

## **UC Merced**

### **Journal of California and Great Basin Anthropology**

#### **Title**

Radiocarbon Dating of Pinyon Nut Exploitation in Eastern California

#### **Permalink**

<https://escholarship.org/uc/item/92v7n464>

#### **Journal**

Journal of California and Great Basin Anthropology, 2(2)

#### **ISSN**

0191-3557

#### **Authors**

Garfinkel, Alan P

Cook, Roger A

#### **Publication Date**

1980-12-01

Peer reviewed

- Hoover, Robert L.  
 1973 Incised Steatite Tablets from Santa Catalina Island. *The Masterkey* 47(3):106-109.
- Hudson, Travis  
 1978 An Unusual Stone Effigy from San Clemente Island, California. *Journal of California Anthropology* 5(2):262-266.
- Schumacher, Paul  
 1875 Ancient Graves and Shell Heaps of California. *Smithsonian Institution Annual Report for 1874*:335-350.



## Radiocarbon Dating of Pinyon Nut Exploitation in Eastern California

ALAN P. GARFINKEL  
 ROGER A. COOK

Recently obtained radiocarbon analyses of the charred parts of pinyon pine cones and seeds from the Sherwin Grade site, Mono County, California, (CA-Mno-584) are of significance to the controversy concerning the proposition that regular use of pinyon resources initiated in the Owens Valley region between A.D. 600 and A.D. 1000 (Bettinger 1976, 1977a, 1977b; McGuire and Garfinkel 1976; Garfinkel and Cook 1979).

Numerous samples of charred plant material were retrieved during the excavation of CA-Mno-584 located above the Sherwin Grade between Bishop and Mammoth adja-

cent to Rock Creek at an elevation of 6,900 ft. One of these samples was previously reported (Garfinkel and Cook 1979:50) and was part of a pinyon cone roasting feature found in unit I-5-Ad at a depth of 30-40 cm. It was dated at  $455 \pm 140$  radiocarbon years (UCR 365):A.D. 1495.

Three other samples of charred pinyon pine remains were available for dating and were retrieved from excavation levels previously interpreted as antedating A.D. 500 (Garfinkel and Cook 1979:75). It was believed that age determinations of these samples might contribute significantly to the ultimate resolution of the argument concerning the age for the initial exploitation of pinyon in the Owens Valley region. Through the good graces of Dr. R. E. Taylor of the Radiocarbon Dating Laboratory at the University of California, Riverside, these samples were analyzed without cost.

Table 1 shows the dates obtained on samples with their accompanying proveniences: the samples are further described below.

The three samples of charred plant material were retrieved directly from the midden during the screening process and were not found in association with any formalized features. Charcoal and charred plant remains were found in most units to a depth of 80 cm. Although several excavation units revealed artifactual remains to a depth of 1.5 m. or greater (to 2.5 m.), only two samples of charred plant material were retrieved below the 70-80 cm. level.

Natural or cultural processes could result in the deposition of these plant remains within the site. Pinyon pines are not found directly on the site today. The nearest pinyon pines are situated quite close to the site upslope and approximately 200 m. to the west and north. Although the vegetation community surrounding the site, Pinyon-Juniper Woodland, does not characteristically support burns with any regularity, lightning fires are known to occur

Alan P. Garfinkel, Dept. of Anthropology, Univ. of California, Davis, CA 95616. Roger A. Cook, Dept. of Transportation, Sacramento, CA 95811.

within these areas. The charred remains of pinyon pines might be introduced through the action of water, wind, and rodents. These latter possibilities are unlikely since no large pieces of pinyon pine wood or dense concentrations of charred plant matter were identified at the site. Further, no evidence existed for extensive rodent disturbance or natural erosional processes.

Aboriginal use of pinyon remains at the site is most firmly documented by the presence of a single pinyon cone roasting feature. The charred remains of various plants most likely owe their presence to pinyon nut processing. Sagebrush (*Artemisia* sp.) or antelope bush (*Purshia* sp.) were probably used as fuel sources for the roasting of pinyon cones. The cone scales expand and open when roasted, releasing the nuts. Considering the small amounts of charred plant material, the

majority of which is identified as pine, sagebrush, or antelope bush, we believe that these remains are representative of human provisioning and not the product of natural depositional processes.

The additional radiocarbon dates presented here require a reassessment of the stratigraphic/temporal division previously proposed for the Sherwin Grade site (Garfinkel and Cook 1979:75). It was initially asserted that excavation levels from 0 to 50 cm. represent a time span from A.D. 500 to the historic era and levels below this antedate this time span and correspond to a period between A.D. 500 and 3000 B.C. This proposal was based on correlations of chronologically diagnostic point types, the presence/absence of steatite beads, and hydration measurements on artifacts of Casa Diablo obsidian (see Table 2).

**Table 1**  
**RADIOCARBON DATES AND PROVENIENCES OF CHARRED PLANT MATERIALS**

Provenience	Depth (cm.)	Sample Contents	Radiocarbon Age and Sample No.
C-78-Cc	50-60	<i>Pinus</i> and <i>Purshia</i> charcoal. Three charred <i>Pinus monophylla</i> cone scales.	1155 ± 160 yrs. (UCR 945):A.D. 795
D-44-Ac-Ad	50-60	<i>Pinus</i> and <i>Artemisia</i> charcoal. Four charred <i>Pinus monophylla</i> cone scales and five seed coats.	490 ± 70 yrs. (UCR 943):A.D. 1460
D-45-Aa	60-70	<i>Pinus</i> , <i>Artemisia</i> , and <i>Purshia</i> charcoal. One charred <i>Pinus monophylla</i> cone scale.	430 ± 150 yrs. (UCR 944):A.D. 1520
		* * *	

**Table 2**  
**OBSIDIAN HYDRATION DATA**

Age	Depth (cm.)	Point Forms	Beads	Casa Diablo Hydration Measurement in Microns
Historic to A.D. 500	0-50	Desert Side-notched, Cottonwood series, Humboldt Basal-notch	Soapstone, <i>Olivella biplicata</i> full-lipped disc	< 4.0
A.D. 500 to 3000 B.C.	> 50	Borax Lake, Humboldt Concave Base	Absent	> 4.0

These new radiocarbon dates indicate a time span ranging from A.D. 795 to A.D. 1520 for excavation levels from 50 to 70 cm. in depth. While there is a clustering of radiocarbon dates at about A.D. 1500, the excavation unit (C-78-Cc) containing the plant remains with the earliest date (A.D. 795) also contained no soapstone beads. The lack of such beads may indicate a somewhat earlier use of this portion of the site. Hydration measurements on artifacts manufactured of Casa Diablo obsidian from the adjacent unit (C-78-Cb) were obtained from the 90-100 cm. (5.75 microns) and 170-180 cm. (6.00 microns) levels. These readings suggest quite ancient dates for the basal deposit based on comparisons with Michels' (1965) hydration readings from the Mammoth Junction site situated a few miles to the northwest at a source locality for Casa Diablo obsidian. Also, a tentative source-specific rate proposed for Casa Diablo obsidian, recently developed using Michels' (1965) data,  $Y = 665.41(X) - 745.00$ , where X equals the hydration value and Y equals the date in years before the present (Garfinkel 1980), dates these values to 1101 B.C. and 1267 B.C., respectively. Other rind values for Casa Diablo obsidian artifacts found in levels below 50 cm. range from 4.14 to 8.18 microns (excluding one anomalously small reading of 2.02 microns). A total of ten hydration readings from these levels have a mean of 5.75 microns and suggested a date of *ca.* 1100 B.C. The basal date of *ca.* 3000 B.C. suggested for the deposit is in close correspondence to the obsidian hydration date derived from a dart point resembling the Borax Lake wide-stem form and determined to have been manufactured from Casa Diablo obsidian. Its hydration value is 8.1 microns, and based on the previously identified source-specific rate would date to 2718 B.C.

This is the largest such hydration value available from the site and this point style is presumed to be the most ancient of such forms

found at the site.

Based on this discussion, there is general agreement with the sequence of dates initially proposed, although a greater recency for depths to *ca.* 70 cm. is suggested. Perhaps one should conclude from the additional radiocarbon determinations and reassessment of the stratigraphic/chronological framework for the site that its depositional history is more complicated than the simplistic determination initially proposed and that various portions of the deposit may have distinctive depositional histories.

The radiocarbon evidence dating the charred remains of pinyon pine are some of the first of such data available for the early use of pinyon resources in eastern California, and are the oldest such direct determinations currently available.

These dates indicate a fair degree of antiquity for the practice of pinyon procurement. The earliest determination (UCR 945) corresponds closely to Bettinger's (1976, 1977a) suggested date A.D. 600-A.D. 1000 for the initial appearance of regular pinyon procurement in the Owens Valley.

Further floral and faunal data with good stratigraphic controls from well-dated contexts are crucial to obtain the precision necessary for the identification of prehistoric subsistence changes in eastern California.

## REFERENCES

- Bettinger, Robert L.  
 1976 The Development of Pinyon Exploitation in Central Eastern California. *Journal of California Anthropology* (3)1:81-95.  
 1977a Reply to McGuire and Garfinkel. *Journal of California Anthropology* (4)1:130-132.  
 1977b Aboriginal Human Ecology in Owens Valley: Prehistoric Change in the Great Basin. *American Antiquity* 42:3-17.

Garfinkel, Alan P.

- 1980 An Initial Archaeological Evaluation of CA-Iny-2146, Inyo County, California. California Department of Transportation, Environmental Studies Branch, Archeological Reports.

Garfinkel, Alan P., and Roger A. Cook

- 1979 Prehistoric Change in Central Eastern California: The Sherwin Grade Site. California Department of Transportation Occasional Papers in Archaeology No. 1. Sacramento.

McGuire, Kelly R., and Alan P. Garfinkel

- 1976 Comment on "The Development of Pinyon Exploitation in Central Eastern California." *Journal of California Anthropology* 3(2):83-85.

Michels, Joseph W.

- 1965 Lithic Serial Chronology Through Obsidian Hydration Dating. Ph.D. dissertation, University of California, Los Angeles.



## Obsidian Hydration Dates for Owens Valley Settlement Categories

ROBERT L. BETTINGER

Archaeology has recently undergone a fundamental transformation of perceived goals, central to which is the decreased emphasis on culture chronology and the increased emphasis on models of prehistoric adaptation and theories of culture process. Paradoxically, with more detailed subsistence

and settlement reconstructions and more rigorous tests of processual theory has come the need for increasingly precise temporal placement of cultural events. Establishing chronology, thus, continues to be a basic archaeological task.

In just this sense, and for just these reasons, the central concern here is chronology, specifically, the dating of aboriginal occupation at archaeological settlement categories in Owens Valley, eastern California. On its own terms, the problem is of local interest at best. Nevertheless, there is a broader perspective in which it assumes larger importance because it provides an essential test of existing subsistence-settlement models proposed for this locality, which have potentially critical implications for understanding man-land relationships over a much larger part of the Desert West.

### BACKGROUND

Since 1972, Owens Valley has been the setting for a long-term archaeological research project, a central purpose of which is to reconstruct regional subsistence and settlement patterns and to define changes in these patterns through time (Bettinger 1975, 1976, 1977). To this end, probabilistic surface surveys were carried out within a large sample transect encompassing all major biotic communities represented in the valley. Sites located during these surveys were subsequently divided into major settlement categories based on their archaeological assemblages and natural settings. Time-sensitive projectile points recovered from these sites were then used to determine the intensity of aboriginal occupation for each settlement category during four prehistoric phases spanning the interval from 3500 B.C. to historic times, and, in turn, this evidence was used to construct simple subsistence-settlement models for each of these phases (for a more detailed discussion see Bettinger 1975, 1977).

Robert L. Bettinger, Dept. of Anthropology, Univ. of California, Davis, CA 95616.