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## Journal of California and Great Basin Anthropology

### Title

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### Permalink

<https://escholarship.org/uc/item/3xf834gq>

### Journal

Journal of California and Great Basin Anthropology, 21(2)

### ISSN

0191-3557

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### Publication Date

1999-07-01

Peer reviewed

## Early Pottery from Sunga'va and Implications for the Development of Ceramic Technology in Owens Valley, California

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*Pottery from Sunga'va, a single-component Haiwee period site (ca. 1,150 B.P.) in southern Owens Valley, was analyzed by Instrumental Neutron Activation Analysis within a larger study of western Great Basin ceramics. The discovery of pottery in a Haiwee Period site positions the advent of ceramic technology in Owens Valley some 500 years earlier than previously thought. Analyses indicate that the pottery was made from local sedimentary clays collected in or near Owens Lake. The small number of sherds in this lakeside village suggests that pottery making in the region began on an experimental basis and may have been associated with the processing or storage of lacustrine food resources. Early experimentation may have set the stage for the later intensification of this craft in the region.*

**BROWNWARE** ceramics are widely considered a marker of the Late Prehistoric Period in Owens Valley, and the western Great Basin in general. Although the introduction of pottery making is not well dated, a few radiocarbon dates, thermoluminescence dates, and a clear association with Late Prehistoric Period sites suggest that the craft began in this region sometime within the last 650 years (Bettinger 1982, 1989; Pippin 1986; Rhode 1994). Aside from the general antiquity of brownware,

however, the context of the origins of ceramics is poorly understood. That is, we know little about the function of early pots, how they were made, the types of clays used, or whether the craft diffused to the area or was a local development. Moreover, because brownware ceramics are typically classified into a single temporal and spatial category and there has been little interassemblage comparison, virtually nothing is known about how this craft changed during the course of prehistory.

Recent excavation at the Sunga'va site (CA-INY-3806/H) at the southern end of Owens Valley near the shores of Owens Lake has shed light on several of these issues (see Eerkens n.d.). Studies suggest that ceramic technology has greater antiquity in this region, began on an experimental basis using sedimentary clays, and was a local development.

### REGIONAL CHRONOLOGY AND THE SITE OF SUNGA'VA

The prehistory of Owens Valley is generally divided into five main chronological periods (see Bettinger and Taylor 1974), including Lake Mojave (prior to 6,000 B.P.), Little Lake (6,000 to 3,100 B.P.), Newberry (3,100 to 1,350 B.P.), Haiwee<sup>1</sup> (1,350 to 650 B.P.), and Marana (650 B.P., to the historical era). These periods are defined by a series of temporally diagnostic projectile point forms, including Lake Mojave, Pinto, Elko, Rosegate, and Desert series, respectively, but recent studies suggest that other artifacts, such as pottery, shell beads, millingstones, formed flake tools, green-grey chert bifaces, and steatite vessels may also serve as temporal markers (e.g., Riddell and Riddell 1956; Bennyhoff and Hughes 1987; Bettinger 1989; Delacorte 1990; King 1990). For example, brownware pottery and thin schist millingstones are now assumed to be indicative of Marana Period occupation. Associated with these periods are major dif-

ferences in how humans organized themselves and exploited resources within the landscape. Of concern here is a major shift from rather mobile settlement and specialized subsistence systems to a more sedentary and diverse system during the Newberry to Haiwee transition (Bettinger 1982, 1989; Bettinger and Baumhoff 1982; Basgall 1989).

The Sunga'va site, named after the Owens Valley Paiute word for cottonwood tree, fits squarely in the Haiwee Period. The site lies on the former banks of Cottonwood Creek on the western shore of Owens Lake in southern Owens Valley (Fig. 1). Two historical charcoal kilns (California State Historical Landmark 537) just south of the site, where felled trees sent downstream were collected and turned into charcoal for mining activities, demonstrate that this now dry wash was once home to a large and permanent creek. Indeed, prior to water diversions by the City of Los Angeles in the early 1900s, this region was home to several perennial creeks, as well as Owens Lake, a major (17 x 10 mi.), permanent body of water. This lake, the third largest in California, provided many important food resources to the Paiute who lived there, including brine fly larvae, waterfowl, and various lacustrine plants. Not surprisingly, the area from the former shores of the lake to the Sierra Nevada is densely covered by prehistoric archaeological materials spanning at least the last 6,000 years of prehistory (Basgall and McGuire 1988; Delacorte and McGuire 1993; Gilreath 1995; Eerkens 1997).

To date, Sunga'va has seen two separate phases of excavation and study. The first, as part of a cultural resource management project for a fiber optic cable line, exposed 3 m.<sup>2</sup> (2 m.<sup>3</sup>) of sediment (Delacorte and McGuire 1993), while the second, as part of a field school from the University of California, Davis, excavated over 20 m.<sup>2</sup> (24 m.<sup>3</sup>). Combined, the work has demonstrated the site to be an extremely well-preserved, single-component site with numerous features and activity areas, a rarity for open air sites in Owens Valley. Over 200 formal flaked stone tools, 150 expedient flake tools, 40 groundstone artifacts, 25 shell beads and pendants,

and two bone tools have been recovered, as well as large collections of debitage and faunal remains. Lithic studies, including geochemical sourcing and technological analysis, along with analysis of site features, including house and storage-pit features, indicate some degree of sedentism or restricted residential mobility by the inhabitants of Sunga'va (Eerkens n.d.; Delacorte and McGuire 1993).

In addition, two unusual ceramic sherds were recovered during the field school excavations. The first (Fig. 2a) was found 78 cm. below the present-day ground surface, 25 cm. above a well-preserved house floor. The dish-shaped floor was over five m. in diameter and contained a central hearth, which was radiocarbon dated to 1,160 B.P. (see below). Directly associated with the floor were two Rose Spring series projectile points, a Humboldt Basal-notched point, and numerous obsidian flaked stone artifacts. Above the floor, in similar stratigraphic position to the sherd, were two additional Rose Spring projectile points. Six artifacts from the house floor context were cut for obsidian hydration (all identified as Coso), yielding a mean rind of 5.0  $\mu$ , with a standard deviation of 0.7  $\mu$ . The second sherd (Fig. 2b) was found over 40 m. away near the present-day ground surface (0 to 10 cm.) in general midden context. No features or diagnostic artifacts were found associated with this second sherd.

### DESCRIPTION OF SHERDS

The two sherds from Sunga'va are made out of a silty clay containing large amounts of mica. They were fired in an oxidized atmosphere and contain little temper (some small, rounded quartz sand fragments). Vessel construction was by coiling, but unlike most pottery in the area, the coils were overlapped and were not pressed and scraped when wet (see Fig. 2). Thus, the coils were visible on the finished pot. The original vessel form is not discernible from the two fragments recovered, but based on sherd curvature the diameter of the sherd in Figure 2a is estimated at 25 cm. The coils used to construct the vessel are separated by an average

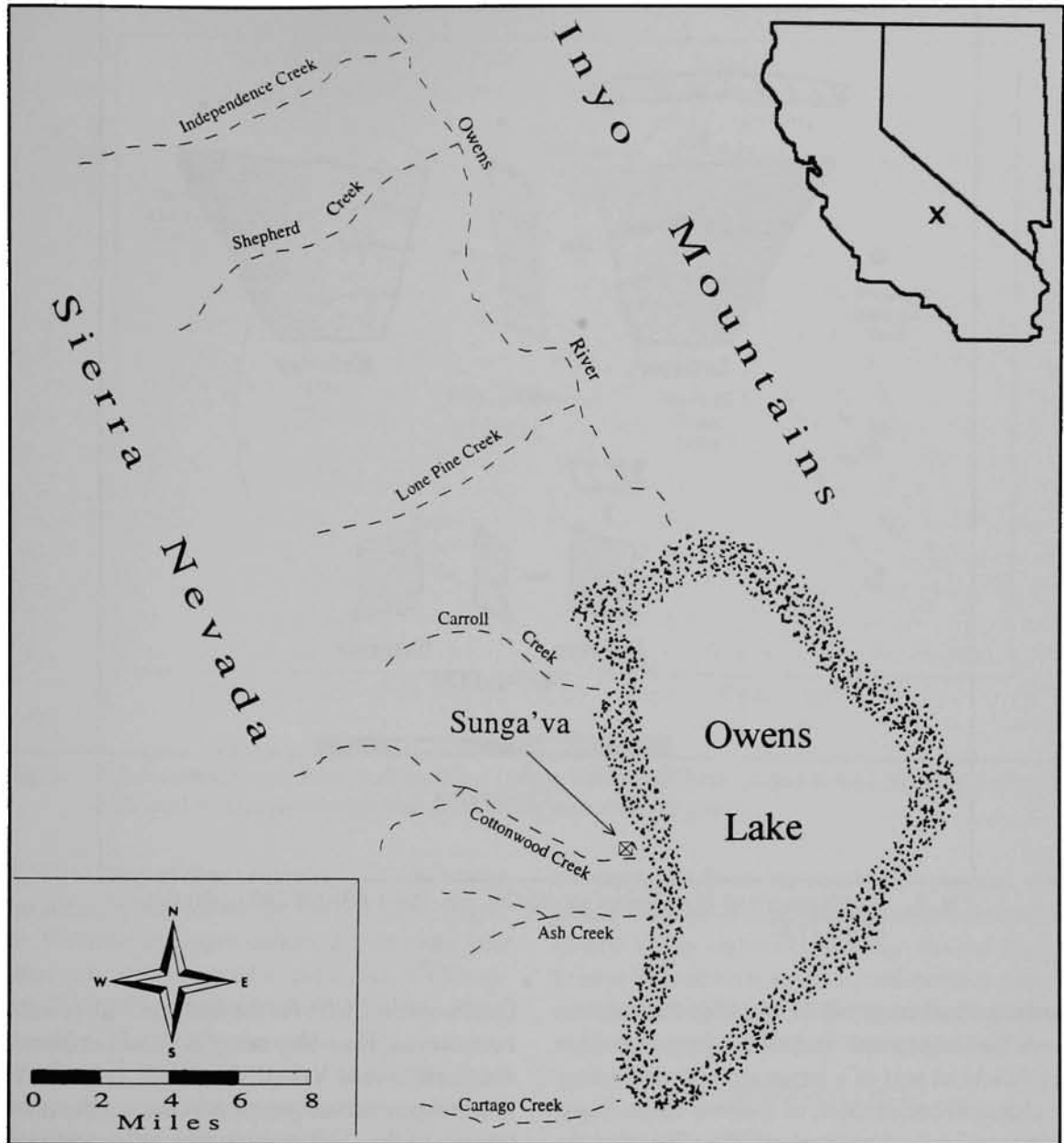


Fig. 1. Regional map of the southern Owens Valley, including Owens Lake and the approximate location of Sunga'va.

of 4.5 mm. Wall thickness, while uneven, probably averaged near six mm. This style of manufacture is similar to contemporaneous corrugated pottery found in the Southwest, where an overlapping coiled tradition developed during the ninth and tenth centuries A.D. to improve vessel strength,

handling, and cooking control (Pierce 1998). The spatial distance between where the two Sunga'va sherds were found (over 40 m.), in addition to slight differences in physical appearance, suggest that they represent distinct vessels.

In order to learn more about the origin of these

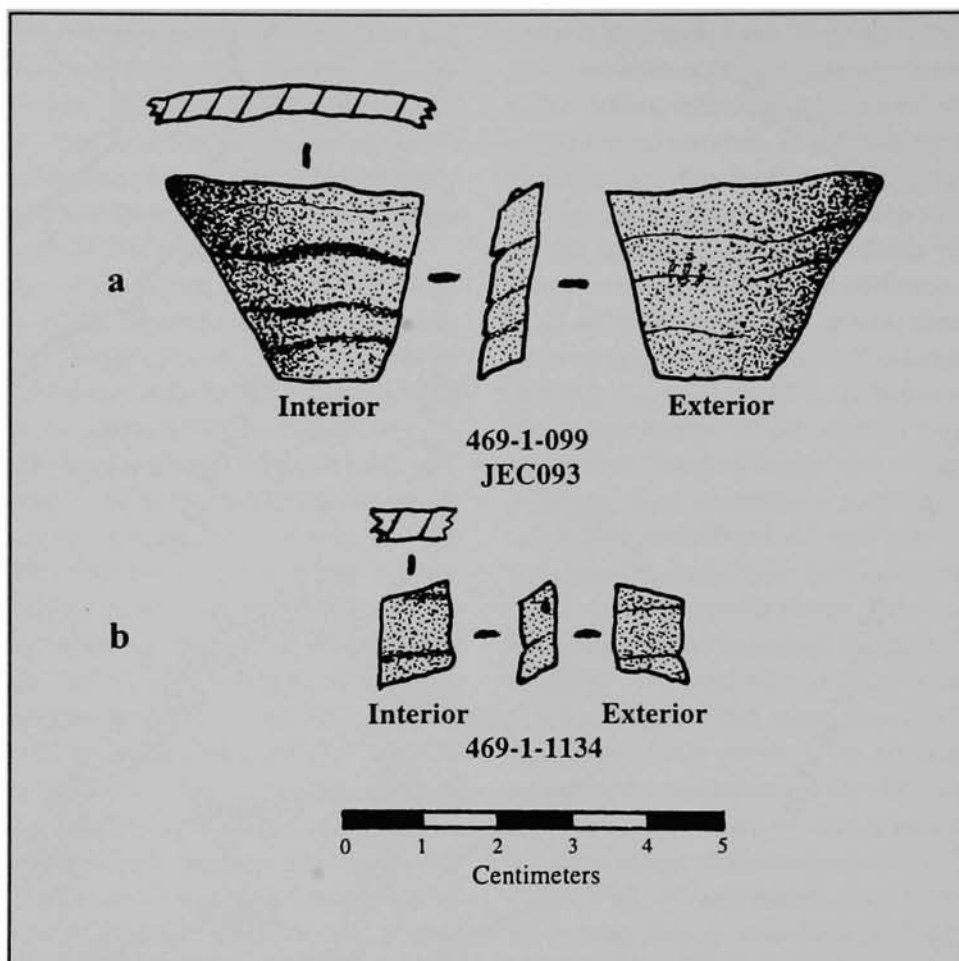


Fig. 2. Sherds recovered from Sunga'va: (a) Cat. No. 469-1-099 (JEC093); (b) Cat. No. 469-1-1134.

sherds, a small fragment of one (Fig. 2a) was removed for Instrumental Neutron Activation Analysis (INAA) as part of a larger study investigating the chemical composition of western Great Basin ceramics (see Eerkens et al. 1998). This sample was assigned the label JEC093 at Missouri University Research Reactor (MURR). All references to samples with the JEC prefix denote MURR sample numbers.

Figure 3 shows the results of a principal components analysis on log-transformed compositional data of pottery samples from Owens Valley (northern and southern), the western Sierra Nevada (Sequoia National Park), and the American Southwest

(south-central Utah), for the first and fifth principal components. Four clay samples collected from the southern Owens Valley are plotted as well. The first component clearly separates the Southwestern, Owens Valley, and western Sierran assemblages, while the fifth component serves to separate southern from northern Owens Valley. The sherd illustrated in Figure 2a falls well within the 90% confidence interval ellipse for the southern Owens Valley sherds.

Based on Mahalanobis distances, the chemical composition of the sherd in Figure 2a compares most favorably with three sedimentary clay samples collected from the area (JEC189, JEC192, and

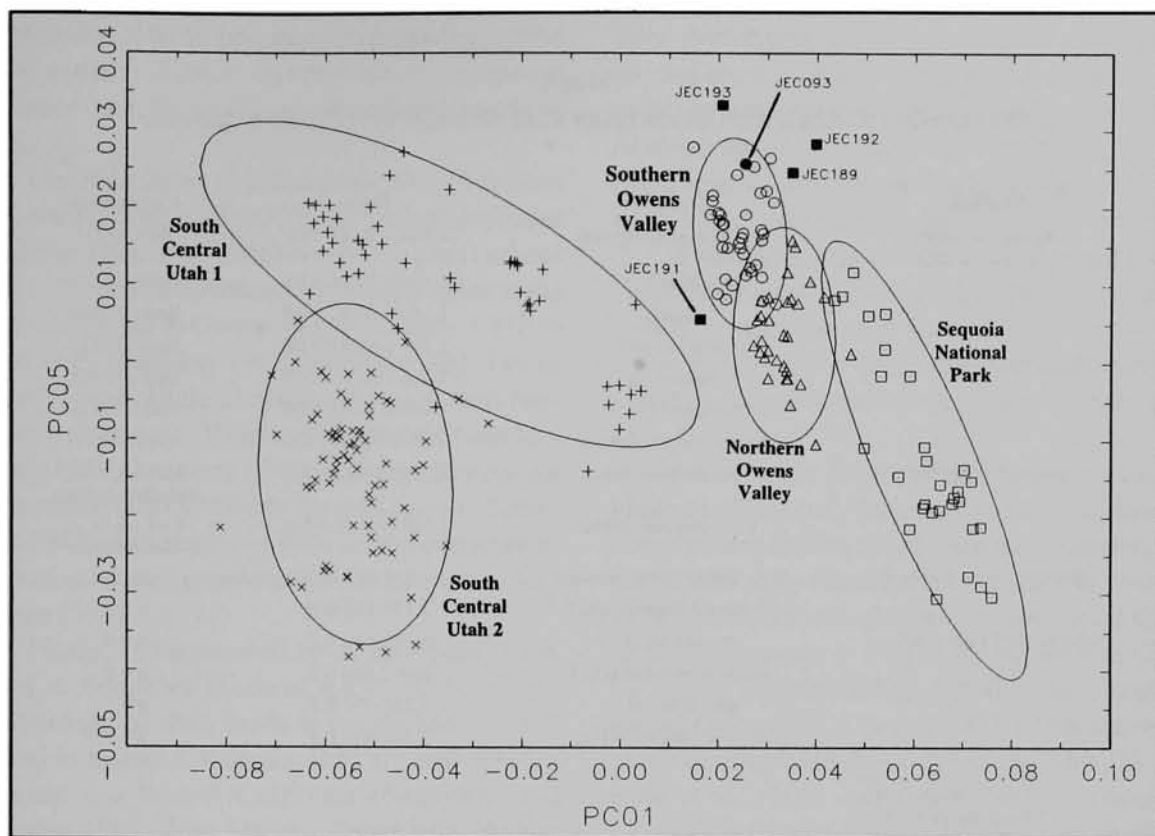


Fig. 3. Plot of principal components of southern Owens Valley, northern Owens Valley, Sequoia National Park, and south-central Utah sherds, showing separation of groups.

JEC193). One of these samples (JEC189) came from clays found within the Owens Lake playa, while the other two were collected from older lake bottom sediments exposed in cut banks of Cottonwood (JEC192) and Ash creeks (JEC193). All of these clays, like the sherds, contain large amounts of mica. A fourth residual clay (JEC-191) from decomposing granite on upper Cottonwood Creek did not match the composition of JEC093. Figure 3 supports this finding, showing JEC093 to be closer to the former three clay samples on the first and fifth components. Although the clays fall outside the 90% confidence ellipse for southern Owens Valley, it should be noted that they are untempered and may not represent the exact clay sources exploited by southern Owens Valley potters.

In short, these results demonstrate that despite similar construction characteristics, the vessel was

not imported from the Southwest, nor any other nearby area, but was produced from local southern Owens Valley clay. Furthermore, the pot appears to have been constructed from sedimentary clay, in contrast to the residual clays reported to have been used ethnographically (Steward 1933:266).

### CHRONOLOGY

Under most circumstances, two potsherds from a site in southern Owens Valley, an area with ample ceramic material, would not be especially noteworthy. What makes these items unusual is their age. Owens Valley pottery, first described by Steward (1928, 1933) and formally defined by Riddell (1951) as Owens Valley Brown Ware (OVBW), has generally been attributed to the Late Prehistoric Period only (Bettinger 1975, 1986, 1989; Madsen 1986; Pippin 1986; Basgall and

**Table 1**  
**CHRONOLOGICAL INFORMATION FOR SUNGA'VA (CA-INY-3806/H)<sup>a</sup>**

Method	Sample	Date	Comments
radiocarbon assay (uncalibrated)	agglomerated charcoal	1,160 ± 90 RCYBP	Beta-41115
	hearth	1,160 ± 60 RCYBP	Beta-113510
	hearth	1,180 ± 70 RCYBP	Beta-113509
	charred post	1,340 ± 60 RCYBP	Beta-135413
	burned log	1,400 ± 80 RCYBP	Beta-113508
	charred post	1,490 ± 70 RCYBP	Beta-135414
	agglomerated charcoal	1,600 ± 100 RCYBP	Beta-38751
obsidian hydration <sup>b</sup>	Coso obsidian flakes	1,107 B.P. (n = 54)	4.63 ± 1.19 μ, including outliers
	Coso obsidian flakes	1,004 B.P. (n = 52)	4.44 ± 0.64 μ, excluding outliers
projectile point typology <sup>c</sup>	Rose Spring Corner-notched	1,350-650 B.P.	n = 30
	Humboldt Basal-notched	3,150-650 B.P.	n = 2
<i>Olivella</i> shell bead typology <sup>d</sup>	tiny saucers (G1)	post-2,600 B.P.	n = 9
	saucer or wall disk (G2/J)	post-2,600 B.P.	n = 2
	split-drilled (C2)	1,250-950 B.P.	n = 1
	shelved punched (D1a)	1,250-950 B.P.	n = 1

<sup>a</sup> From Eerkens (n.d.)

<sup>b</sup> From Basgall (1990).

<sup>c</sup> Per Bettinger and Taylor (1974).

<sup>d</sup> Per Bennyhoff and Hughes (1987).

McGuire 1988; Griset 1988; Delacorte 1990). The earliest dated ceramics in Owens Valley come from Structure 13 at CA-INY-30 (Basgall and McGuire 1988), radiocarbon dated at 710 ± 70 B.P. (Beta-22294), or A.D. 1280, although Rhode (1994) dated one of these sherds by thermoluminescence to A.D. 1662 ± 49, casting doubt on either the association of the sherds to the house floor or the integrity of the radiocarbon date. However, the sherds from Sunga'va appear to date to the early Haiwee Period, some 400 to 800 years before the accepted age of the introduction of pottery to the region.

Seven radiocarbon dates, 54 obsidian hydration readings, 32 projectile points, and 13 beads demonstrate Sunga'va to be a single-component Haiwee Period occupation (Eerkens n.d.) (see Table 1). The radiocarbon evidence hints that the site may have seen two separate occupations, one around

1,450 B.P. and a second near 1,160 B.P. The sherd in Figure 2a was found in association with a house floor with a central hearth. This hearth was dated to 1,160 ± 60 B.P. (Beta-113510). Thus, pottery seems to be associated with the later occupation.

Hydration measurements on 54 artifacts from the Coso obsidian source corroborate the radiocarbon evidence (Eerkens n.d.). Using the hydration rate established by Basgall (1990; also see Basgall and McGuire 1988), an estimated age of 1,107 B.P. was obtained. Excluding two outliers over 9.0 μ—items possibly scavenged from older sites—a converted age of 1,004 B.P. was calculated, with a much smaller standard deviation. Hydration measurements on 10 of the Rose Spring points averaged 4.70 μ, with a standard deviation of 0.58, or 1,146 B.P. converted. The small standard deviation with-

in the suite of hydration measurements (minus the two outliers) further supports short occupation duration and the single-component nature of the site.

Chronologically sensitive projectile points from the site are restricted to 30 Rose Spring specimens and two Humboldt Basal-notched types (Eerkens n.d.). The former have been consistently dated to the Haiwee Period in Owens Valley, roughly 1,350 to 650 B.P. (Lanning 1963; Bettinger and Taylor 1974). Humboldt Basal-notched points are less temporally diagnostic (Thomas 1981; Basgall and McGuire 1988; Delacorte 1990), although they are not uncommon in early Haiwee Period deposits (Bettinger 1975), and appear to have served primarily as knives rather than projectile tips (Delacorte and McGuire 1993).

Finally, 16 marine shell beads have been recovered at Sunga'va (Eerkens n.d.). Although the chronology of shell beads is incompletely understood in eastern California, they are well dated in coastal and central California (Bennyhoff and Hughes 1987; King 1990). Types with chronological significance recovered from Sunga'va (four types, 13 beads) are restricted to forms occurring after 2,600 B.P. (Delacorte and McGuire 1993; Randy Milliken, personal communication 1999), and are dominated by tiny saucers made from *Olivella* shells. The uniformity of the projectile point and bead assemblages is highly unusual among open air sites in Owens Valley, which often contain a mix of artifacts from different time periods, and again testifies to the short temporal span of occupation.

## DISCUSSION AND CONCLUSIONS

The presence of two ceramic sherds made of local clay in an early Haiwee Period site in Owens Valley suggests that pottery making began in this region, at least in an experimental fashion, several hundred years earlier than previously thought. These early Haiwee Period sherds from Sunga'va are distinct from their later (Marana Period) and more common OVBW counterparts in that they

have overlapping coils that were not completely pressed together and scraped so as to remove exterior signs of coiling, and they are lighter in color. At this point, there are too few specimens to warrant a separate name or typological category. However, future excavations, particularly at Haiwee Period sites along the former lakeshore, may uncover additional sherds of this type. If so, this class of brown ware may warrant the definition of a new ware type, and may prove that early pottery making occurred much earlier than currently accepted.

Relative to the large and diverse lithic assemblage at Sunga'va, the small number of sherds demonstrates that ceramics were not an important part of the early Haiwee Period toolkit in Owens Valley. Excavations at other Haiwee Period sites or site components in Owens Valley, such as CA-INY-2596 (Burton 1986), CA-INY-30 (Basgall and McGuire 1988), CA-INY-3812 (Delacorte and McGuire 1993:238-253), CA-INY-3769 (Delacorte et al. 1995), and CA-INY-1428 (Gilreath 1995), have failed to identify ceramics, suggesting that this technology was not an important one. More important in this context may have been the experimentation with pottery technology, which appears to have been focused on sedimentary sources of clay, such as that found at Owens Lake. Indeed, most the sites listed above are located away from the shores of the lake or away from the lake altogether. Thus, it may be that early pottery use was geared towards the exploitation of lacustrine food resources, such as the processing of waterfowl (e.g., for the extraction of bone grease), the storage of brine fly larvae mush, or the cooking of starchy plants collected from the lakeshore. Continued use of pottery for these activities may explain the high density of sherds found in Marana Period sites around the lake.

The silty clay used to construct these vessels, along with incompletely pressed coils, indicate that these early pots were not very durable. Later potters may have found residual clays to be superior for pot construction, which would explain Stew-



ard's (1933:266) report that ethnographic Paiute used only residual clays. Given the similarity in construction style to contemporary Southwestern pottery, it is possible that Owens Valley inhabitants learned and emulated this technique through contact with people from that area. Corrugated pottery was being used along the Virgin and Colorado rivers in southern Nevada, some 150 miles east, at about the same time Sunga'va was occupied (Pierce 1998). Though not absent, there is only scant evidence for contact between these two areas. However, the lack of true corrugation on the Sunga'va sherds, the minimal evidence for contact or trade with the Southwest at this time, and the fact that these items are made of local clay suggest instead that pottery making was largely a local development in Owens Valley.

The presence of sherds within this older context implies that many California hunter-gatherer groups may have had at least passing knowledge of fired clay technology for quite some time, and may have made and used ceramics in expedient ways not conducive to preservation (e.g., see Leonard 1839:38). Archaeological sites in California occasionally have ceramics in earlier (i.e., pre-650 B.P.) contexts. For example, Drover (1975; also see Drover et al. 1979) dated fired clay artifacts by thermoluminescence from coastal Orange County to over 3,000 B.P. and from Catalina Island to over 2,000 B.P. (Drover 1978). Similarly, American Southwest-style painted ceramics dating between 1,000 and 2,000 B.P. are occasionally found in some California locations (e.g., Hunt 1960; Gilreath et al. 1987; Koerper and Hedges 1996). Yet for reasons unknown, awareness and knowledge of pottery was not used to develop more intensive ceramic technologies until much later in prehistory, after 650 B.P., when hunter-gatherers in many parts of California began to make and use pottery in larger quantities (e.g. Van Camp 1979; Waters 1982; Weaver 1986; Gilreath et al. 1987; Basgall and McGuire 1988; Lyneis 1988; Jackson 1990; Johnson 1990; Mack 1990).

Yet, this early awareness of and experimenta-

tion with pottery may have been important in setting the stage for the later development and intensification of ceramic technology, particularly in the southern Owens Valley. Pottery in this area is far more dense and diverse than in other parts of Owens Valley and the Great Basin (Weaver 1986; Touhy 1990:94). Several sites producing over 200 sherds have been recorded during survey and excavation in the southern Owens Valley (e.g., Basgall and McGuire 1988; Delacorte et al. 1995; Gilreath 1995; Eerkens 1997). Although these numbers pale in comparison to collections from the Southwest or Great Basin Fremont sites, they are substantial by late prehistoric Great Basin or Numic standards. In fact, there is evidence that by protohistoric times, Owens Valley populations may have even supported a small number of specialist potters (Steward 1933:266; Bettinger 1989:324). Small-scale experimentation over several hundred years may have allowed Owens Valley inhabitants to refine the knowledge and skills needed to develop the craft into a more viable, stable, and socially acceptable technology.

Why people began to make pottery in Owens Valley is currently unknown, but will be the subject of future research. However, it may be no coincidence that as people began to restrict their mobility in early Haiwee Period times (Bettinger 1982, 1989; Basgall 1989; Delacorte 1990; Basgall and Giambastiani 1992; Delacorte and McGuire 1993), they began to experiment with pottery making. The context of Sunga'va, including several intact house floors and a limited range of toolstone sources, suggests that its inhabitants practiced a restricted settlement pattern. The shift to a more sedentary settlement pattern during early Haiwee Period times may have made ceramic technology a viable and desirable alternative to basketry and other technologies previously used for cooking and/or storage (see Arnold [1985:109-125] for a discussion of the relationship between pottery making and sedentism).

Based on the small number of sherds at Sunga'va, experimentation with pottery in southern

Owens Valley probably began on a small scale. The importance of pottery in the material tool kit of Owens Valley inhabitants appears to have remained minimal until Marana Period times. Whether the craft was maintained on an informal and experimental scale from early Haiwee to Marana Period times or was abandoned after the early Haiwee Period and subsequently revitalized in the Marana Period is unknown. Additional excavations at lake-side Haiwee Period sites are sure to shed more light on this topic by showing either that the Sunga'va sherds are anomalous or that they form a minor but consistent part of early Haiwee Period material culture.

### NOTE

1. The Haiwee Period (see Bettinger and Taylor 1974) is also referred to as the Rose Spring or Rosegate Period (Thomas 1981). For the purpose of this report, the term Haiwee Period is used to avoid confusion, except when referring to the projectile points, which are commonly called Rose Spring points (Lanning 1963; Bettinger and Taylor 1974).

### ACKNOWLEDGEMENTS

Thanks to Michael Delacorte, Robert Bettinger, and an anonymous reviewer for reading and commenting on earlier versions of this report. Funding for this research was provided by the Wenner-Gren Foundation for Anthropological Research, University of California at Santa Barbara, and the Missouri University Research Reactor.

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