Early Archaic Fired and Modeled Clay from Inland Southern California

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Abstract

This paper describes a fired and modeled clay assemblage from CA-RIV-6069, the Lakeview site, a deeply buried cultural deposit with no indication of surface ceramics. Represented are a variety of fired clay artifacts and possible vessel rim fragments. Chronometric dating of the site suggests a Late Archaic component preceded by Early and Middle Archaic components, making the Lakeview site one of the oldest, if not the oldest, archaeological site containing pottery yet excavated in California.

Introduction

This paper describes a fired and modeled clay assemblage (Griset 2008a) from CA-RIV-6069 (Figure 1), the Lakeview site, a deeply buried cultural deposit discovered in 1998 during archaeological investigations by Applied EarthWorks, Inc. for the Metropolitan Water District of Southern California (MWDSC) Inland Feeder Pipeline Project. The Inland Feeder is a pipeline and tunnel system delivering water from the Colorado River Aqueduct near San Jacinto to the East Branch of the California Aqueduct in San Bernardino County (MWDSC 1993; McDougall et al. 2007).

RIV-6069 (Figures 2 and 3) is one of nine deeply buried prehistoric sites found during the implementation of a subsurface testing program developed for the Inland Feeder project (Onken and Goldberg 1998). A detailed report of archaeological investigations and findings at this site is presented in *CA-RIV-6069: Early Archaic Settlement and Subsistence in the San Jacinto Valley, Western Riverside County* (Horne and McDougall 2008).

The Lakeview site is situated on the well-drained distal portion of an alluvial fan emanating from the northern edge of the Lakeview Mountains and largely contained within a mountain front cove, just above the floor of the San Jacinto Valley and south of the San Jacinto River. The expansive plain north of the agricultural fields is the Mystic Lake basin, which periodically fills with overflow from the San Jacinto River that drains the western slopes of the San Jacinto Mountains. In prehistoric times Mystic Lake was likely a permanent water source.

When first discovered during the testing program, the site had no surface expression. During trenching, cultural deposits were encountered from 30 to 390 cm below the modern ground surface. The largest deposit extended 150 to 350 cm deep within weakly altered alluvial fan deposits emanating from the Lakeview Mountains to the immediate south. Soil development and the stratigraphic context of the cultural deposits suggest that the upper, more recent cultural component at RIV-6069 is of Late Archaic age (ca. 4,000 to 1,500 BP; Goldberg et al. 2001), while the lower cultural component dates to the Early and Middle Archaic (ca. 9,500 to 4,000 BP) (Goldberg at al. 2001). These age estimates are supported by 10 radiocarbon assays on charcoal from cultural features and/or deposits, one thermoluminescence date derived from a large, purposefully formed and fired clay artifact, and 11 obsidian hydration dates.

An extensive assemblage of cultural materials was recovered during the various phases of investigation at

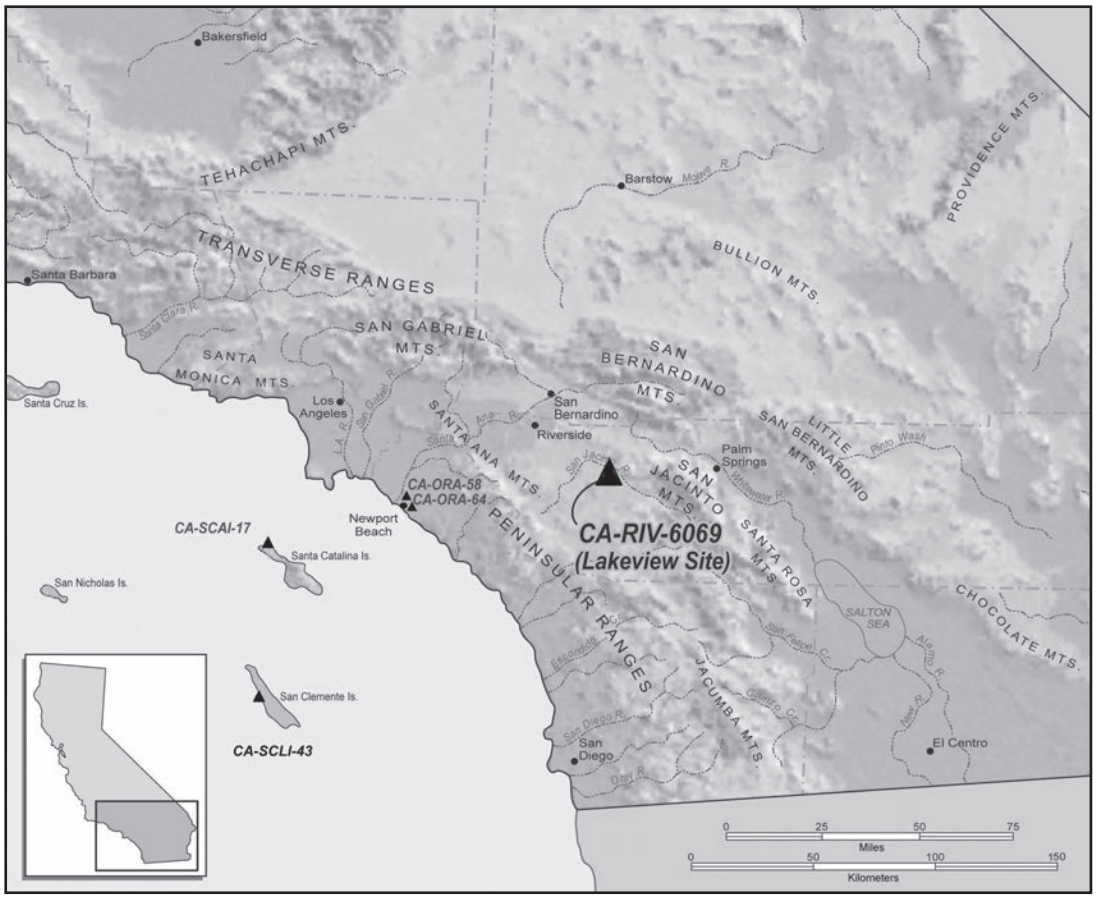

Figure 1. Location of archaeological site CA-RIV-6069 (star) and local geomorphic features. Locations of CA-ORA-58, CA-ORA-64, and sites that yielded pottery on the Channel Islands.

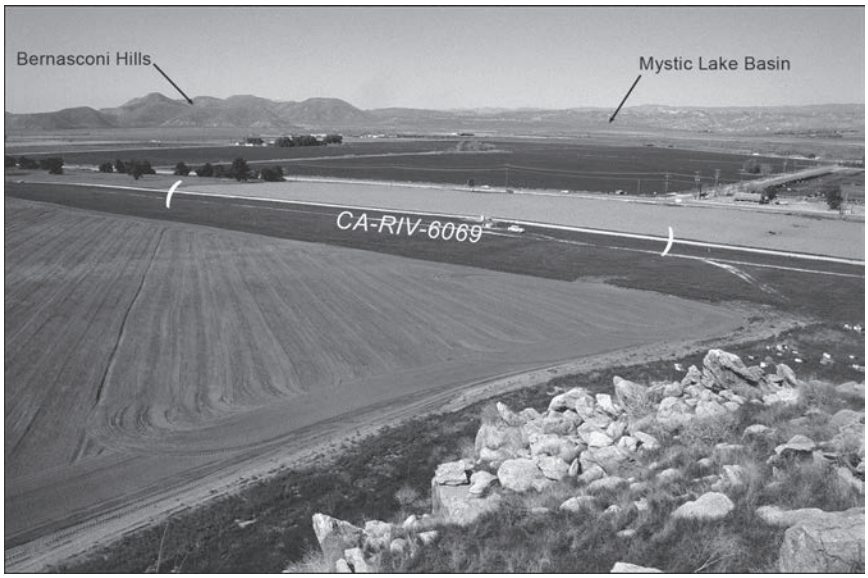

Figure 2. View over the CA-RIV-6069 archaeological site (light lettering at center) from the Lakeview Mountains, looking northwest towards the Bernasconi Hills and Mystic Lake basin. The Inland Feeder is shown as a linear strip of vegetation bordered to the north and south by disked agricultural fields; the western and eastern boundaries of CA-RIV-6069 are demarcated by curved white lines.

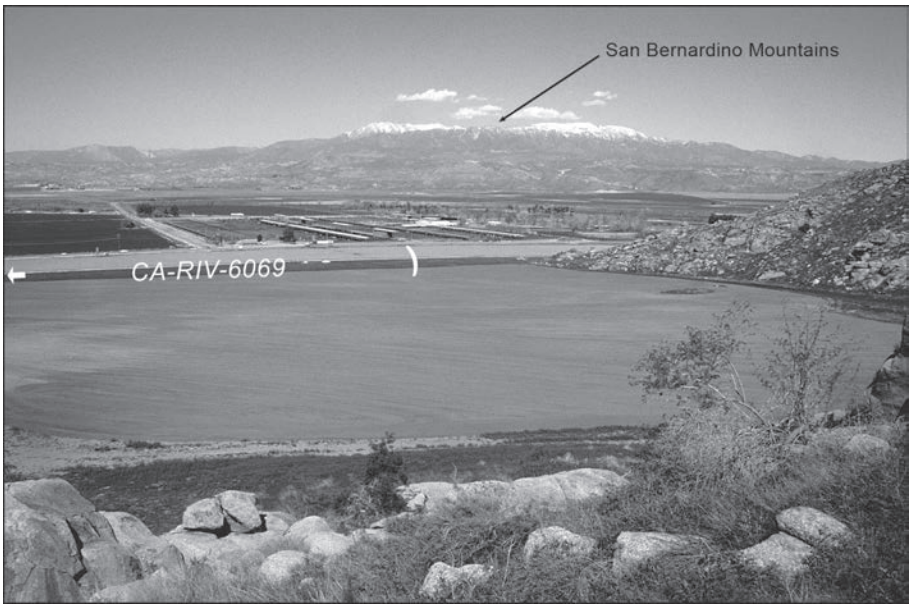

Figure 3. View of CA-RIV-6069 from the Lakeview Mountains, looking north towards the snow-capped San Bernardino Mountains. The western portion of the site continues to the left.

RIV-6069 (Horne and McDougall 2008:43–60). Fifteen discrete cultural features were identified, including intact fire hearths, caches of ground stone artifacts, concentrations of artifacts, fire-altered rock, and unmodified cobbles representing remnants of activity areas (Horne and McDougall 2008:103–124).

Cultural materials include: several hundred ground stone tools (manos, metates, discoidals, stone spheres, ground stone fragments, pestles, one small bowl, one rectanguloid object, and one palette); flaked stone tools (dart points and point fragments, other bifaces, cores and core/cobble tools, patterned and unpatterned flake tools); and approximately 2,500 pieces of lithic debitage (Horne and McDougall 2008:125–248). More than 90 percent of the lithic artifacts (including formed tools and debitage) were manufactured from locally available materials (i.e., quartz and quartzite for flaked stone artifacts and quartz, quartzite, and granitic rocks for ground stone tools). Among the imported lithic materials are various forms of cryptocrystalline silicates, obsidian, metavolcanic materials, water-polished pebbles, pieces of red ochre, quartz and tourmaline crystals, and small sandstone concretions that were split and ground to create stone bowls. The latter occur in various stages of manufacture. Other cultural materials include worked animal bone, an abalone (*Haliotis* sp.) shell pendant, unmodified marine shell, approximately 6,000 fragments of mammal bone (both burned and unburned), and fired and modeled clay fragments (Horne and McDougall 2008). The latter (Griset 2008a) are the subject of this paper.

The vertical distributions of cultural materials and features indicate that two stratigraphically and temporally discrete cultural components exist at RIV-6069. The upper component—Analytic Unit (AU) 1—ranges in depth from approximately 150 to 240 cm below the modern ground surface and contains very sparse quantities of formed tools, lithic debitage, and burned and unburned fragments of animal bone. Three cultural features were also investigated in the upper component assigned to AU 1 (Horne and McDougall 2008). The lower, earlier cultural component, assigned to AU 2, ranges in depth from 270 to 390 cm and produced relatively large quantities of flaked and ground stone tools, lithic debitage, burned and unburned fragments

of terrestrial animal bone, marine shellfish remains, and 12 cultural features.

Chronometric data indicate an occupation range from ca. 9500 to 2100 cal BP. Table 1 shows conventional and calibrated age determinations for the 10 radiocarbon-dated charcoal samples. Sample Beta-122674, collected from a hearth (Feature 1), dates the upper component to 2340–2115 cal BP. A second sample (Beta-119095), found beneath an inverted basin metate in Feature 9, provides a minimum age of 7515–7355 cal BP for the underlying stratum (Stratum Qof_2). Two samples from Feature 15, located in infilled channel sediments (Stratum Qyf_1), yielded dates of 9220–8945 cal BP (Beta-121832) and 9040–8940 cal BP (Beta-121657). The remaining six samples came from Stratum Qof_2 and yielded dates ranging from 9475 to 8530 cal BP (Table 1).

One large fired and modeled cylindrical ceramic object (Specimen 1564-1) from 278 cm depth was subjected to thermoluminescence (TL) analyses. The TL date for this specimen is 6,000 ± 600 BP. Although this is considerably younger than the radiometric assay from the same excavation level that yielded Specimen 1564-1 (Beta 122677, 8170 ± 60 BP, 9260–8965 cal BP), the thermoluminescence analyst J. Feathers observed that this specimen suffers from "anomalous fading," wherein the derived date can only be a minimum age (Horne and McDougall 2008:Appendix A). Utilizing a correction procedure for anomalous fading, Feathers obtained a corrected date of 10,100 ± 2,200 BP. Although the error is quite large because of uncertainties in determining the anomalous fading rate, the corrected thermoluminescence results are consistent with the suite of radiometric assays from AU 2 that range from 8975–8530 to 9475–9215 cal BP (J. Feathers, personal communication 1998).

Table 1. Radiometric Data Summary for CA-RIV-6069.

Lot No.	Lab No.	Stratum	Feature	^{14}C Age (BP)	Cal. Date BP (2 sigma)	Comments
1167-1	Beta-122674	Qyf_2	1	2230 ± 50	2340–2115	Charcoal from hearth (Feature 1), 234–240 cm below MD3[a].
1202-1	Beta-122675	Qof_2	–	7940 ± 70	8975–8530	Charcoal from 350 cm below MD3 in TEU 22; associated with ceramic Specimen # 1200.
1370-1	Beta-122676	Qof_2	–	8370 ± 70	9475–9215	Charcoal from 320 cm below MD3 in TEU 30; ceramic Specimen # 1366 recovered from 300–310 cm level of TEU 30.
1496-1	Beta-122673	Qof_2	4	8210 ± 60	9365–8980	Charcoal from Feature 4 (use surface) 274–283 cm below MD3; associated with ceramic Specimen #1495.
1567-1	Beta-122677	Qof_2	–	8170 ± 60	9260–8965	Charcoal from 280 cm below MD3 in TEU 40; associated with ceramics Specimens #1560, 1564, 1568
1845-1	Beta-119095	Qof_2	9	6550 ± 50	7515–7355	Charcoal from metate and ground stone cache (Feature 9), 324 cm below MD3. Provides minimum age of stratum Qof_2.
1898-21	Beta-121657	Qof_2	15	8090 ± 50	9040–8940	Charcoal from hearth (Feature 15), 359–370 cm below MD3.
1899-8	Beta-121832	Qof_2	15	8120 ± 60	9220–8945	Charcoal from hearth (Feature 15) 359–370 cm below MD3; associated with ceramic Specimen #1891.
2178-1	Beta-120303	Qof_2	11	8100 ± 40	9025–8955	Charcoal from use surface (Feature 11), 324 cm below MD3; associated with ceramic Specimen #2182.
2178-1	Beta-117491	Qof_2	–	8010 ± 40	8980–8670	Charcoal from 314 cm below MD3 in TEU 15.

[a] MD3 = Mapping Datum 3.

In summary, radiometric data suggest that the earliest occupation of RIV-6069 occurred approximately 9,500 years ago and continued sporadically until approximately 8,900 years ago. Following what appears to have been an occupational hiatus of approximately 1,400 years, RIV-6069 was occupied once again about 7,500 years ago, during the later portion of the Early Archaic, or the early portion of the Middle Archaic. The final occupation of RIV-6069 occurred approximately 2,300 to 2,100 years ago, during the Late Archaic.

Fired and Modeled Clay Assemblage from CA-RIV-6069

Thirty-six fired and modeled clay artifacts were recovered from the site (Table 2 and Figures 4–12). Two of these came from AU 1: Specimen 648-2 (a possible bowl wall fragment) at 140–150 cm depth (Figure 5e) and Specimen 767-4 (a tapered cylinder fragment) at 180–210 cm depth (Figure 6a). Neither is dramatically different in shape or material from the specimens found in the older cultural deposits of AU 2, and given the vagaries of excavation with large equipment, some mixture might have occurred during the investigations. The remaining 34 clay artifacts were recovered from AU 2 and radiocarbon dated to times between 9475 and 8530 cal BP (Table 1).

Given the antiquity of these fired clay specimens and their potential value for understanding local and regional prehistory, Applied EarthWorks, Inc. consulted Pamela Vandiver in October 1998 and invited her to analyze the ceramics.[1] Vandiver measured the specimens, determined hardness on the Mohs scale, examined composition and microstructure, and performed water dissolution tests to determine if certain specimens had been subjected to fire. The results of those examinations were provided to Applied EarthWorks, Inc. and reported in Horne and McDougall (2008:Appendix E-1). Other obligations prevented Vandiver from completing a report, and in early 2004 one of us (SG) was asked to examine and report on the specimens. An advantage of this combined assessment is the pairing of a materials science approach with a traditional archaeological ceramic analysis approach. Vandiver is more familiar with early Old World and Asian ceramics; Griset has extensive experience with California archaeological sites and with the types of clay artifacts and baked forms found in these contexts. Griset analyzed each specimen both macroscopically and microscopically, studied digital images provided by Applied EarthWorks, Inc. under various magnifications and differential lighting, and then compared her findings with those of Vandiver.

Table 2 provides descriptive data for these 36 specimens, including both analysts' observations; Vandiver's composition and microstructure analyses are drawn from her notes (Horne and McDougall 2008: Appendix E-1) using the categories described below. "Needle Polisher," for example, is a common Old World archaeological term used for objects of certain similar shapes:

Needle Polisher: flattened or ovoid, with evidence of post-fire wear present as linear impressions of indented scraped lines on multiple sides; three medium-sized specimens.

Token or Gaming Piece: two adjoined plastically worked surfaces, one surface flat and one convex, fractured surfaces show alignment of mica parallel to the surfaces, as if plastically formed by compression from the top and bottom surfaces; three small specimens.

Probable Figurine Body Fragments: one rounded plastically worked or smoothed surface, and other surfaces that are broken; the clay body is not bedded but aligned in a complex, twisting way as if plastically worked or kneaded to shape; often one element or more is joined or added to another;

Table 2. Fired and Modeled Ceramic Specimens from CA-RIV-6069.

Spec #	Prov.	Depth	L (cm)	W (cm)	Th (mm)	W (g)	Mohs	Form (Griset 2008a)	Griset (2008a)	Vandiver (1998)
0140-3	TEU 03	283–293	1.8	1.3	0.8	1.4	2.0–3.0	Loaf	–	Token
0344-2	TEU 08	268–278	1.4	1.2	0.4	0.7	2.5	Tubular	Bead?	Bead
0504-5	TEU 13	278–288	1.5	1.3	0.2	0.4	2.5–3.0	Miscellaneous	Fortuitous inclusion? Daub? Floral impressions on both surfaces.	Pottery wall fragment
0531-4	TEU 14	268–278	1.5	1.0	0.6	1.0?	2.5–3.0	Pottery wall fragment	Wiping marks on both surfaces.	Pottery wall fragment
0597-4	TEU 16	248–258	1.1	1.0	0.2	0.2	1.5	Miscellaneous	Fortuitous inclusion? Very fine silty clay with possible seed impressions on exterior.	Pottery rim
0598-5	TEU 16	248–258	1.6	1.4	0.5	0.7	1.5	Miscellaneous	Fortuitous inclusion?	Pottery rim
0601-5	TEU 15	268–278	3.2	2.7	0.8–1.5	7.0	2.0	Pottery rim sherd	Rounded direct rim, small bowl ca. 9 cm diameter, oxidized interior.	n/a - Found after Vandiver's analysis
0648-2	MEC 06	150–180	1.7	1.4	0.3	0.7	1.5–2.0	Pottery wall fragment	–	Pottery wall fragment
0767-4	MEC 23	180–210	2.4	1.3	0.9	3.4	1.5–2.0	Cylinder, tapered fragment	Fractured lengthwise, worn.	Figurine columnar element, small
1200-4	TEU 22	340–350	4.9	1.6	1.5	10.0	2.5	Cylinder, tapered fragment	Faint scratch down middle of one side.	Figurine columnar element, large
1313-2	TEU 26	300–310	4.2	1.9	1.5	8.3	2.0	Cylinder, tapered	Trapezoidal cross-section, ochre; similar to Specimen 1564-1.	Figurine columnar element, large
1325-3	TEU 27	280–290	1.4	0.9	0.4	0.4	1.5	Pottery wall fragment	–	Pottery wall fragment
1345-3	TEU 29	310–320	1.7	1.4	1.1	2.2	2.0–2.5	Cylinder fragment? Sherd?	Similar shape and clay to 601-5; interior surface fractured.	Figurine body fragment
1366-5	TEU 30	300–310	3.0	2.3	1.5	8.1	3.0	Cylinder, tapered fragment	–	Figurine body fragment
1438-3	TEU 34	290–300	2.5	1.3	1.0	3.1	2.0	Miscellaneous	Hearth/floor fragment? Twisted length of clay; similar to Specimens 1457-6, 1725-4.	Figurine body fragment
1560-3	TEU 40	262–270	1.4	1.0	0.5	0.8	1.5–2.0	Loaf	–	Token
1564-1	TEU 40	278	6.0*	8.1	3.4	110.0*	2.0	Cylinder, tapered fragment, large fragment	Smoothed exterior of approximately 1/3 of original cylinder; fractured lengthwise; rounded base with two indentations; ochre staining. TL dated to ca. 10,000 ± 2,000 BP	Columnar element, large
1568-3	TEU 40	280–290	1.2	1.1	0.3	0.4	1.5	Miscellaneous	Fortuitous inclusion? Fine silt, all edges rounded, vugs	Pottery rim
1615-3	TEU 43	252–260	1.8	0.9	0.3	1.3	<1.0	Miscellaneous	Fortuitous inclusion? Fine silt, worn on all edges and surfaces; flattened.	Pottery rim
1640-3	TEU 44	280–290	2.2	1.9	1.3	2.4	1.5–2.0	Loaf	Flattened base, rounded dome.	Token
1658-6	Fea. 5	280–290	1.6	1.4	0.3	1.1	2.0	Tubular	Bead?	Bead
1678-5a	TEU 46	290–300	1.7	1.2	0.8	1.2	2.0–2.5	Miscellaneous	Fortuitous inclusion? Fine silt, irregular curvatures.	Figurine body fragment

Table 2 Continued.

Spec #	Prov.	Depth	L (cm)	W (cm)	Th (mm)	W (g)	Mohs	Form (Griset 2008a)	Griset (2008a)	Vandiver (1998)
1678-5b	TEU 46	290–300	2.0	1.2	0.9	1.2	2.0–2.5	Miscellaneous	Fortuitous inclusion? Fine silt, irregular curvatures.	Figurine body fragment
1691-4	TEU 47	270–280	2.5	1.2	0.7	2.4	1.5–2.5	Cylinder?	Elliptical cross-section, floral impressions.	Figurine columnar element, small
1706-5	TEU 48	280–290	2.5	1.5	0.8	2.4	1.0–1.5	Miscellaneous	Fortuitous inclusion, irregular, rounded on all edges.	Figurine columnar element, small
1725-4	TEU 49	290–300	5.0	1.5	1.1	7.6	3.0	Miscellaneous	Hearth/floor fragment? Twisted length of clay, vugs, floral impressions, burnished.	Figurine columnar element, large
1731-3	TEU 49	310–320	2.0	1.9	0.3	1.7	2.0	Miscellaneous	Fortuitous inclusion? Indeterminate impressions on both sides.	Pottery wall fragment
1741-5	TEU 50	290–300	3.0	1.0	0.8	3.4	2.0	Miscellaneous	Fortuitous inclusion? Twisted, vugs, burnish; similar to Specimens 1438, 1725.	Figurine columnar element, small
1778-3	TEU 52	310–320	2.0	1.6	1.1	2.0.	2.0	Miscellaneous	Rounded blob with floral impressions; similar to Specimens 1495-6,1830-2.	Needle polisher
1805-5	TEU 54	290–300	1.7	1.2	0.6	0.8	2.0	Pottery rim sherd?	Sharply pointed rim? Broken edge of body is very smooth—possibly fortuitous inclusion rather than rim?	Pottery rim
1821-3	TEU 55	290–300	1.2	1.1	0.6	1.0?	2.0–2.5	Pottery rim sherd?	Interior curvature is somewhat irregular.	Pottery rim
1830-2	TEU 56	280–290	3.2	2.1	1.0	5.9	2.0–2.5	Miscellaneous	Irregularly shaped, all edges rounded, many tiny vugs and floral impressions, similar to #1495-6 and #1778-3.	Needle polisher
2182-1	Fea. 11	303–330	2.9	1.1	0.8	2.4	2.0	Cylinder, tapered	Pointed on one end, rounded flange on other.	Figurine columnar element, small

two large and two medium specimens; one small piece is also present in two fragments.

Probable Figurine Legs or Appendages or Columnar Elements: fragments with linear shape that are rounded, oval or conical in cross-section; one or more surfaces worked or smoothed; four large and five medium specimens (the largest specimen, 1564-1, was not available for description by Vandiver (Horne and McDougall 2008:Appendix E-1).

Pottery Vessel Rims: two adjoining smoothed or worked surfaces that meet in either a pointed, flattened, or rounded shape that has been worked or finished; six specimens.

Pottery Vessel Wall Fragments: two parallel or nearly parallel, smoothed, worked or finished surfaces; the clay and mica particles in the bodies are aligned parallel to the surfaces and are present in several conforming or parallel layers, that is parallel to one another and to the surfaces; six fragments.

Beads: tubular shape, with particle alignment parallel to the surfaces; each fragment has inner surface somewhat faceted as if molded around a linear object, such as a stick, and exterior surfaces are rounded and smoothed; two fragments.

For comparability with the growing body of southern California early ceramic data, Griset (2008b) used

terms that describe shape rather than function, unless function is clearly plausible:

Tubular: cylinders with a central hole, thought to be beads; two fragments (Specimens 344-2 and 1658-6) (Figure 4).

Bowls: small, hand-modeled shallow bowls; three rim sherds (Specimens 601-5, 1805-5, and 1821-3) and three wall sherds (Specimens 531-4, 648-2, and 1325-3) (Figure 5 a–c and Figure 5 d–f, respectively).

Cylinder: in keeping with terminology established for CA-ORA-64 (Macko et al. 1998) and elsewhere, these are elongated, generally cylindrical pieces; some taper from one end to the other; in a range of sizes—small, medium, large; eight fragments (Specimens 767-4, 1200-4, 1313-2, 1345-3, 1366-5, 1564-1, 1691-4, and 2182-1) (Figure 6 a–h).

Loaf-shaped: small with one flattened surface and rounded rectangular or elliptical dome; three fragments (Specimens 140-3, 1560-3, and 1640-3) (Figure 7 a–c).

Miscellaneous Shapes: blobs; irregular shapes of clay with uneven or faceted surfaces; or fine silt in a wide range of shapes. Fortuitous inclusions are indicated by items with numerous floral impressions and many vugs (holes left when organic materials are oxidized); 17 fragments (remaining specimens) (Figure 8 a–q).

The two approaches, Vandiver's and Griset's, differ primarily in their identification of items as figurine elements/cylinders and pottery rims or walls. Griset placed more items than did Vandiver in the "Miscellaneous" category and thought that many of these had not been intentionally fired.

With the notable exception of Specimen 1564-1 (Figure 6f), most of the ceramics are small to medium size, ranging from 1.1 to 5.0 cm long (2.3 cm average), 0.9 to 2.6 cm wide, and 0.2 to 1.5 cm thick. The clay body is similar to the residual clay materials available on site (Horne and McDougall 2008:69–90). Clay color ranges from orangish brown to grayish brown to gray, and one example of a black color in fresh fracture, depending on the degree of oxidation during firing or post-depositional activities. Non-plastic materials include fine muscovite and biotite mica, rarely micaceous schist, and occasional quartzitic grains. Mohs hardness is generally between 1.5 and 2.5, with three instances of 3.0, and one less than 1.0. By comparison, modern earthenware ceramics have a hardness of about 3–4.

Vandiver (1998) estimated that firing temperatures were below 800°C, based on the unaltered state of the mica particles. When one views an assemblage of such random, non-standard forms as is represented in the collection from RIV-6069, there is always the question of whether the materials were intentionally or accidentally fired. Vandiver's position is clear:

> It is highly unlikely that natural agents could have produced the variation in artifact type, forming and finishing methods that are present in these ceramics. They are not accidental, but intentionally formed and finished. The presence of porosity at joints indicates that many of the fragmentary objects were made by joining several lumps of clay and by plastically deforming the clay using body uniaxial and shear force. Traces of smoothing by wiping of one or more surfaces is present, as are impressing or indenting of the surface with several tools…for instance, finger indentations, incising by drawing with a stick-like implement, punching or piercing (punctate) of the surface, forming of a hole around an armature [Vandiver 1998:2].

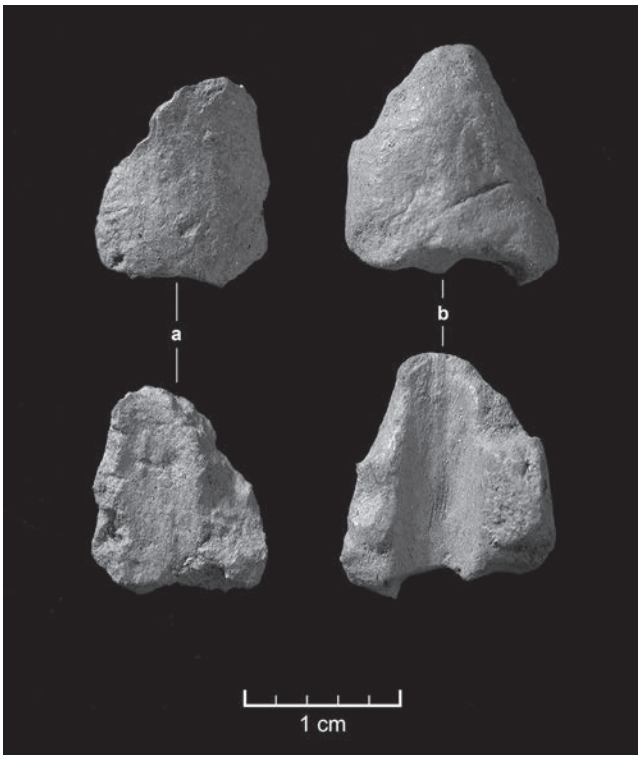

Figure 4. CA-RIV-6069 ceramic Specimens 344-2 (left) and 1658-6 (right); small tubular objects, perhaps bead fragments.

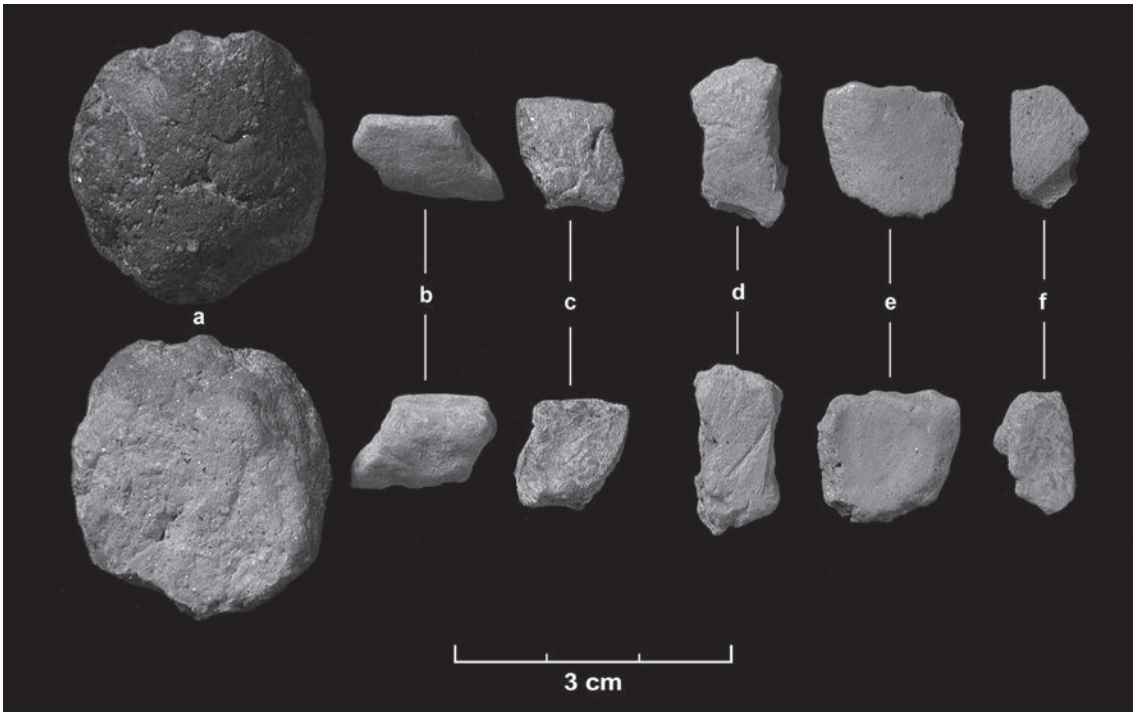

Figure 5. Pottery vessel rims and body sherds. Rims: (a) 601-5; (b) 1805-5; (c) 1821-3. Body sherds: (d) 531-4; (e) 648-2; (f) 1325-3.

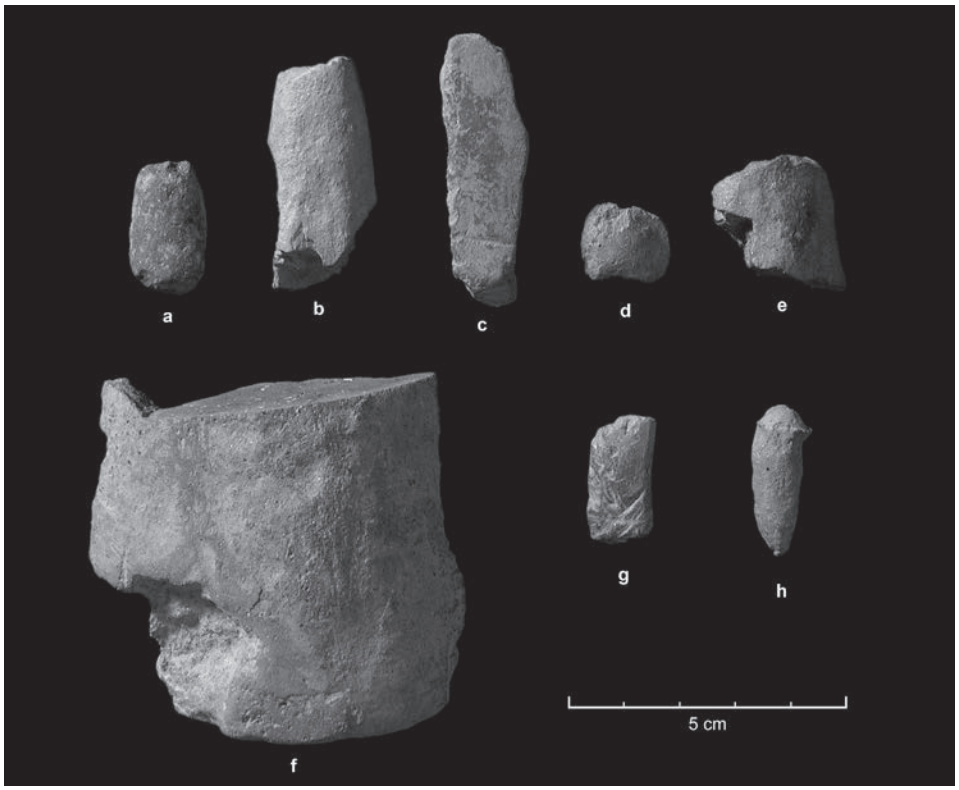

Figure 6. Cylindrical objects. Specimens (a) 767-4; (b) 1200-4; (c) 1313-2; (d) 1345-3; (e) 1366-5; (f) 1564-1; (g) 1691-4; (h) 2182-1.

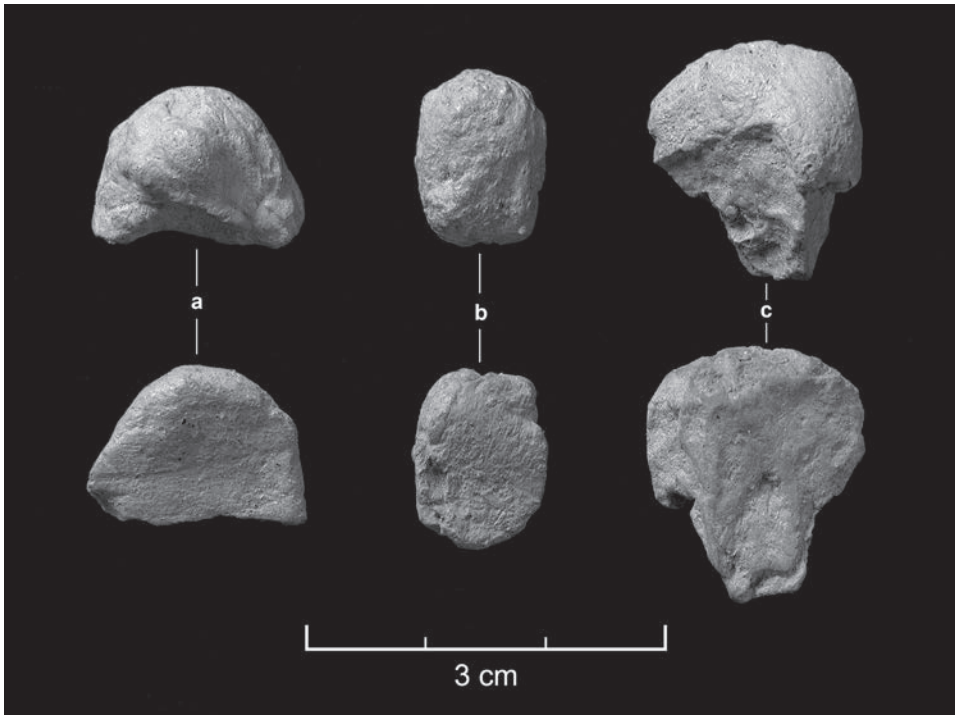

Figure 7. Loaf-shaped ceramic objects. Specimens (a) 140-3; (b) 1560-3; (c) 1640-3.

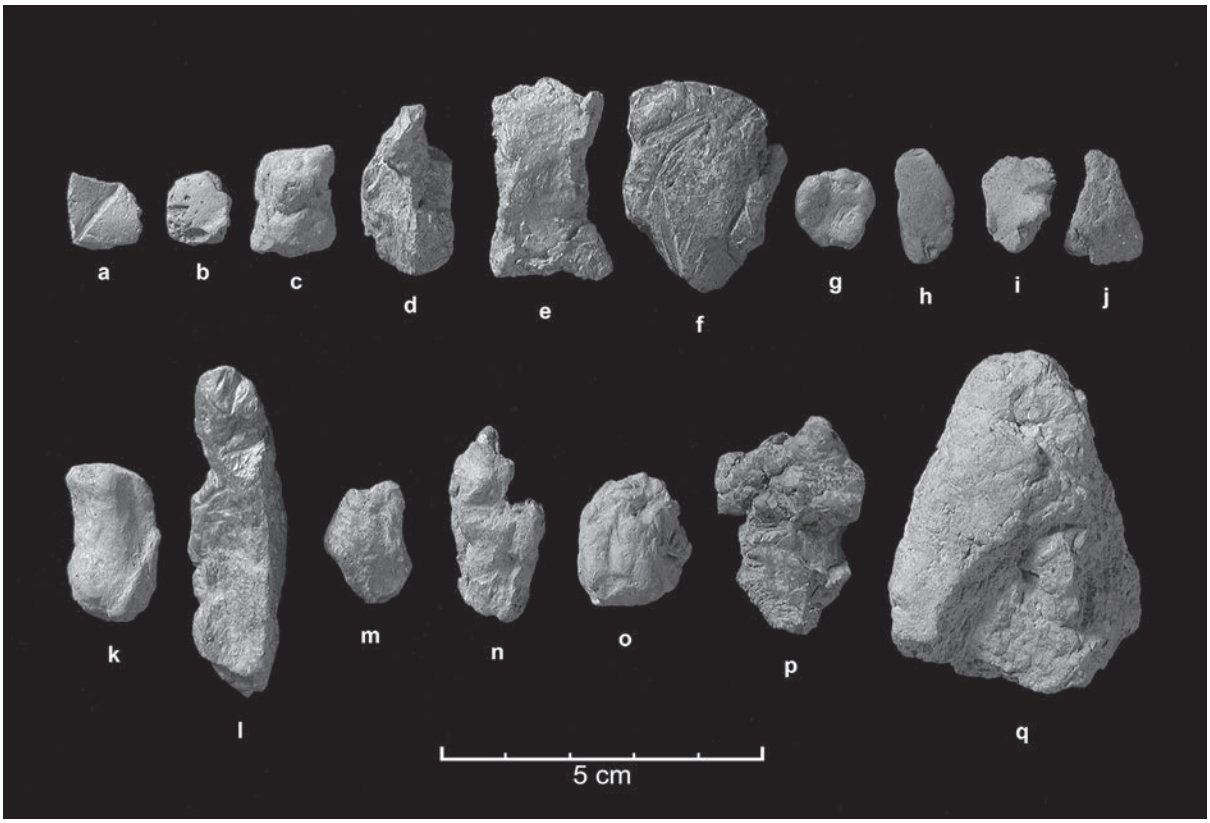

Figure 8. Miscellaneous shapes: Specimens (a) 504-5; (b) 597-4; (c) 598-5; (d) 1438-3; (e) 1457-6; (f) 1495-6; (g) 1568-3; (h) 1615-3; (i) 1678-5a; (j) 1678-5b; (k) 1706-5; (l) 1725-4; (m) 1731-3; (n) 1741-5; (o) 1778-3; (p) 1830-2; (q) 1891-11.

She states also that none of these processes has a natural analog.

Griset disagrees with this statement. Having harvested basketry materials from California streambeds and mussels from estuaries, she has observed that random pieces of fine silty clays often adhere to the plants and shells that are transported from the place of origin to a processing area. When these clay bits dry, they fall off or are removed during the processing, leaving behind smooth pieces of clay that sometimes become accidentally fired due to proximity to campfires. Fragments of daub—pieces of the clay used to seal and cover brush shelters—are also commonly found in California middens; they are baked by the accidental or intentional burning of structures. Most perishable structures in ancient California were destined for the fire in any case, either as part of funerary ceremonies or to rid residence areas of pests at the end of a seasonal stay. Basketry impressions are also found in baked clay fragments, suggesting that baskets sitting on clayey soils were moistened during their use, leaving behind impressions in soils that were heated and thus preserved (e.g., by stone boiling in baskets).

Thousands of clay fragments with grass, seed, and basketry impressions are found in sites throughout the Sacramento-San Joaquin Delta (White 2013), San Francisco Bay area, and North Coast Ranges of California, areas where archaeologists commonly use wet-screening of midden deposits which results in a higher recovery of baked clay specimens. These sites also have a baked clay tradition of hand modeled forms (Griset 2008b).

Specimens 1438-3, 1457-6, 1725-4, and 1891-11 (Figure 9 a–d) are hard twisted lumps of clay with very uneven surfaces and facets, many of which appear to be burnished, and they contain many vugs and plant impressions as well as scratches in different directions. Such activities as cleaning the surface of a prepared clay floor or around a prepared clay hearth would result in small pieces of clay that are dislodged and later swept into the fire where they undergo repeated heating cycles until the hearth contents are swept out and discarded. The burnished areas of the specimens accrue through repeated use of the floor or hearth prior to fragmentation.

Perhaps the oddest item from RIV-6069 is Specimen 1564-1, the large tapering cylinder fragment recovered from 278 cm depth (Figure 10). Measuring approximately 6 cm long by 8 cm across, it has a flattened base with two indentations, and the edges of the walls where they join the base are rounded. Approximately one-third of the cylinder remains; the other two-thirds was fractured and lost, and the upper end was fractured as well. Judging from the curvature at the base, the original diameter is estimated at 7.5 cm; presently, only approximately 3 cm remains. The exposed interior shows various joints that enabled Vandiver to ascertain that the cylinder was made from four lumps of clay. A faint ochre stain is visible on one portion of the exterior wall, about one-third up from the base. A sample was cut from Specimen 1564-1, opposite the formed base

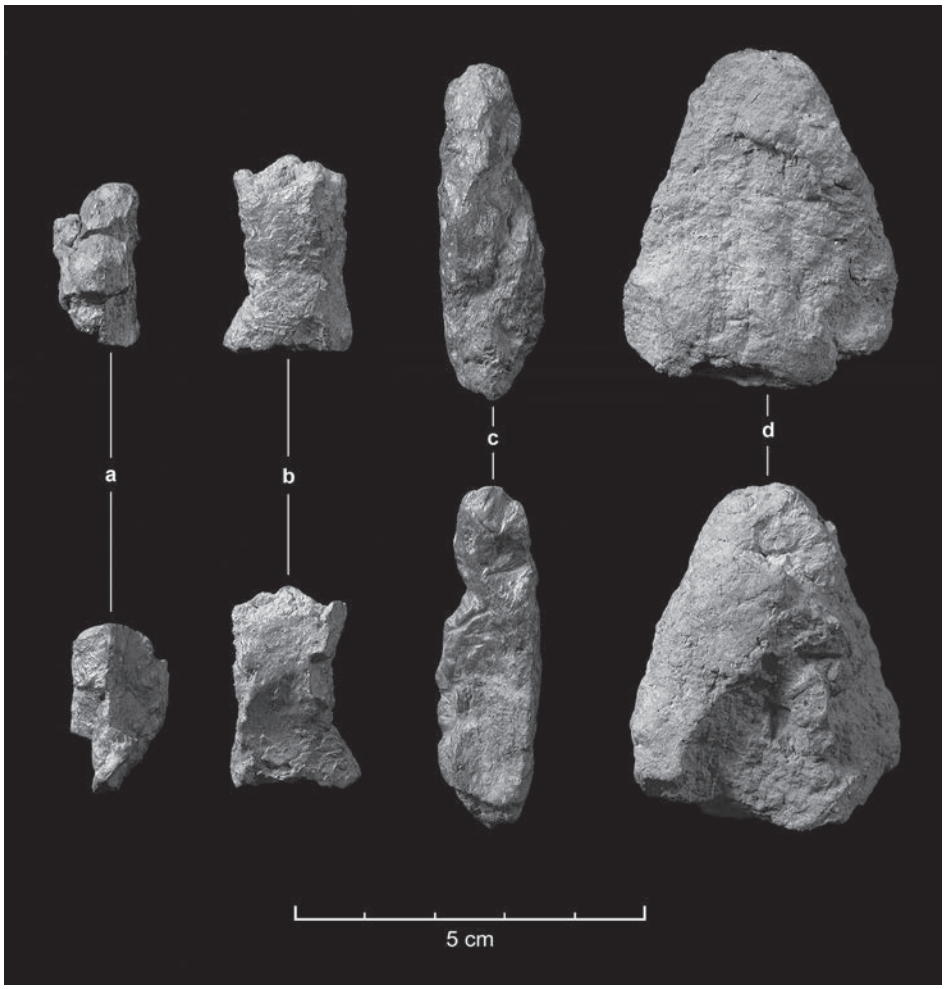

Figure 9. Twisted fired clay lumps with vugs and plant impressions, two views. Specimens: (a) 1438-2; (b) 1457-6; (c) 1725-4; (d) 1891-11.

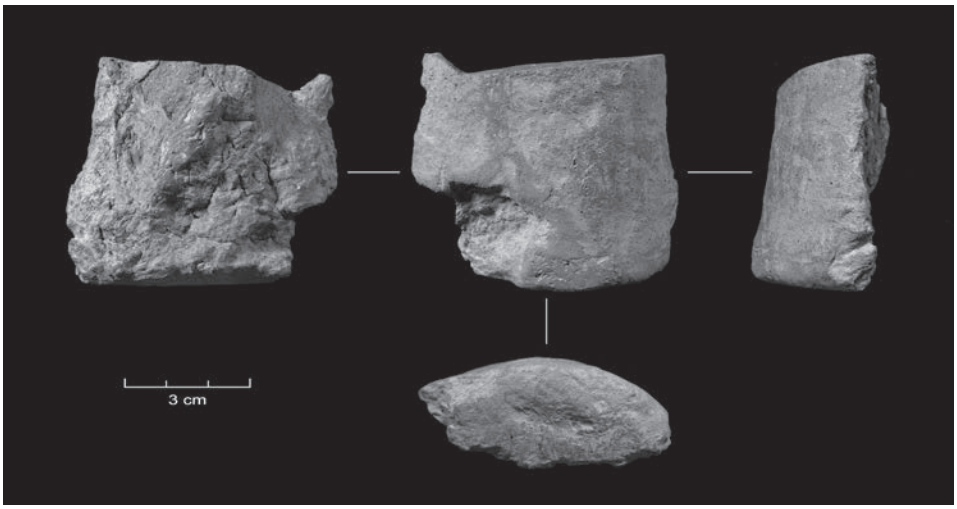

Figure 10. Specimen 1564-1, a large, tapering, ceramic cylinder.

of the object (Figure 10), and submitted for thermoluminescence dating, yielding an estimated date of 10,100 ± 2200 BP years (Horne and McDougall 2008:Appendix A).

One additional specimen, Specimen 1313-2, recovered at 300–310 cm depth, is a thin wedge of a similarly shaped and sized cylinder as Specimen 1564-1, and it, too, has a faint ochre stain on the remaining exterior surface (Figure 11). No analogous form for Specimens 1564-1 and 1313-2 was found by Griset in a search of the ceramic literature for North America.

Fired Clay Artifacts Associated with Cultural Features

Four clay artifacts were recovered from cultural features at RIV-6069: Features 4, 5, 11, and 15.

Feature 4

This activity area at 274–285 cm depth contained ground stone tools (including a discoidal), debitage, burned and unburned animal bone fragments, and Specimen 1495-6 (Figure 8f). Containing many floral impressions, the artifact is likely a piece of daub, incidentally fired as a result of food processing or other household activities. Charcoal from Feature 4 yielded a date of 9365–8980 cal BP (Beta 1226723) (Table 1).

Feature 5

This discrete concentration of ground stone fragments, debitage, and unburned faunal remains at 280–290 cm depth also yielded Specimen 344-2 (Figure 4), a tubular fired clay artifact that has been identified by both analysts as a bead fragment.

Feature 11

An activity area at 324–330 cm depth contained ground and flaked stone tools, debitage, unmodified cobbles, four concentrations of burned and unburned faunal materials, and Specimen 2182-1 (Figure 12). This clay artifact is a tapered cylinder with a rounded flange on one end and a pointed end on the other, though the latter may be due to an old fracture. It is the best example of a possible figurine or figurine fragment from RIV-6069. Charcoal from Feature 11 yielded a date of 9025–8955 cal BP (Beta 120303) (Table 1).

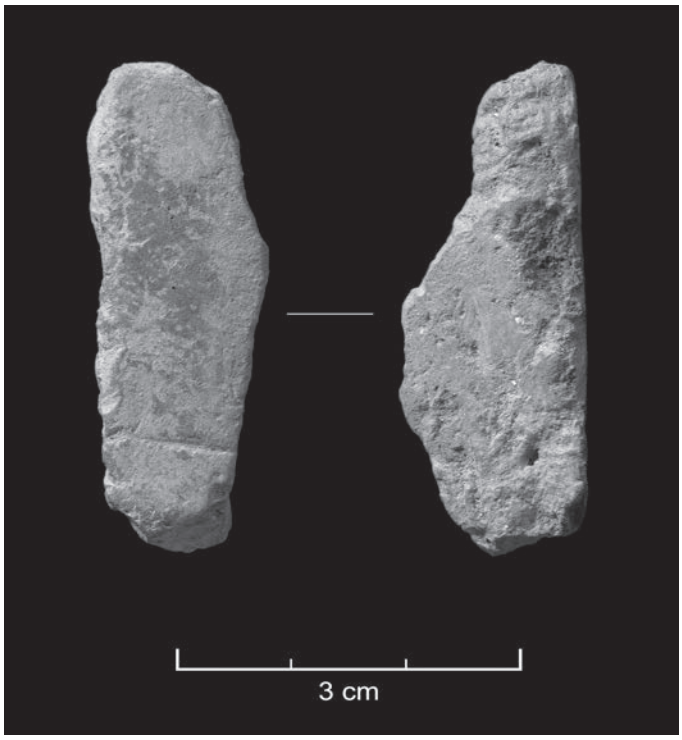

Figure 11. Specimen 1313-2, a tapering ceramic cylinder.

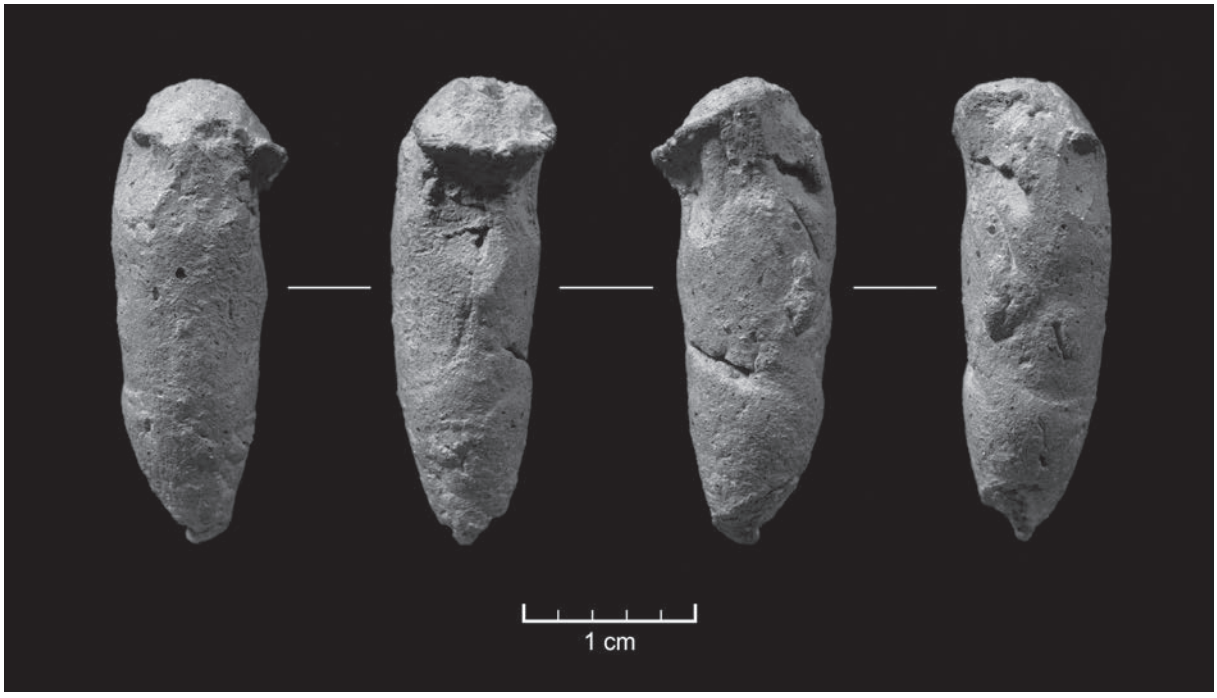

Figure 12. Ceramic Specimen 2182-1, a possible figurine or figurine fragment associated with CA-RIV-6069 Feature 11.

Feature 15

This activity area, at 356–391 cm below the present ground surface, was centered around an intact, stone-lined, circular hearth composed of seven metates inset vertically into infilled channel sediments. One of the metates exhibits extensive ochre staining on its basined surface. Other remains found in Feature 15 include a variety of ground and flaked stone tools, debitage, and burned and unburned mammal, bird, and rodent bone. Fired clay Specimen 1891-11 is a large, irregularly-shaped object, presently conical in outline due to many fractured surfaces. Only one small area along one edge retains the original surface, and it is uneven and full of floral impressions (Figure 9 d). Vandiver identified this item as a possible figurine body fragment; Griset placed it in the "Miscellaneous" category and suggested it was a large fortuitous inclusion. Charcoal collected from ashy sediments adjacent to the hearth yielded radiocarbon dates of 9040–8940 cal BP (Beta 121657) and 9220–8945 cal BP (Beta 121832) (Table 1).

In addition to the specimens described above, six items were identified by Vandiver and Griset as likely fragments of small to very small bowls: Specimens 601-5, 1805-5, and 1821-3 are categorized as possible rim fragments (Figure 5 a–c), and Specimens 531-4, 648-2, and 1325-3 (Figure 5 d–f) appear to be wall or body fragments. Specimen 601-5 is the best candidate for a small, thick-walled and relatively shallow bowl with an estimated maximum diameter of <9 cm. As noted previously, several small, shallow bowl forms were purposely shaped from split and ground sandstone concretions that are not native to the site; similar concretions occur naturally within the San Timoteo Badlands, 8 km north of RIV-6069 (Horne and McDougall 2008:298–299, Figures 14-7 and 14-8). The similarity between these and the small, fired clay bowl fragments suggests that they may have served similar, albeit unknown, functions.

Although several fired clay specimens have faintly incised lines, all appear to be either floral impressions or post-firing scratches. All "punctations" appear to derive from floral materials that oxidized in the firing and left vugs in the clay body. The only decoration evident in this body of fired clay artifacts is the faint ochre stain on the two fragments of large tapered cylinders, Specimens 1564-1 and 1313-2 (Figures 10 and 11).

Comparisons with Other Early Period Southern California Ceramics

The archaeological collection from RIV-6069 includes the oldest firmly dated assemblage of fired clay specimens yet reported from southern California. Consequently, it has no contemporaneous or direct correlates.

The prehistoric site closest in time and space to our study site is CA-ORA-64 on the southern California coast at Newport Bay (Figure 1). ORA-64 is one of the largest and oldest prehistoric sites investigated in Orange County, representing Paleo-Coastal and Milling Stone traditions (Drover 1975; Macko et al. 1998). ORA-64 yielded 120 fired clay specimens dating from ca. 8,800 to 4,500 BP (Drover 1971, 1975; Drover et al. 1979, 1983; Macko et al. 1998). The latter is a thermoluminescence date (Drover 1975), while the former is established by a suite of radiocarbon dates obtained from shell beads found in cultural features that reportedly contained ceramics, stone beads, and other artifacts "within a discrete area" (Macko et al. 1998:63). The site's excavators were fully aware of the controversial nature of the early dating for their ORA-64 archaeological ceramics:

> The ORA-64 ceramics are unlike any other, a uniqueness that befits their being the oldest ceramic objects in the New World…Analysis is still ongoing to determine the confidence that can be assigned to using the shell bead dates for the ceramics [Macko et al. 1998:63].

Macko identified 96 fired clay artifacts from ORA-64 and reported the following categories (see Macko et al. 1998:56):

Cylinders (n = 59; 61 per cent). Thought to be effigies, these are small (1.0–3.4 cm long), tapered and cigar-shaped, either undecorated, or decorated; they also tend to have flat bases. One specimen has anthropomorphic features indicated by punctations for eyes and nose, while two additional cylinders have bulbous appendages added to either side at one end that are suggestive of ears on a head or male testes or something else altogether.

Tube Beads (n = 5; 5 per cent). Described as being rolled around a twig, these range from 1–1.5 cm long and 4–6 mm in diameter; these specimens are undecorated.

Possible Vessel Fragments (n = 3; 3 per cent). All three rim sherds are decorated; one on the interior concave surface; two on the convex exterior. These specimens were classified based on the rounded rim form and general curvature suggestive of a spherical shape that is <10 cm in "overall dimensions." It is unclear what dimensions are indicated; no suggested diameters or wall thickness were provided.

Globular/Ball Shaped including plugs (n = 4; 4 per cent). Described as small enigmatic ceramic globular or ball-shaped artifacts, the specimens appear to range from 1.5–2.5 cm in diameter and each is decorated with a different pattern of punctations.

Molds/Casts (n = 25; 26 per cent). Macko identified three types in this category: cylinder molds (n = 16); miscellaneous molds (n = 4); and undifferentiated (n = 5). Macko speculated that clay was wrapped around large-diameter (but less than 10 cm) plant material and then fired; the description sounds similar to what elsewhere is classified as daub fragments. No definitions were provided for the undifferentiated or miscellaneous types, but they are reminiscent of Griset's term "miscellaneous with fortuitous" inclusions.

Cylindrical forms found at the RIV-6069 Lakeview site are only vaguely similar to those recovered from ORA-64. The latter are consistently small, more evenly shaped and smoothed, and frequently decorated with punctate/incised designs. In contrast, the RIV-6069 tapered cylinders include several large specimens that may have been as much as 7 cm in diameter at the base; none of these cylinder specimens evinces punctate/incised designs.

At RIV-6069, decoration is limited to two ochre-stained pieces (Figures 10 and 11), whereas 24 (25 per cent) of the 96 specimens reported by Macko et al. (1998) are decorated. All but three of the latter are decorated with punctate/incised or punctate elements; the exceptions are two examples of cord-wrapping and one with possible shell-edge stamping. Whether the ochre on the specimens from RIV-6069 was applied as decoration during manufacture or as part of ritual use cannot be determined; however, it should be noted that ochre is present on several ground and flaked stone implements recovered from Early Archaic deposits (Horne and McDougall 2008:303, Figure 14–11). While ochre is present on shell beads at ORA-64, it is not found on the ceramic materials.

A site on the lower Santa Ana River, CA-ORA-58 (Figure 1), contained cylindrical fired clay items (Anonymous n.d.); however, their provenience within the midden is unknown as the site was not systematically excavated. Radiocarbon dates from shell samples recovered from the site range from 3,685 ± 100 to 960 ± 110 BP, about 600 years younger than the latest known occupation of ORA-64 (Macko et al. 1998:63).

Porcasi (1998) described ceramic materials recovered from sites on two of the Southern Channel Islands,

Catalina and San Clemente (Figure 1). Drover (1978) first reported thermoluminescence dates on two ceramic specimens from the basal level of the Little Harbor site, CA-SCAI-17, on Santa Catalina Island: 2,849 BP and 2,002 BP. Radiocarbon dates obtained by Meighan (1959) and Raab et al. (1995) suggest that the age of the basal level of the site is closer to 5,000 BP. Both specimens are tapered cylinders with large bulbous or knob-like ends with projecting flanges and exhibit impressed lines, possibly from vegetal binding prior to firing, and one specimen retains ochre stains (Drover 1978). Neither is similar to the fired and modeled clay artifacts from RIV-6069.

During her reanalysis of faunal remains from the Little Harbor site, Porcasi (1998) discovered an additional 17 fired clay specimens, one of which closely resembles the two specimens reported by Drover (1978). With reference to a mixture of shape and functional descriptions, a wide assortment of forms is represented by the other 16 specimens, including decorated and undecorated tapered cylinder fragments, other hand modeled forms, and daub remnants (Porcasi 1998:Figure 3 and Table 1). Porcasi also identified a "cupped discoidal" ceramic specimen in the collection from CA-SCLI-43 on Eel Point, San Clemente Island (Figure 1). This artifact has a broken stem and "resembles half of a spool, earplug, or labret" (Porcasi 1998:276). Direct dates for the object are lacking, but obsidian hydration dates from similar midden levels at SCLI-43 range from 8,000 to 4,000 BP, while radiocarbon dates range between ca. 9,000 and 6,000 BP. Other California Channel Islands ceramic specimens include: a fired clay "head" from San Nicolas Island (Chace 1973); and a hematite-colored fired clay object from Santa Rosa Island (Orr 1968), estimated by King (1990:263) to date to ca. 3,000–1,000 BC (ca. 4,950–2,950 BP).

Conclusions

The fired and modeled clay assemblage from RIV-6069 presents an intriguing glimpse of an apparently localized clay tradition that included well-smoothed, tapered cylinders, tubular beads, and small (<10 cm diameter), shallow, hand-modeled bowls with thick (>1.5 cm) walls, as well as some very thin (0.3–0.6 cm) specimens that may represent pottery rims of indeterminate shape and size. Additionally, many "miscellaneous" forms were identified, some of which were likely fired incidentally as a result of processing food and materials, preparing and repairing structures, and/or as a by-product of other clay-modeling activities. Although tapered cylinders are represented in the collection from this site, they are unlike the tapered cylinders reported from ORA-64 or SCAI-17. Unlike the intentionally decorated specimens from other sites, the only decorative technique identified on the clay specimens from RIV-6069 is the use of ochre on two fragments of very large, tapered cylinders (Figures 10 and 11).

Archaeological evidence now indicates that people living along the southern California coast, on the islands, and in inland areas between 9,000 and 1,500 years BP were clearly manipulating clay and forming distinctive shapes, some of which are found across the region and are not unique to single sites. Decorative techniques applied to these fired and modeled specimens appear to be restricted to specific locales, though this may be a misconception due to the paucity of reported sites and data. Some forms can be tentatively identified by shape, such as rim and wall fragments of vessels, tubular forms as beads, and tapered cylinders that may represent figurines or figurine fragments. How these fired and modeled clay specimens were used prehistorically is unknown, and the only analogies that can be made are with ethnographic observations of the production and use of hand-modeled, low-fired clay items. These examples include manufacture by children and adults for recreational, utilitarian, and ceremonial purposes.

Some Archaic period fired clay artifacts appear to be small, hand-modeled bowls. These non-culinary forms were made for thousands of years without ever developing into a formalized "pottery" tradition such as

that documented throughout the American Southwest, including Late Prehistoric southern California. There is presently no linkage between the Archaic fired and modeled clay tradition we describe in the present paper and the "pottery" traditions of the Late period in southern California, including that found at archaeological sites in close proximity to RIV-6069 dated from ca. 500 to 350 BP (Robinson et al. 2001:105–128).

In closing, we emphasize that other Early Archaic sites in southern California may also contain fired or baked clay artifacts as yet undiscovered or even unrecognized. Owing to excavation and recovery techniques of various levels of rigor, such artifacts might not have been identified previously in situ, during screening, or during laboratory analyses, and may have "slipped past" earlier archaeologists.[2] Because the pottery inventory recovered from RIV-6069 was so varied, yet so unexpected, we believe that future archaeological investigations should anticipate that fired or baked clay artifacts could be present in site deposits of similar antiquity throughout southern California.

End Notes

1. Pamela Vandiver is currently Senior Research Scientist at the Heritage Conservation Science Program in the College of Engineering at the University of Arizona, Tucson. She was formerly Senior Research Scientist in Ceramics at the Smithsonian Center for Materials Research and Education in Suitland, Maryland.

2. Griset (2008b) discussed baked clay, as opposed to ceramic pottery traditions in ancient California.

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