SCAHome.org/](http://www.SCAHome.org/), or contact us:

SCA Business Office  
CSU-Chico, Bldg 25, Suite 101  
Chico, CA 95929-401  
Ph (530) 898-5733  
Fx (530) 898-4220  
[SCAOffice@csuchico.edu](mailto:SCAOffice@csuchico.edu)

## Education Aids for Archaeology

**Society for American Archaeology** education pages focus on four areas within archaeology education: academic programs, curriculum development, professional development, continuing education, and public education: <http://www.saa.org/education/index.html>.

**National Park Service Teachers Resources:** <http://www.cr.nps.gov/archeology/PUBLIC/Teach.htm>

**Bureau of Land Management** has a web site containing information for students and teachers, including current exhibits with teacher resources and links to sites protected and managed by the BLM. This site is great also for doing activities involving biology, geography, and geology: <http://www.blm.gov/education/index.html>

**Archaeological Institute of America** website is a primary resource for archaeological information and educational aids like study plans: <http://www.archaeological.org/webinfo.php?page=10260>

**Smithsonian Institution's** Decoding the Past: The Work of Archaeologists: [http://www.smithsonianeducation.org/educators/lesson\\_plans/decoding\\_the\\_past/index.html](http://www.smithsonianeducation.org/educators/lesson_plans/decoding_the_past/index.html)



Mail or FAX this membership form and address changes to:

Society for California Archaeology  
Business Office  
Department of Anthropology, CSU Chico  
Chico, CA 95929-0401

FAX: 530-898-4220

## SCA Membership

Check One

- ☐ Student . . . . . \$30.00  
☐ Senior (+60) . . . . . \$30.00  
☐ Spouse . . . . . \$30.00  
☐ Regular . . . . . \$70.00  
☐ Institutional . . . . . \$100.00  
☐ Contributing . . . . . \$100.00  
☐ Corporate . . . . . \$250.00

New Member\_\_\_/\_\_\_Renewal

Please Complete

Name

Address

City/State/Zip

Phone ( )

FAX ( )

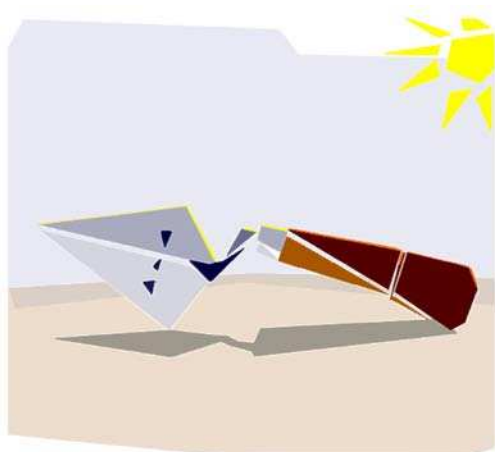
e-mail

Membership good for one year on receipt of application.

Society for California Archaeology  
Business Office  
Department of Anthropology, CSU Chico  
Chico, CA 95929-0401

## Time Sensitive Material

Address Service Requested



Society for  
California Archaeology  
Newsletter  
Volume 40, No. 2