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Implications of Ritual Biface Caches from the Irvine Site

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Excavations at the Irvine site (CA-ORA-64) yielded two unusual cache features, each containing a pair of large ceremonial bifaces, but one of these caches also contained a plummet charmstone and a globular perforated stone. One biface was knapped of Buck Mountain obsidian, a northeastern California resource over 1100 km. from ORA-64. Two bifaces were fashioned of dull-gray glassy materials exotic to coastal southern California, and the fourth biface was made of Monterey chert. These large ritual bifaces indicate late Early Holocene or early Middle Holocene cultural connections between the northwestern Great Basin and Orange County.

Cached magico-religious stone objects are rare archaeological finds within territory held at contact by Gabrielino (Tongva) and Juaneño (Acagchemem) peoples. Some caches are characterized by the presence of only one category of ideotechnic object, while other groupings are formed of a mix of types. Some are associated with mortuary contexts, but others appear to stand apart from death rites.

Artifacts discovered in ceremonial caches include the following: cogged stones (e.g., Anonymous 1937a, 1938a; Eberhart 1961; Strandt 1965:23-24; Winterbourne 1968; Dixon 1968; Scientific Resource Surveys, Inc. 1996; Koerper and Mason 1998); "ball stones" (e.g., Anonymous 1937b, 1938a; Koerper et al. 1996:18); discoidals (e.g., Anonymous 1937a, b; Strandt 1965:23-24; Dixon 1975); "paddle-form" tablets (e.g., Anonymous 1938b; Koerper et al. 1996:4); phallic

pestles or "spikes," "birdstones," and various-sized perforated stones of notable lapidary quality (e.g., Anonymous 1935:4, 1937a; Winterbourne 1967:20-21, 155; Wallace 1987); shamans' paraphernalia (e.g., Winterbourne 1967:21-23, 44, 155); and "plummet" charmstones (e.g., Macko 1998). There are also certain distinctive large stone discs (e.g., Chace 1972; Irwin 1978:91; Koerper and Chace 1995:282) whose iconographic content might reproduce the symbolism in sacred ground paintings (Irwin 1978).

Excavations at CA-ORA-64 (Fig. 1), the Irvine Site, allow the addition of biface cache features to this list. Feature 400 contained two large concave-base ceremonial bifaces. Feature 578 contained two stemmed bifaces. A plummet charmstone and a perforated globular stone were also included in Feature 400. Such globular perforated stones are presumed to be magico-religious objects (Koerper and Singer 1988:67-68), as are plummet charmstones (e.g., Drover et al. 1983). This paper describes these ceremonial bifaces and other artifactual remains and suggests cultural connections between ORA-64 and the northwestern Great Basin. Dimensions for the four bifaces are provided in Table 1.

CA-ORA-64

Overlooking the Pacific Ocean and adjacent to the Santa Ana River Valley, the Irvine site was first occupied in the Early Holocene. During the first 4000 years of site occupation, the sea level rose between 20 and 25 m. to its current level, transforming the river valley into Newport Bay. Prehistoric abandonment occurred circa 4300 Calendar Years Before Present (CYBP) (Macko 1998:39-41). Excavations were first conducted at ORA-64 from 1971-1976 (see Drover et al. 1983); from 1994-1996, Macko, Inc. directed a large-scale mitigation program (Macko 1998).

The 1994-1996 excavation units revealed 772 features, of which about 600 contained human remains. Radiocarbon and other data allowed a division of the 45,000 m² site into eastern and western core areas (Fig. 2), the former with deposits generally older than 6000 CYBP, and the latter with deposits spanning the range from 9500

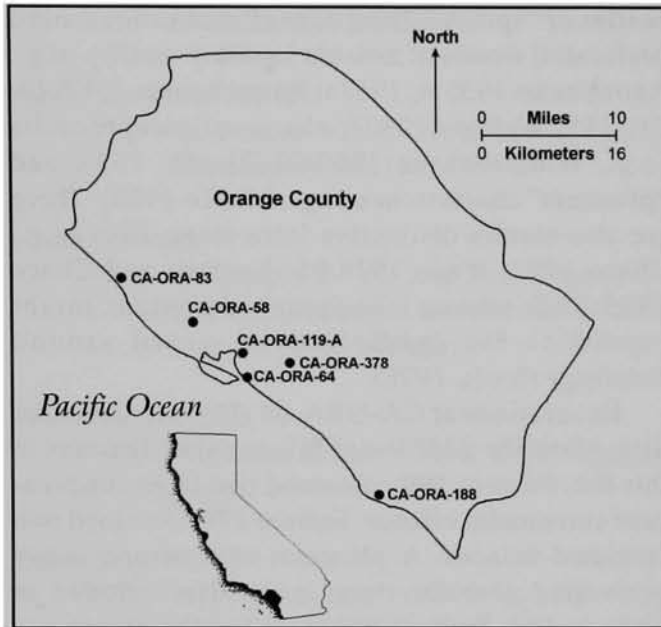


Figure 1. Location of CA-ORA-64.

to 4300 CYBP.

Shellfish, fish, avian, and sea and terrestrial mammal remains and diverse artifact assemblages indicate occupations during a significant portion of the year by small populations relying heavily on marine resources. The variety and abundance of technomic artifacts, as well as the remarkable diversity of sociotechnic and ideotechnic items (Macko 1998), indicate a wide range of activities. The latter artifact categories include over 350 shell beads (see Erlandson et al. 2005), over 200 stone beads, over 2100 bone beads, several pendants, numerous plummet charmstones, 70 ball stones, nearly 1000 discoidals, two cogged stones, several stone tubes, six globular perforated stones, 66 fired clay cylinders (many with punctate decoration) (see also Drover 1971; Drover et al. 1979,1983), and the cached ceremonial objects that are the focus of this report.

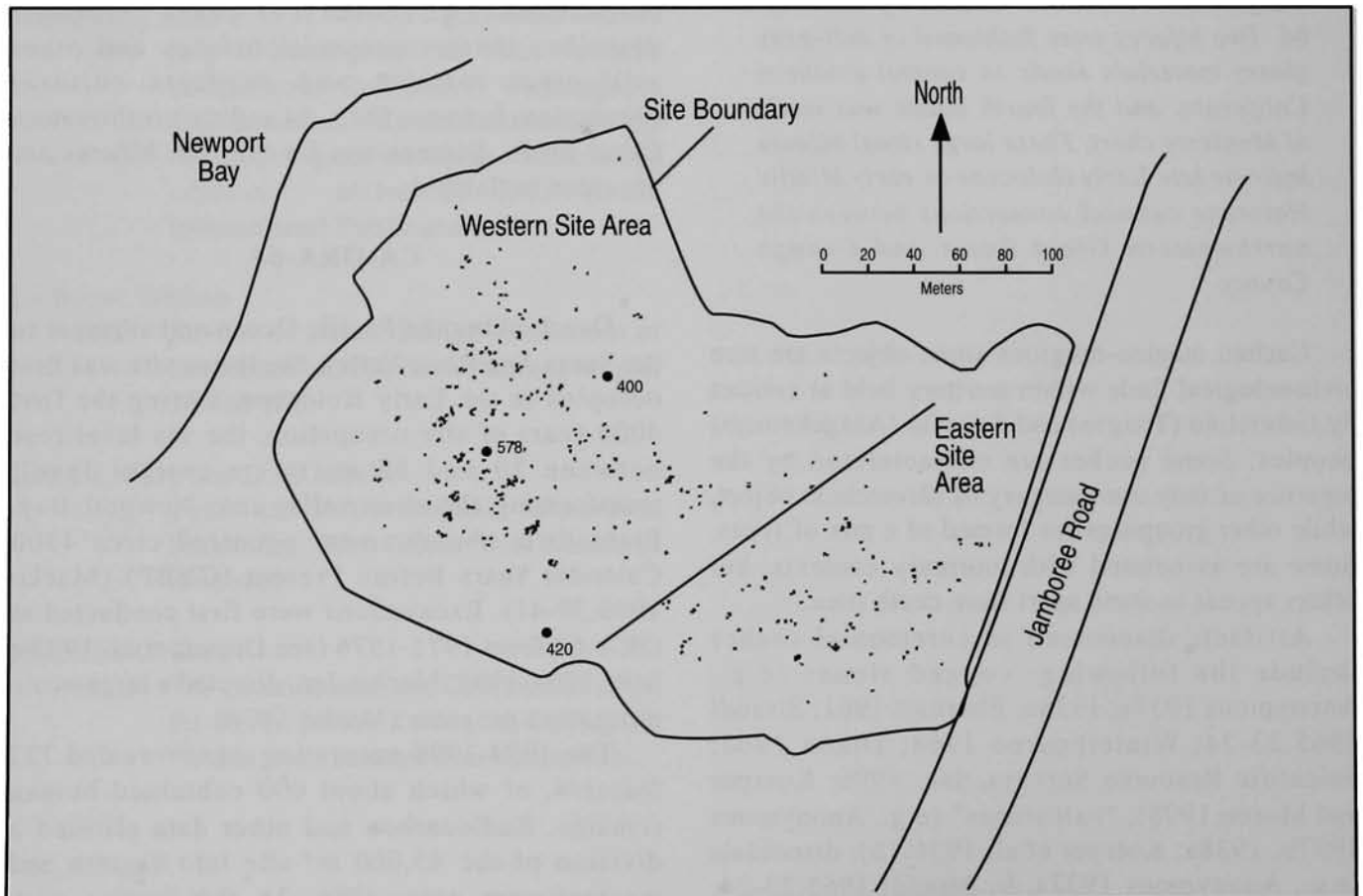


Figure 2. CA-ORA-64 site map. Location of features 400 and 578 in relation to locations of human remains and large ball stone Feature 420. Small dots identify locations of burial remains.

Table 1
Metric Analysis and Description of Bifaces

Cat #	15728	15729	17230	17229
Feature #	400	400	578	578
Material	Monterey Chert	Glassy Rhyolite?	Obsidian	Glassy Rhyolite?
Maximum Length (cm.)	22.7	26.6	25.2	30.1
Maximum Width (cm.)	6.4	8.9	7.7	8.5
Maximum Thickness (cm.)	1.48	1.82	1.5	1.35
Weight (g.)	221.55	430.02	290.27	340.08
Width At Base (cm.)	N/A	N/A	1.5	2.68
Distance Of Max. Width From Base (cm.)	9.5	9.8	6.7	10.5
Medial Length (cm.)	22.4	26.2	25.2	29.6
Distal Shoulder Angle, Notch A	N/A	N/A	150	150
Distal Shoulder Angle, Notch B	N/A	N/A	150	150
Proximal Shoulder Angle, Notch A	N/A	N/A	40	85
Proximal Shoulder Angle, Notch B	N/A	N/A	30	85
Notch Angle (A)	N/A	N/A	110	65
Notch Angle (B)	N/A	N/A	120	65
Location Of Max. Thickness From Distal End	10.8	19.5	10.5	10.2
Neck Width (cm.)	N/A	N/A	N/A	2.8
Maximum Width At Shoulders (cm.)	N/A	N/A	5.6	5.5
Depth Of Basal Concavity (cm.)	0.33	0.44	0.0	0.53
Cross-Section Form	Lenticular	Lenticular	Lenticular	Lenticular
Medial Form	Lenticular	Lenticular	Lenticular	Lenticular
Pressure Flaking Pattern On Blade, Face A	Perpendicular Parallel	Perpendicular Parallel	Perpendicular Parallel To Transverse Parallel	Perpendicular Parallel
Original Flake Scars On Blade, Face A	Absent	Absent	Absent	Absent
Impact Scars On Blade, Face A	Absent	Absent	Absent	Absent
Pressure Flaking Pattern On Blade, Face B	Perpendicular Parallel	Perpendicular Parallel	Transverse Parallel	Perpendicular Parallel
Original Flake Scars On Blade, Face B	Absent	Absent	Absent	Absent
Impact Scars On Blade, Face B	Absent	Absent	Absent	Absent
Basal Configuration	Concave	Concave	Stem	Split Stem
Method Of Manufacture Of Base, Face A	Pressure Flaking	Percussion Or Indirect Percussion	Notching Via Indirect Percussion	Notching W/ Pressure Retouch
Neck Thinning Method, Face A	N/A	N/A	N/A	Notching W/ Pressure Retouch
Method Of Manufacture Of Base, Face B	Pressure Flaking	Perpendicular Parallel	Notching Via Indirect Percussion	Notching W/ Pressure Retouch
Neck Thinning Method, Face B	N/A	N/A	N/A	Notching W/ Pressure Retouch

ORA-64 appears to have been a village site rather than a seasonal camp, and one that served at least for some significant period as a center of ritual activity. Tentatively, we favor a "collector" model, whereby inhabitants brought resources back to the central settlement, rather than a forager model, in which inhabitants moved to resources (see Binford 1980:5, 10-12, 15). A settlement subsistence shift of imperfectly understood

character occurred at ORA-64 that perhaps coincided with a stabilization of sea levels and the consequent growth of kelp beds.

FEATURE 400

Feature 400 (Fig. 3) was found in the western core area of the site; it consisted of two concave-base bifaces (Fig. 4), a plummet charmstone made

of a mottled beige/white siliceous concretion of the Monterey Formation (Figs. 3, 5a), and a globular perforated stone (Fig. 5b) made of a green metasediment. The artifacts had been deposited in a shallow pit dug into the shale bedrock, 82 cm. below the present ground surface. The bifaces were placed next to one another, pointing in opposite directions along an alignment of approximately 76 degrees east of magnetic north. The smaller (#15728), made of Monterey Formation chert, lay north of its larger dull-gray glassy partner (#15729). The charmstone lay south of this larger biface, while the globular perforated stone object was found beneath the base of specimen #15729, with the perforation oriented vertically.

The glossy dull-gray biface specimen (#15729) was subjected to non-destructive X-ray fluorescence (XRF) analysis (Table 2) at Geochemical Research Laboratory (Hughes 1996) as were the ceremonial points of Feature 578 (Table 2). Upon macroscopic inspection, both dull-gray glossy bifaces (#15729 from Feature 400 and #17229 from Feature 578) appear to be made of the same material, and look not unlike some low-silica rhyolites. Hughes (1996) reports seeing similar lithic materials in northern California, southcentral Oregon, and northwestern Nevada, stating also that "...I have observed glasses with these visual properties occurring in close proximity to more aphyric obsidians (for example, in the Warner Mountains of northeastern California)." An extensive search of the recovered debitage turned up no specimens of



Figure 3. Feature 400 in situ. Cylindrical plummet charmstone to right of larger biface.



Figure 4. Feature 400 bifaces.

this kind of material. We infer that the dull-gray bifaces were not knapped at ORA-64.

Upon XRF analysis of chemical composition, specimens #15729 and #17229 appear distinct, especially when the values for Sr (strontium), Y (yttrium), and Fe_2O_3 (ferric oxide) are compared (Table 2). The materials may be two different varieties of glass, but it is also possible that they are from a single source in which geochemical variability is considerable.

There were no matches to known sources for these two bifaces, whose materials are here called glassy rhyolites. The texture is glassy, to the degree that the term "rhyolitic obsidian" might be considered. Parenthetically, it is not uncommon to find a single flow unit having a variety of textural variations (one of which could be obsidian), all with the same

Table 2
Geochemical Data for Artifacts from CA-ORA-64,
Orange County California

Trace and Selected Minor Element Concentrations

Cat. Number	Zn	Ca	Rb	Sr	Y	Zr	Nb	Ba	Ti	Mn	Fe₂O₃^T	Obsidian Source (Chemical Type)
15729 (Fea. 400)	35 ±4	14 ±3	111 ±3	71 ±3	30 ±2	128 ±3	9 ±2	796 ±13	1011 ±22	355 ±13	1.30 ±.12	Unknown, (low-silica rhyolite?)
17229 (Fea. 578)	40 ±4	14 ±3	105 ±3	106 ±3	16 ±2	147 ±3	8 ±2	877 ±13	1394 ±24	387 ±13	1.71 ±.12	Unknown, (low-silica rhyolite?)
17230 (Fea. 578)	41 ±4	12 ±3	105 ±3	62 ±3	16 ±2	89 ±3	8 ±2	644 ±13	651 ±20	429 ±13	.97 ±.12	Buck Mountain, Warner Mtns.

All trace element values in parts per million (ppm) except total iron [in weight %]; ± = pooled expression (in ppm and, for total iron, weight %) of x-ray counting uncertainty and regression fitting error at 300 seconds livetime.

trace element characterizations (C. Skinner, personal communication 1997).

The specific source for the Feature 400 Monterey chert biface (#15728) is unknown, but there are numerous locations along the southern California coast that could have provided source material. Although ORA-64 rests upon bluffs underlain by the Monterey Formation, we know of no locally available seam providing large enough pieces of workable stone to produce a biface 23 cm. long. Suitable Monterey chert could have come from quarries on the mainland to the north (see Weide 1973; Spanne 1975; King 1976:312; Glassow 1977, 1981; Grivetti 1984; Rudolph 1984; Johnson 1985:54-55; Arnold 1987) or from Santa Cruz Island (see King 1976:312; Glassow 1977; Arnold 1987).

The Monterey chert biface (#15728) was very evenly pressure flaked (Table 1), with flakes being narrow (3 to 4 mm.) and short (averaging about 5 mm.). The pressure flaking was meticulously executed to produce a denticulate margin not found on the other three bifaces. Pressure flake platforms were set opposite one another to create the denticulation. In contrast, its glassy rhyolitic partner (#15729) has the most irregular pressure flaking of the four specimens.

Flaking on this biface was multidirectional and noninvasive (<5 mm.), the latter resulting in steep-sided margins. The concave base of the chert specimen was carefully manufactured via pressure reduction. The concavity on its larger partner appears to have been made via percussion (Table 1). This resulted in steep-sided margins in the concavity, effectively stopping further shaping due to an increased risk of end shock.

FEATURE 578

Feature 578 (Fig. 6) was found 60 m. southwest of Feature 400 in the western core area of the site; it consisted of two stemmed-base bifaces (Fig. 7). These artifacts were recovered from a shallow depression dug into the shale at a depth of 134 cm. below ground surface. The two bifaces lay with their points oriented to approximately 21 degrees east of magnetic north.

The larger specimen (#17229) was manufactured of a dull-gray glassy rhyolite (Table 2) as was specimen #15729 from Feature 400 (see discussion above). The smaller biface (#17230), made of highly aphyric obsidian with distinctive red and black banding, is identified as originating from the Buck

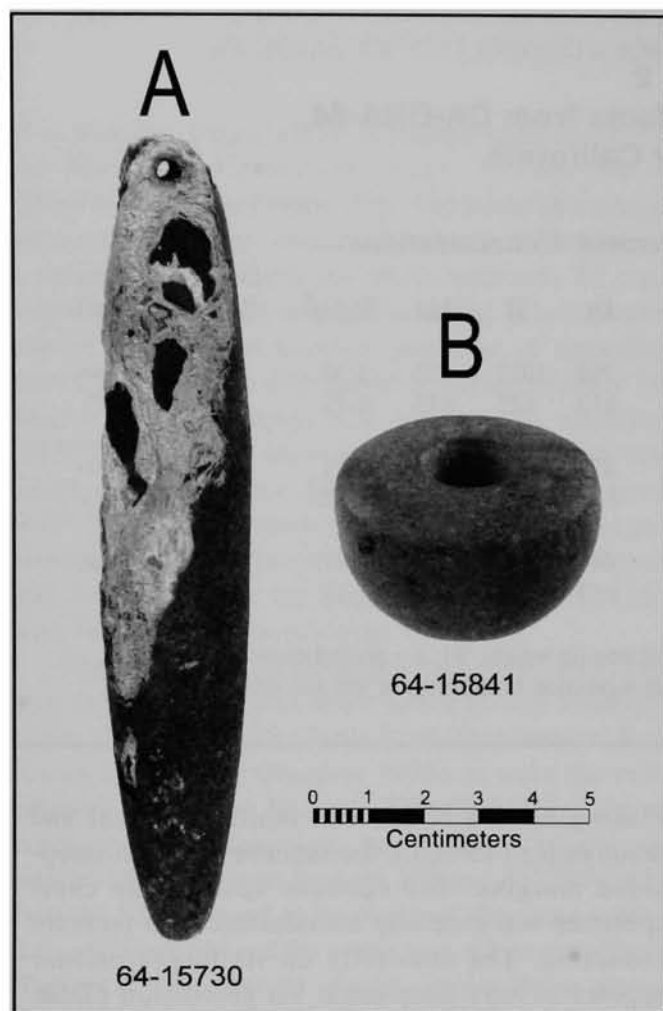


Figure 5. Feature 400 Artifacts; a, plummet charmstone; b, globular perforated stone.

Mountain source (Fig. 8) located in the Warner Mountains, Modoc County, California (Hughes 1996). Obsidian flakes and tools from this source are rare in archaeological sites in the lower Sacramento Valley and have not been previously reported from sites south of San Francisco Bay (Hughes 1996). No debitage with red-and-black banding was identified during a careful search through the ORA-64 debitage collection. We believe it highly unlikely that the biface (#17230) was manufactured locally.

Specimen #17230 was subjected to obsidian hydration analysis. Three rinds were measured by Glenn Russell and Mike Gottesman (OHL 16080, 16081, and 16082), yielding readings of 10.0 μ , 12.1 μ , and 11.6 μ respectively. Assuming variable rind-growth time between northeastern California and

ORA-64, it is estimated that the obsidian biface "has probably been in southern California for 5000 years or more" (M. Gottesman, personal communication 1999).

Pressure flaking of the glassy rhyolite biface (#17229) is regular, resulting in a perpendicular/parallel pattern that invades both faces an average of approximately 1 cm. (Table 1). Pressure flakes on the bottom third of the blade are 1/2 to 2/3 the width of the flake scars on the rest of the artifact and are not as intrusive. Shaping of the split stem resulted from notching and pressure flaking.

The red-and-black obsidian biface (#17230) has the most regular and invasive pressure flaking of the four bifaces (Table 1). The flaking pattern is perpendicular to transverse parallel, very regular, and on average invasive to approximately 2 cm. The single stem base was formed by a combination of margin raking and indirect percussion, as indicated by exceptionally large notching flake scars. (Raking refers to drawing a tool against and perpendicular to the lateral margin of the target stone.)

FUNCTION

Use wear analysis of the four bifaces followed certain models presented in Hayden (1979). The four bifaces were examined under a binocular microscope using a range of powers from 10X through 30X. Considerable polish was seen on the arrises of the faces. (An arris is a plend, or a hip, line, or ridge formed when two surfaces meet at an exterior angle.) The higher the arris, the greater the polish. This polish could have resulted from heavy or repeated handling or from curation or transportation of the bifaces while wrapped in a soft material, such as hide. No use wear was evident on the margins of these artifacts. That is, the margins lacked dulling, rounding, striations, polish, step fractures, bending fractures, and micro-chipping. The margins look intact, virtually as pristine as the day they were made. To summarize, the bifaces show only the characteristics of manufacture, with the exception of the aforementioned polish on the arrises.

A variety of observations allows the reasonable inference that the bifaces were not functional tools. Highly exotic lithics are unusual material choices for utilitarian objects. Exceptional care in manufacture

casts additional doubt on the utilitarian hypothesis. The morphologies mimic those of projectile points, but the extreme sizes would make for unwieldy hunting implements. Either length or width to thickness ratios disqualify the bifaces for any employment that would load forces onto the artifacts. They would simply snap or shatter, a sad fate for objects so beautifully crafted from rare stone. The accumulation of polish, coupled with a complete lack



Figure 6. Feature 578 bifaces in situ.

of normal use wear or damage further makes the case. The circumstances surrounding final disposition, particularly the association in Feature 400 of one paired set with two other artifacts presumed to be of magico-religious import, suggest the signature of sacred caches. The nonutilitarian nature of the bifaces thus separates these caches analytically from other biface caches deemed "economic" (e.g., Rick and Jackson 1992; Scott, et al. 1986).

ORA-64 contained evidence of about 600 human burials. Since no human remains were found in direct association with either biface cache, the cache features appear more representative of items of cultural patrimony than of mortuary goods specific to a single burial or even one of the many multiple burial groups. Pastron and Walsh (1989:85-87) have suggested that "certain goods may be placed in cemeteries independently of any single mortality."

DISCUSSION

Several categories of artifacts suggest that contact between the Great Basin and Orange County occurred

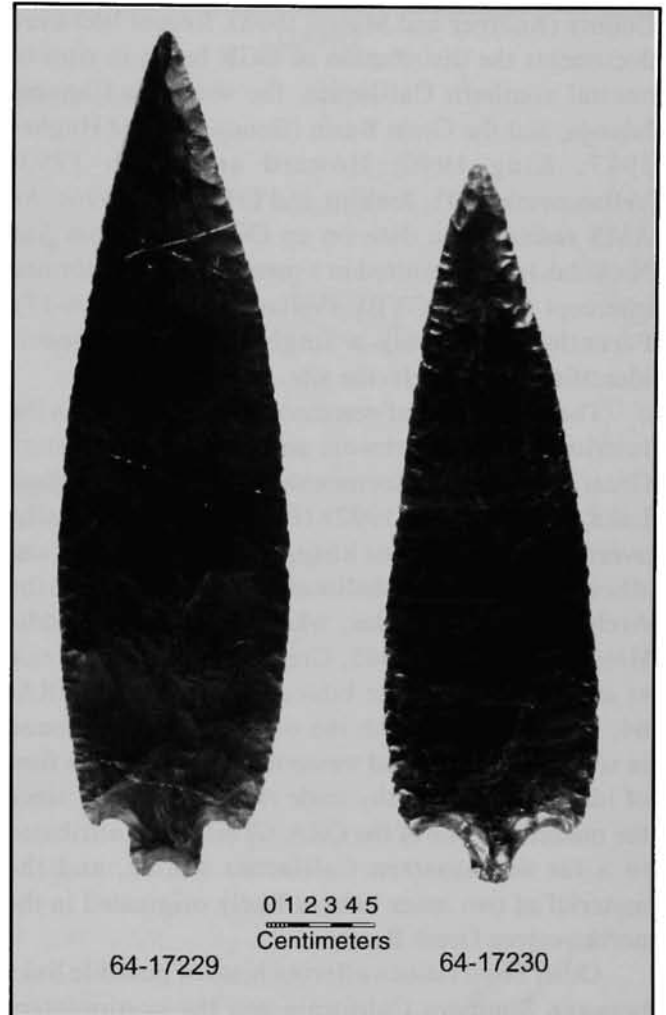


Figure 7. Feature 578 bifaces.

well before the Late Holocene. For instance, limited down-the-line exchange (Renfrew 1972) characterized the flow of Coso obsidian from Inyo County into the Los Angeles Basin (Koerper et al. 1986; Ericson et al. 1989). Even volcanic glasses from Mono County and Mineral County, Nevada, have been recovered in Orange County (Koerper et al. 1986).

Other categories of artifacts establishing long distance trade connections include cogged stones and Olivella grooved rectangular (OGR) beads. Two cogged stones, a Los Angeles Basin invention, have been found in Inyo County, one from Darwin and another just north of Little Lake (Eberhart 1961:365; Herring 1968:12; McKinney 1968:40; Koerper and Mason 1998). The greatest concentration of cogged stones is along the lower Santa Ana River, Orange

County (Koerper and Mason 1998). Recent literature documents the distribution of OGR beads in sites of coastal southern California, the southern Channel Islands, and the Great Basin (Bennyhoff and Hughes 1987; King 1990; Howard and Raab 1993; Vellanoweth 1995; Jenkins and Erlandson 1996). An AMS radiocarbon date on an OGR bead from San Nicholas Island resulted in a mean 1 sigma calibrated intercept at 5385 CYBP (Vellanoweth 1995:16-17). Parenthetically, only a single OGR specimen is identified from the Irvine site.

The occurrence of ceremonial biface caches in the Interior Pacific Northwest and in the northwestern Great Basin is well documented; e.g., at the Malheur Lake sites (Oetting 1992) (Fig. 8). Parenthetically, oversized ritual bifaces knapped out of obsidian and siliceous material are hallmarks of the Western Idaho Archaic Burial Complex, which dates to the Middle Holocene (Pavesic 1985; Green et al. 1986; Pavesic et al. 1993). The large bifaces discovered at ORA-64, in conjunction with the oversized bifaces found in southern Oregon and western Idaho, suggest a flow of ideas along a lengthy trade route, especially since the material of one of the ORA-64 bifaces is attributed to a far northeastern California source, and the material of two other bifaces likely originated in the northwestern Great Basin.

Other observations offering hints of possible links between Southern California and the northwestern Great Basin include the presence of well-shaped ground stone balls in both locations. Symmetrical ball stones are found from Ventura County (e.g., Greenwood and Browne 1963:48; Greenwood 1969:25, 27; Rosen 1978:46), Los Angeles County (e.g., Treganza and Malamud 1950:150, Plate 24; Walker 1951:23; Peck 1955; Ruby 1961:200), Orange County and into San Diego County (e.g., Shumway et al. 1961:29-30; Warren et al. 1961:16, Table 1, Plate 4; Crabtree et al. 1963:333, Table 1, Plate 2; Gallegos 1991:29-30). Sometimes they occur in groupings. For instance, at CA-ORA-58, three perfectly round granite balls were found with a child burial (see Koerper et al. 1996:18-19). Two had diameters of 67 mm., and the third had a diameter of 66 mm. A 67 mm. diameter granite ball was recovered with another burial. In the final WPA document dealing with ORA-58 (Anonymous 1938a), three granite balls were reported to have been exhumed as a cache, but not in

association with a burial; two were 60 mm. and one was 61 mm. in diameter.

Sixty-nine ball stones were unearthed during the 1994-1996 excavations at ORA-64 (Macko 1998:115), in addition to the one reported by Drover et al. (1983:17). Two artifacts the size of bowling balls (Fig. 9) were found cached together (Feature 420); the smaller weighed 11.381 kg. and the larger weighed 11.793 kg. Parenthetically, the only two larger ball stones that we are aware of are two sandstone balls about a foot in diameter, showing rough shaping done with hammerstones, and they were found at a ceremonial site in San Fernando, Los Angeles County (Walker 1951:23).

Well-shaped ground stone spheres have been found at several locations in the northwestern Great Basin (D. Jenkins, personal communication 1997). For example, two basalt balls, nearly identical in size (weighing 2.787 kg. and 2.793 kg.) were discovered at two sites at Malheur Lake (Oetting 1990). The lighter one had a maximum diameter of 12.85 cm., while the heavier one was 12.90 cm. in diameter.

CONCLUSIONS

The biface cache features described here provide evidence for ritual behavior at ORA-64, and add new variety to the list of locally recovered ritual caches. The two discoveries suggest that perhaps other oversized projectile-shaped bifaces found in Orange County, though not in any artifact grouping, were similarly employed in nonutilitarian contexts. We are aware of several such artifacts, including an obsidian specimen from CA-ORA-83, the Cogged Stone site (Herring 1968:20), and a specimen from CA-ORA-188 (Strandt #79) that is curated at the Bowers Museum of Cultural Art, Santa Ana.

This paper documents the remarkable occurrence in Orange County of obsidian from Buck Mountain, in the Warner Mountains, northeastern California. Such material is rare in lower Sacramento Valley sites and either absent or virtually absent from sites south of San Francisco Bay (Hughes 1986, 1996). Our study also documents an additional category of material exotic to Orange County, a dull-gray glassy rhyolite (or rhyolitic obsidian?) of unknown origin, but similar at the macroscopic level to lithics found in the northwestern Great Basin.

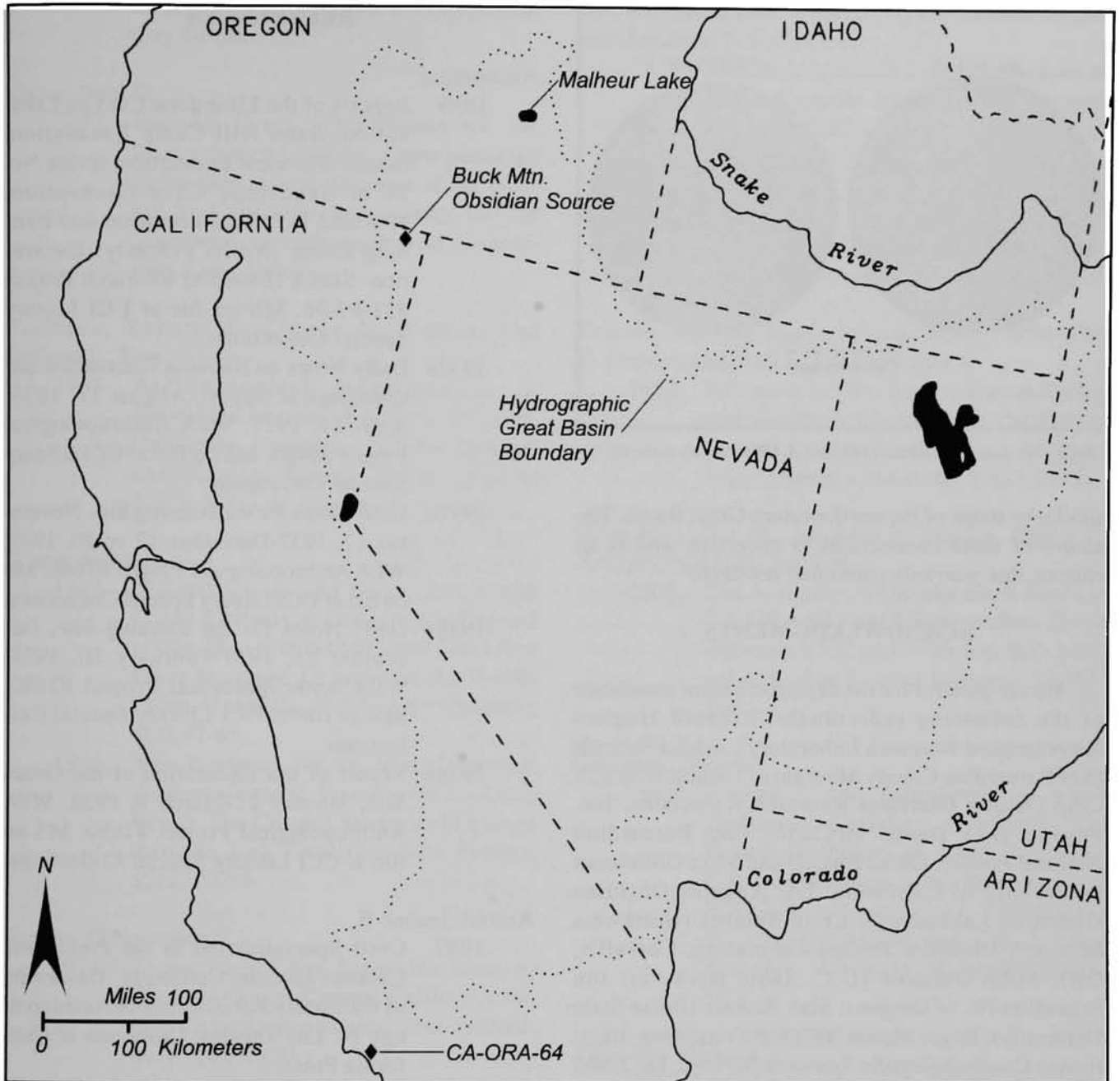


Figure 8. Map after Grayson (1998) showing distance between CA-ORA-64 and the Buck Mountain obsidian source.

The four-artifact clustering of Feature 400 included a distinctive globular perforated stone. Its direct association with two oversized bifaces and a plummet charmstone offers support for the interpretation of Koerper and Singer (1988:67) that this artifact type had ritual significance.

Limited trade interactions between the western

Great Basin and southern California are implied in the distribution of certain kinds of goods (e.g., obsidian and shell beads). The ORA-64 data suggest connections that extended much further north into the Great Basin than previously recognized. These data include not only the observations afforded by Features 400 and 578, but also by the ball stones (Feature 420),

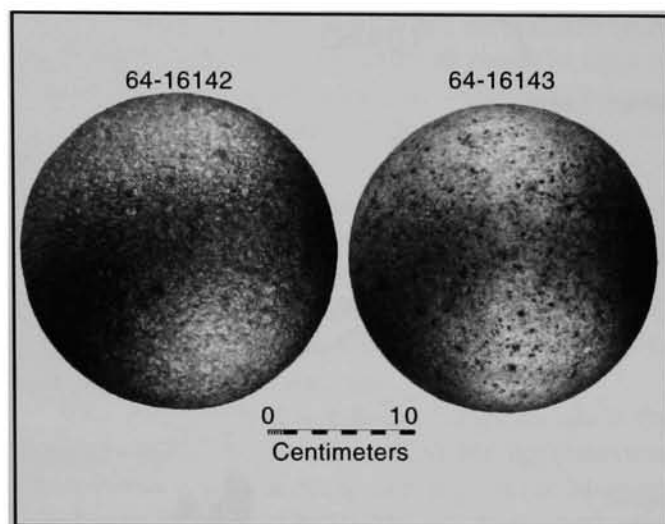


Figure 9. Large ball stones from CA-ORA-64 (Feature 420).

similar to those of the northwestern Great Basin. The nature of these connections is uncertain, and is an enigma that warrants continued research.

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