Prehistoric Pottery of Coastal Los Angeles County

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Abstract

Aboriginal ceramics within Los Angeles County were long thought to have been exclusively of historic age and a result of acculturation. Excavations at CA-LAN-2630, the California State University, Long Beach, Parking Structure site, have produced the largest assemblage of pottery from controlled stratigraphic contexts yet known from Los Angeles County. With 55 associated radiocarbon assays this ceramic assemblage is the best-dated excavated pottery collection from southern California. The LAN-2630 evidence reveals a ceramic industry that predated the arrival of Europeans by several centuries. This discovery also extends the distribution of prehistoric ceramics into a part of California hitherto thought to be lacking such pottery and represents the northernmost extension of Southern California Brown Ware. Moreover, it provides new data for functional interpretations of ceramics within the Native cultures of California.

Gabrielino Ceramics?

Did the Late Prehistoric Gabrielino make pottery? If you asked any archaeologist working in California's Los Angeles County 30 years ago, or perhaps even only 20, the answer invariably would have been "no." Archaeological ceramics were evidence found near the Colorado River and beyond, far to the east, to the south in San Diego County, and to the northeast in the Sierra foothills and adjacent San Joaquin Valley.

The aceramic impression was formed mainly from non-archaeological sources. Hugo Reid, married to a Gabrielino woman during the Mexican period, believed that Spaniards had introduced ceramic technology to his wife's people (Heizer 1968:44). No less an authority than Alfred L. Kroeber (1922:276) concluded that pottery was produced within Gabrielino territory only during the Spanish Colonial period. Expanding upon his position, Kroeber (1925:628) stated emphatically "… no pottery has been found in ancient remains in the Gabrielino habitat," and thus any Gabrielino use of pottery had to be historic.

Following Kroeber's lead, Strong (1929:347) and Johnston (1962:31) suggested that ceramics would have been of little value to Indians with access to Santa Catalina steatite. Stone vessels, they argued, could duplicate some, if not all, of the cooking functions performed by pottery vessels. When confronted with evidence that at least some historic Gabrielino women made pottery, Johnston (1962:3,16) argued that they learned this from the Serrano during the Spanish Colonial period and possibly even at the missions.

Gabrielino ethnographic accounts and even archaeological evidence are regrettably more limited than is the case for neighboring Indian groups. This is a legacy of the fact that the heart of their territory, Los Angeles, would become "ground zero" for the most populous European settlement in California. The tiny pueblo, then the small town, and finally the megalopolis of Los Angeles over a two hundred year period first marginalized the Gabrielino, then virtually obliterated the archaeological traces of their presence. As a result, when it came to evaluating whether the prehispanic Gabrielino were pottery makers or not, scholars could not say if they truly had evidence of a lack, or simply a lack of evidence. This notwithstanding, it is of interest that baked clay pipes were reported in use by the

Gabrielino by at least one early Spanish explorer, Fray Crespí (2001:341), and John P. Harrington (1942:25) listed the precontact Gabrielino among the makers of coiled and paddle-and-anvil pots. Unfortunately, as was his wont, Harrington's cryptic comment was offered without detailed evidence for his conclusion. Possibly, somewhere within the boxcar loads of Harrington's field notes, there are more ample descriptions, which might allow for a definitive assignment as either pre- or post-historic based upon his ethnographic interviews.

What little we know of Gabrielino life is based upon the scanty accounts of Spanish explorers (Portolá 1909; Costansó 1910; Teggert 1911; Cabrillo 1929; Fages 1937) and ecclesiastics (Palóu 1926; Boscana 1934). Modern ethnographic reviews by C. Hart Merriam (1967:433–438), Kroeber (1925), and Harrington (1933a, 1933b, 1934, 1942) have added little concrete information about nascent or experimental industries such as pottery. More recent researchers, such as Blackburn (1963), who employed Harrington's field observations, and Heizer (1968), who edited and annotated Hugo Reid's letters of 1852, have added to this corpus; their work, unfortunately, does little to help us identify the Gabrielino as potters or non-potters. The most comprehensive summaries of Gabrielino culture history are provided by Johnston (1962), Bean and Smith (1978), and McCawley (1996). Bean and Smith (1978:542) accepted Harrington's determination that the pre-contact Gabrielino were pottery makers but offer no specific evidence to support it. Reconstruction of Gabrielino life is based almost entirely on the ethnographic record (cf. LaLone 1980).

In Orange County, archaeological evidence for Late Prehistoric pottery has increased over the past four decades. Despite the claims of McLean (2001) who believes that all aboriginal pottery in Orange County is historic, pottery has been discovered in at least five prehistoric Orange County sites, some, if not all, of Gabrielino cultural ascription. These are CA-ORA-119A (Koerper et al. 1978; Koerper and Drover 1983; Hurd et al. 1990), CA-ORA-302 (Lauter 1977), CA-ORA-309 (Padon et al. 1987), CA-ORA-414B (Demcak 1988), and CA-ORA-681 (Taylor and Douglas 1982; Cameron 1999). These data refute Kroeber's (1925) assertion that the Late Prehistoric Gabrielino did not make pottery. Unfortunately, it still leaves the situation to the north, within modern Los Angeles County, no less murky when it comes to aboriginal ceramic use.

CA-LAN-2630: The CSULB Parking Structure Site

The extension of Late Prehistoric ceramic technology northwards into Los Angeles County can now be firmly established based on extensive research at CA-LAN-2630, or the California State University, Long Beach (CSULB) Parking Structure site (Figure 1). LAN-2630 is buried beneath roughly 60 cm of topsoil, imported construction fill, and alluvial sediments. The site lies along the banks of Bouton Creek, a relict tributary of the San Gabriel River. Excavation commenced at LAN-2630 in early May 1994 and continued into July of the same year. Shell, stone, and bone tools, nearly 1.25 metric tons of mollusk shells, and 642 pottery sherds (713 g) were recovered. Fifty-five radiocarbon age determinations indicate that the site was in use between AD 1200 and 1700 and make LAN-2630 the best-dated site containing prehistoric pottery within California.

LAN-2630 was first encountered on May 5, 1994, during initial construction of Parking Structure 1 (Figure 2). The inadvertent discovery of a relatively dense concentration of shell prompted university representatives and construction personnel to suspend all pre-construction earthmoving activities. A scientific excavation program was already in place to assess whether such shell deposits encountered during normal construction activities at CSULB had been formed by natural or cultural processes. If the latter,

Figure 1. Study area. Map by Rusty van Rossmann.

then archaeological salvage procedures in compliance with state law would be triggered.

Earlier archaeological investigations of the campus had been hampered by a 40-year controversy concerning the nature and origins of similar deposits (Carter and Neitzel 1977; Rosen 1978a). The conclusions of many archaeologists intimately familiar with the campus (Matthew A. Boxt, Brian D. Dillon, Franklin Fenenga, Clement W. Meighan, William J. Wallace, and Nancy Whitney-Desautels Wiley) were considerably at odds with those of a single dissenting archaeologist (Keith A. Dixon) regarding whether specific deposits were cultural or natural. Also very controversial was the question of whether bona fide cultural deposits, if present, were in situ or had been redeposited by earthmoving activities over a long history of campus construction and/or by natural processes (e.g., wind and rain). Despite four decades of archaeological attention, absolutely

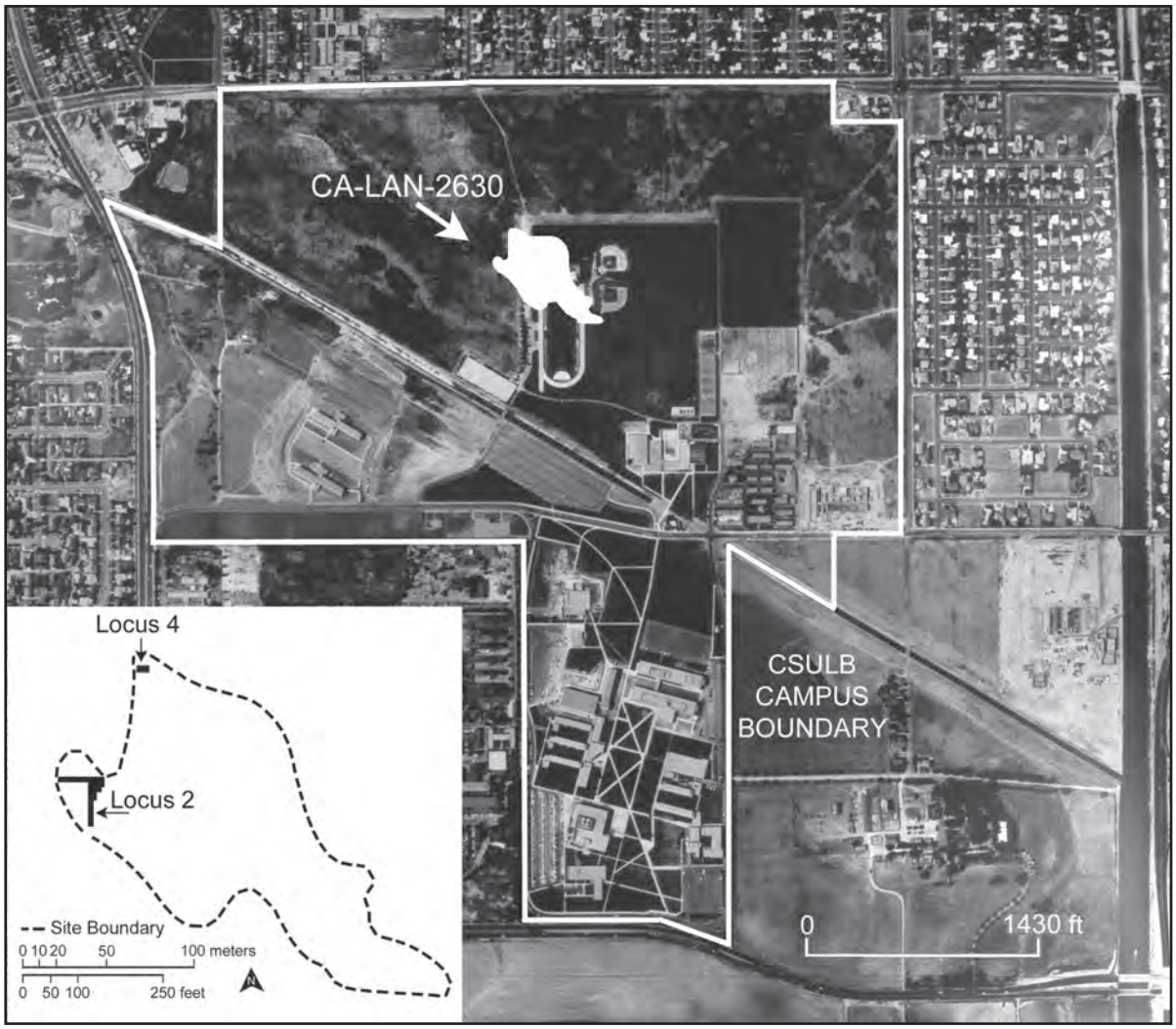


Figure 2. Location of CA-LAN-2630 on the CSULB campus. Campus boundaries indicated by white line. Map by Matthew A. Boxt and Rusty van Rossmann overlaid on a 1959 air photo showing the site area prior to major construction. Insert map at lower left shows excavated locations within the site boundaries. Photo courtesy of the Fairchild Aerial Photography Collection, Whittier College.

no surface indications of pottery had ever been reported.

Figure 3 shows the locations of the six sites on the CSULB campus that have been tested archaeologically. CA-LAN-235 was excavated by SRS (1979) and by Bonner (1984), and CA-LAN-2629 was excavated by Boxt; neither site produced any native pottery. CA-LAN-705, CA-LAN-1000, and CA-LAN-2616 were also excavated by Boxt. They produced no native ceramics, although radiometric data suggests they are contemporaneous with LAN-2630. Enough of the archaeological deposit at the other five sites on campus was scientifically processed to allow for the conclusion that probably all but the LAN-2630 site had lacked pottery.

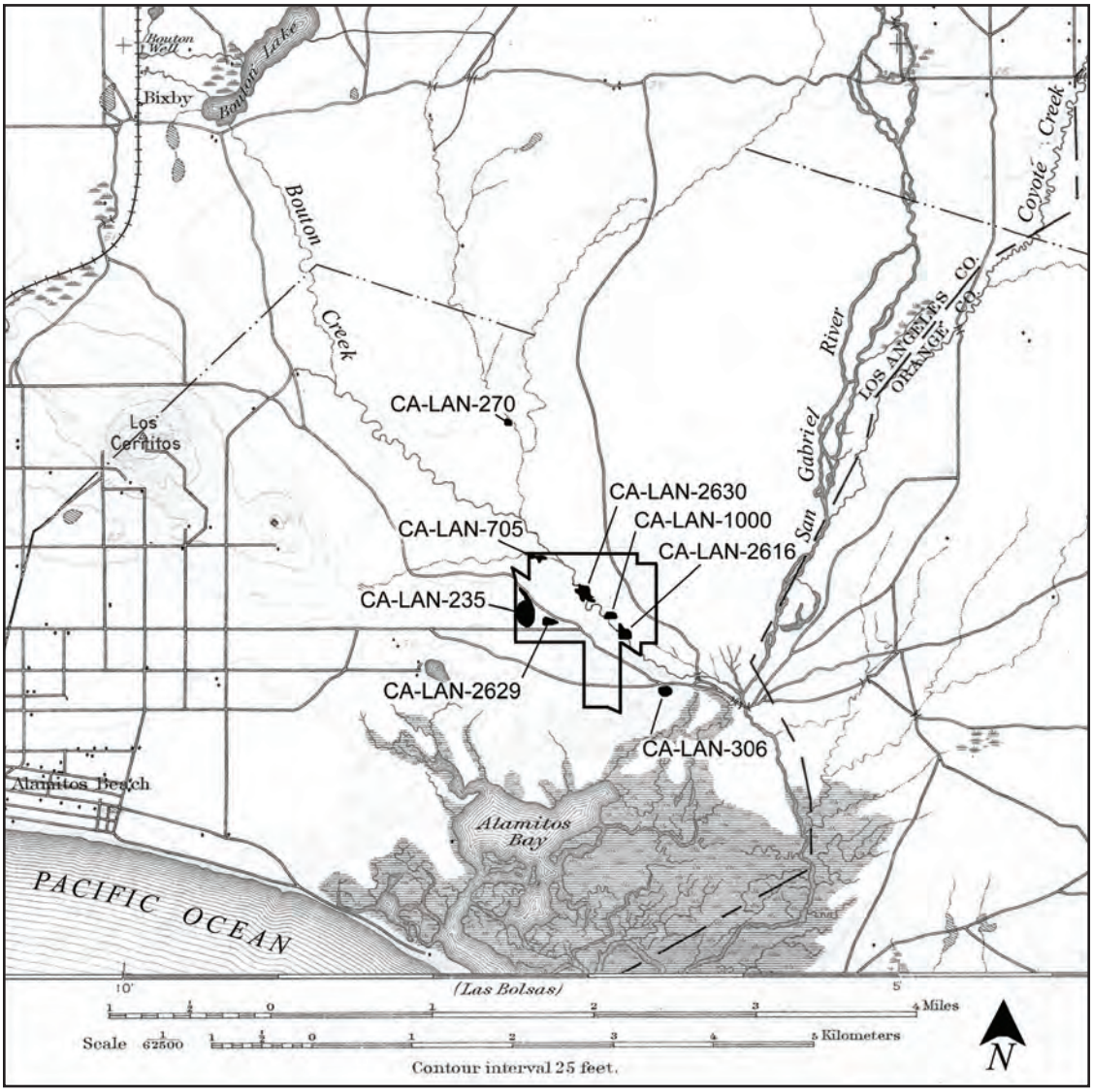


Figure 3. The relationship between sites mentioned in the text and local watercourses, including the original alignment of Bouton Creek. CA-LAN-270 and CSULB sites CA-LAN-705, CA-LAN-2630, CA-LAN-1000, and CA-LAN-2616 are all situated along the banks of Bouton Creek, visible in the Figure 2 1959 air photo only as a "ghost channel." Base map is the USGS 1899 Downey 15' topographic sheet, compiled from ground surveys made in 1893–1894.

A series of low intensity overbank deposits along Bouton Creek formed an expanse of high ground adjacent to the rich, albeit low-lying and swampy, hunting and collecting areas of Alamitos Bay. The CSULB sites sit atop this raised area. Dietary remains suggest a subsistence-settlement pattern oriented toward the exploitation of resources in the major estuary system that existed in the vicinity of what is now the CSULB campus (Miller and Boxt 2009). The local marsh environment offered an extremely productive combination of terrestrial, aquatic, and marine foods for the region's ancient inhabitants. Sites such as LAN-2630, LAN-705, LAN-1000, and LAN-2616 probably functioned as temporary camps from which terrestrial, marine, and estuarine food resources were procured and brought back to settlements for processing and consumption.

The common denominator of all the CSULB sites and their nearest neighbors is their streamside location. Periodic episodes of local resource availability and scarcity, coupled with localized inundations or accessibility problems, probably caused the local prehistoric population to move from site to site over the years or possibly even within single seasons. There is no way to determine whether all the sites were occupied simultaneously or alternatively and in sequence over short periods of time. At least some sites may have had unique functions not shared with their neighbors; CA-LAN-270, for example, was found to have a funerary component (Bates 1972), while LAN-2630 had pottery in such abundance as to argue for its local primacy in this industry.

With the discovery of the deeply buried LAN-2630 site, meetings were held to resolve the concerns of archaeologists, Native Americans, developers, and campus officials. Alternative construction plans were discussed, and an archaeological salvage project directed by Boxt was authorized as a means of mitigating impacts to the newly discovered prehistoric site. An asphalt parking lot was mechanically removed so as to provide access to the archaeological deposits. A boundary test program was subsequently initiated which saw the excavation of 47 backhoe trenches, facilitating the determination of the site's western perimeter. Four likely areas were then proposed as candidates for more intensive study, two of which were subsequently eliminated. Locus 1 produced the skeleton of a domestic cow, while Locus 3 within the Bouton Creek relict watercourse was filled by roughly four meters of historic alluvium. Locus 2 and Locus 4 produced incontrovertible evidence of intact archaeological deposits. An additional 100 auger units were then hand-bored to further delineate the site's boundaries (Figure 2).

A stratigraphic profile of the lower CSULB campus had been developed through previous investigations, and so we knew where the archaeological deposit was most likely to be in terms of gross depth. A backhoe operator removed 60 cm of topsoil, fill, and alluvial sediments overlying LAN-2630, and the final 5 to 10 cm of sediment overlying the prehistoric deposit was removed by hand. This cost- and time-effective method for removing non-cultural strata made it possible for a field crew of up to 50 people to easily access the cultural deposits.

Upon removal of the non-archaeological overburden, two trenches, each measuring 4 m wide by 30 m long, forming an L-shape, were placed within the structural footprint of the proposed parking structure. Research proceeded with the excavation of 49 sampling units of five different sizes: 16 2 x 2 m units, 27 1 x 2 m units, five 1 x 1 m units, and one .5 x 2 m unit. Nine test units were reduced in half at lower levels, and three were expanded at lower levels. Excavation was carried out in 10 cm levels, and all sediments were passed through 5 mm (1/8 in) mesh screen. Previous experience in excavating archaeological sites on the CSULB campus showed water screening to be the most effective way of recovering artifacts and ecofacts.

Six major stratigraphic units were identified at the LAN-2630 (Figure 4). These are identical to those also noted at LAN-705 and two other lower campus sites (LAN-1000 and LAN-2616) and therefore are of considerable local reliability. Stratum 1 is composed of minor amounts of imported gravel, usually mixed with the local loam topsoil. Stratum 2 is a calcareous fine sandy silt that is mostly unweathered, representing recent overbank deposits from the creek and the adjacent San Gabriel River. Stratum 3 is roughly 20 cm thick and is interpreted as representing the major flood of 1867–1868 that established the San Gabriel River in its current course (Newmark 1916:362). This flood was the first and one of the largest historic floods along the new channel (Kittell 1977). Stratum 4 is composed of fine sandy silts and loams with abundant marine shell; this stratigraphic unit contains most of the archaeological remains found at the site and is the principal cultural stratum. It averages 70 cm in thickness with a gradational lower boundary. All the LAN-2630 ceramics were recovered from Stratum 4.

Stratum 5 is interpreted as an overbank or levee deposit from Bouton Creek. It is mostly silt with minor amounts of fine sand and represents a slightly lower-energy deposition than the overlying sediments. Stratum 5 is cultural but lacks significant quantities of midden, indicating that it may have been aggraded, at least in part, as a result of human activities. Whether

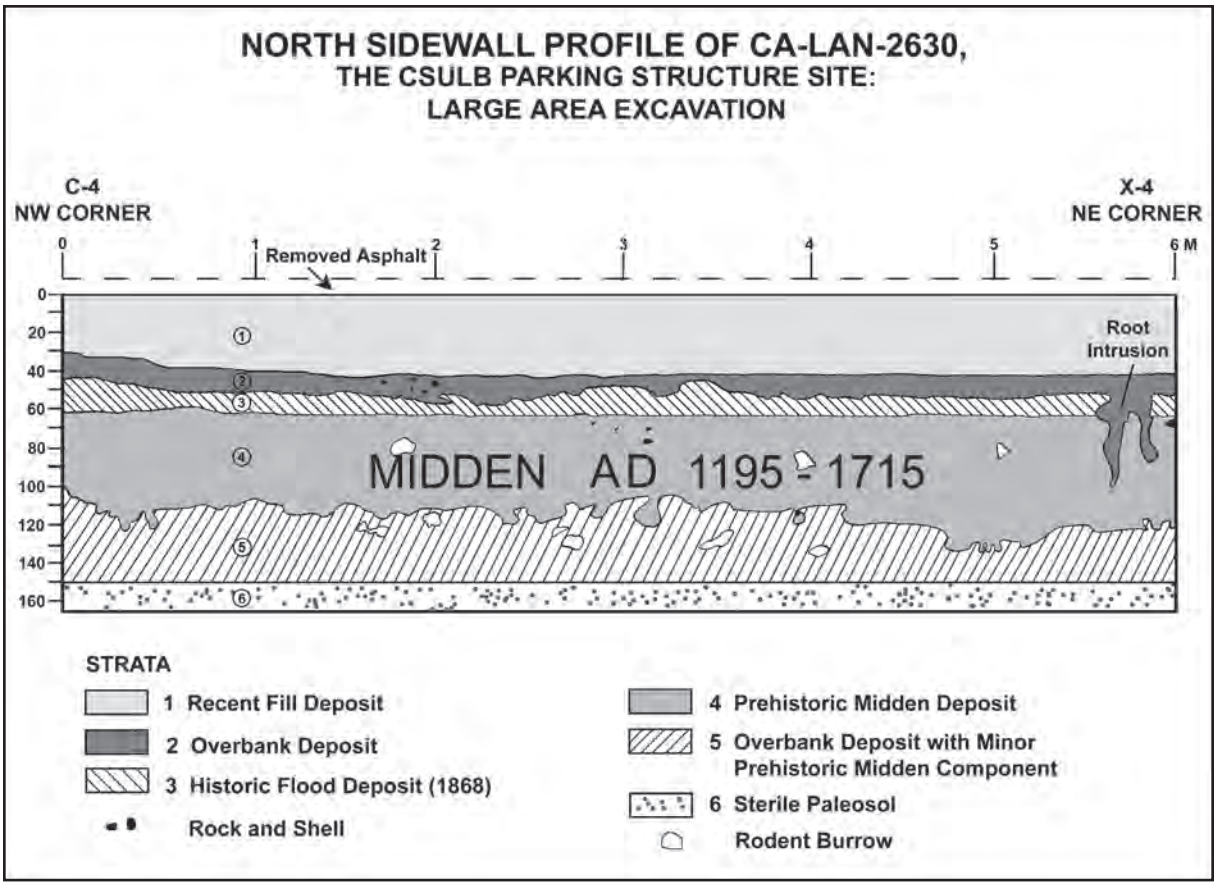


Figure 4. Stratigraphic profile of CA-LAN-2630. All archaeological ceramics were recovered from Stratum 4. Drawing by Rusty van Rossmann.

the minor amounts of midden were the result of bioturbation and translocation from Stratum 4 above or represented sparse human activity could not be determined.

Stratum 6 represents the stable, sterile surface of a lower levee or periodic swamp. It contained no evidence of human habitation. The surface of this well-developed soil horizon must have been exposed to weathering for several hundred years prior to its burial by Stratum 5. Its sediments are clays and silty clays with abundant mottling and includes common land snails. This stratum may have been characteristic of the local environment at the time of the site's initial human occupation at roughly cal. AD 1200.

We believe that the LAN-2630 excavations reached the bottom of the site's cultural deposit and that Stratum 6 represents the pre-occupation, natural land surface. Deep penetrating excavations to 300 cm into this same Stratum 6 at nearby site LAN-750 revealed that this sterile stratum has considerable depth. While there is a possibility that deeply buried cultural strata may still be found beneath ostensibly sterile paleosol deposits such as Stratum 6, we do not consider this likely.

The CSULB Parking Structure site covers an area estimated between 15,000 m^2 and 16,000 m^2; the average thickness of cultural Strata 4 and 5 is calculated as roughly 90 cm. By multiplying the average thickness of the cultural deposit by the estimated surface area, we estimate that LAN-2630 incorporates roughly 14,000 m^3 of midden. Overall, about 120 m^3 of midden were excavated at Locus 2 and Locus 4, and so less than 1 percent of the total archaeological deposit was tested. Salvage excavation of LAN-2630 within the footprint of Parking Structure 1 was coupled with the parallel goal of archaeological preservation. A large quantity of data was recovered, impacts to the archaeological site were minimized, and a significant portion of the deposit remains intact.

Ceramic Evidence Distribution

The horizontal distribution pattern of excavated pottery is roughly the same as for all other artifact classes encountered at LAN-2630, primarily concentrated in the northwest quadrant of the site (Figure 5). While there was some post-depositional mixing at LAN-2630, mostly by rodents, such disturbance is of little consequence to the broader geological/environmental picture. If the LAN-2630 ceramics had resulted from early contact with Europeans, Mission period exchange, or manufacture by acculturated Gabrielino, we would expect to have found historic artifacts associated with Stratum 4, but none were recovered. The very few historic period artifacts unearthed at LAN-2630 were found in depths between 0 and 50 cm. These include 18 glazed whiteware ceramic sherds, dating to the late nineteenth/early twentieth century. This historic pottery exhibits a distribution pattern stratigraphically different from the Southern California Brown Ware of Stratum 4.

The CA-LAN-2630 Ceramic Assemblage

The LAN-2630 ceramic assemblage largely consists of fragmentary body sherds ranging in area from 1 to 3 cm^2. Cultural and natural processes, such as low-temperature firing, trampling, and erosion, coupled with the sherd's friability and high moisture content in the soils, would increase decomposition, contributing to the small size of the potsherds (Figure 6). Rims comprise less than 1 percent of the sample, representing perhaps four separate vessels (Figure 7); however, the entire collection may represent 10 to 12 vessels. The potsherds at LAN-2360 correspond to culinary or water-storage vessels of both bowl and olla forms. Surface colors range from reddish brown (5YR 4/4) to dark gray (10YR 4/1), and there is no surface decoration. Body thickness ranges from 4 to 9 mm and rim thickness from 8 to 12 mm. Due to poor preservation and a relatively small sample size, the basal configuration for these vessels remains unknown. The sample population contains no obvious

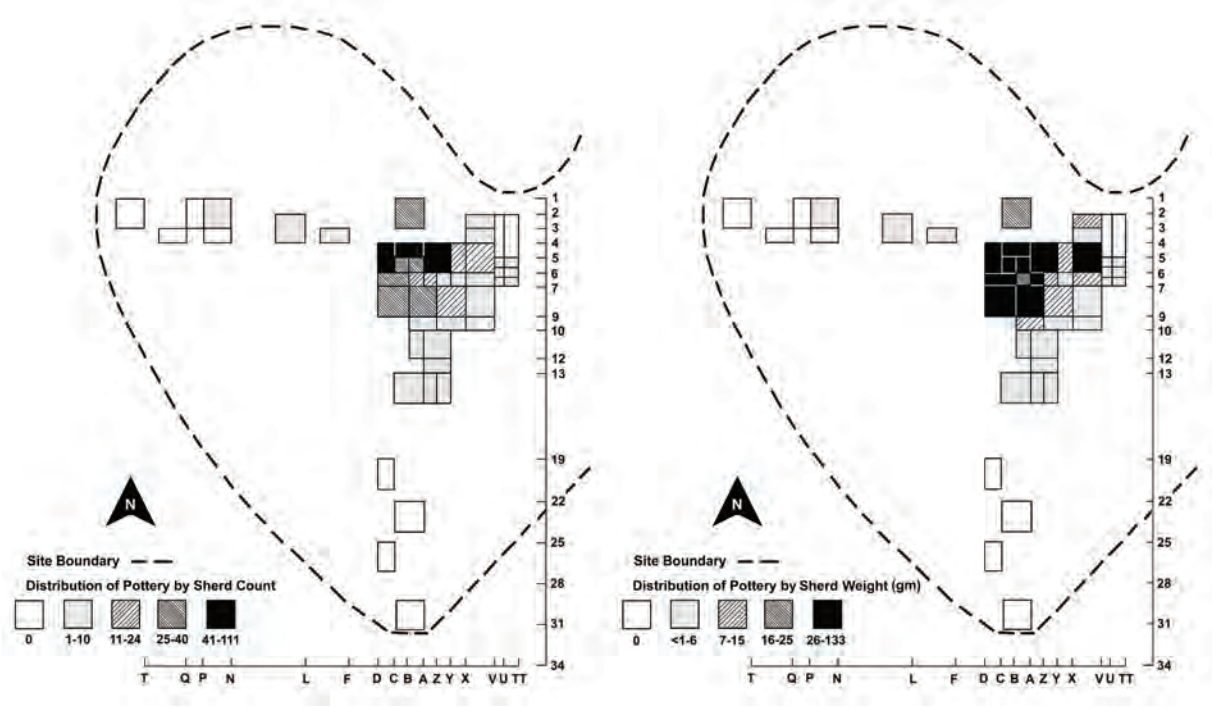


Figure 5. Western portion of Locus 2. Left: Horizontal distribution of CA-LAN-2630 excavated potsherds by frequency; right, by weight. Drawings by Rusty van Rossmann and Matthew A. Boxt.

faceted flat surfaces, although some potsherds exhibit evidence of slab molding, a common method used to form vessel bases. All five rim sherds are thickened at their tops, and all five also exhibit some rounding. Five other specimens are angular and may represent neck fragments.

The LAN-2630 potters employed a number of manufacturing techniques: molding, coiling, paddle-and-anvil shaping, thinning, and scraping. The pottery was manufactured from local clays that undoubtedly were collected from nearby sources (Hurd and Miller, this double-issue). Paste size ranges from silt (.002 mm–.05 mm) to medium sand (.05–2.0 mm). Air pockets are visible in some sherds (Figure 6a, b, and t). In general, the LAN-2630 assemblage was minimally tempered. Fine-grained sand, quartz, mica, feldspar, cryptocrystalline silicate particles, and hematite appear as natural temper inclusions. Most sherds have a characteristic micaceous glint.

A visual and microscopic examination of the potsherds, assessing wall thickness, color, clay composition, and surface decoration, enabled us to divide them into two general categories. Category 1 specimens are yellowish red (5YR 5/8) and reddish brown to dark gray in color; they exhibit inclusions of silt to fine- to medium-sized sand with mica, quartz, feldspar, and cryptocrystalline silicate. They are 4–9 mm thick, have blackened and brown cores, and often exhibit dark gray clouding on the surface. The inner surface is almost always dark gray, and the outer surface is reddish brown to dark gray. Ninety-seven percent of the CSULB potsherds comprise this category. A black oily residue, possibly asphaltum or food, is present on seven percent of Category 1 specimens. Some Category 1 potsherds have a fibrous imprint on either their exterior or interior surface, suggesting smoothing by soft wood or reeds. Some specimens have reddish-brown exteriors and dark gray interiors, which may be evidence of fire-clouding or of firing upside down.

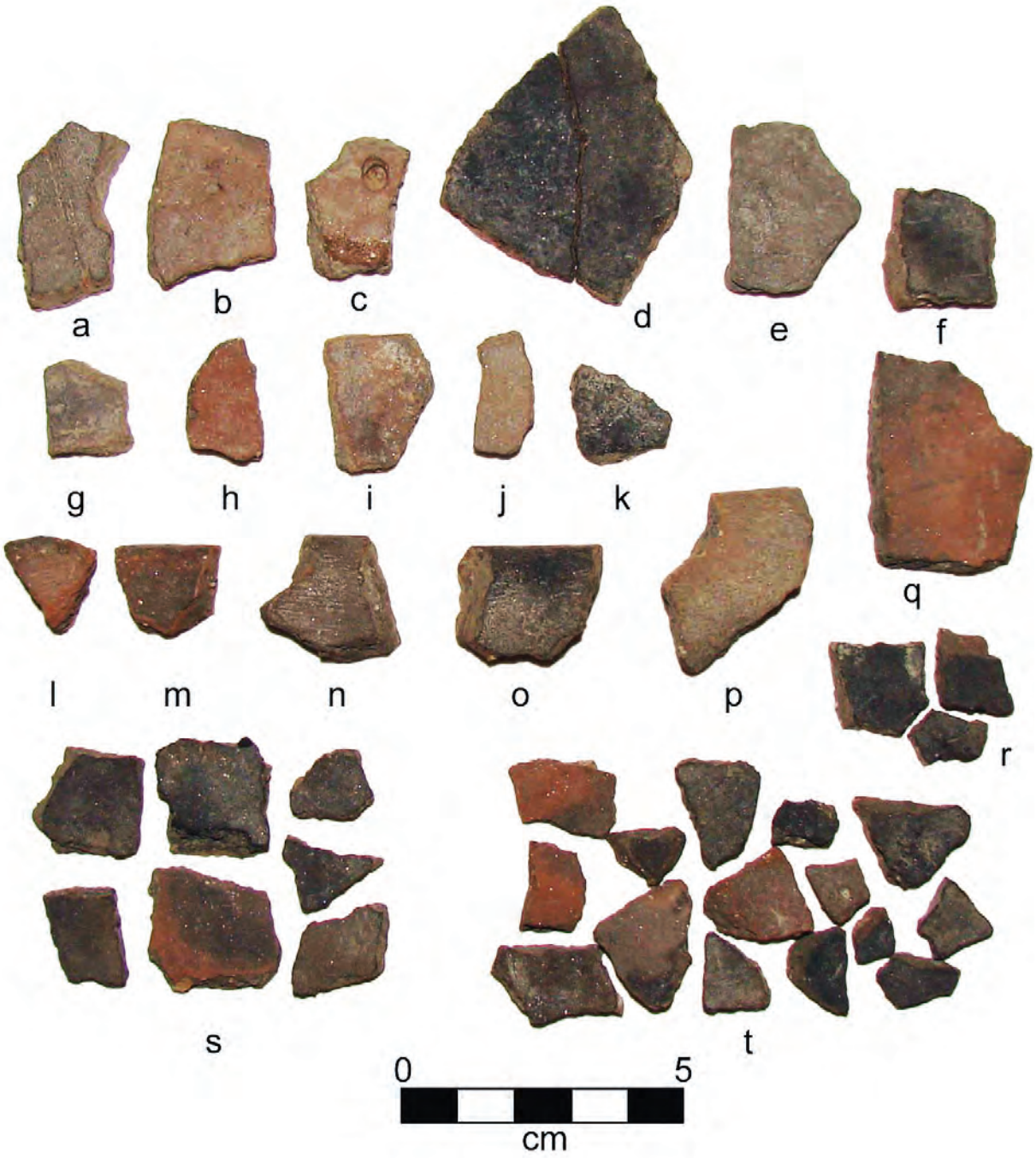


Figure 6. Selection of ceramic sherds of various sizes from CA-LAN-2630; specimens a–k and q–t are body sherds; specimens l–p are rim sherds. Note the wide range of surface coloration represented by this sample. Minute flecks of mica are visible on the surface of each sherd. Specimens a, e, n, and o exhibit interior smoothing; s and t reveal fire clouding. Air pockets are visible in specimens a, b, and t. Specimen c has been drilled for neutron activation analysis. Photograph by Rusty van Rossmann.

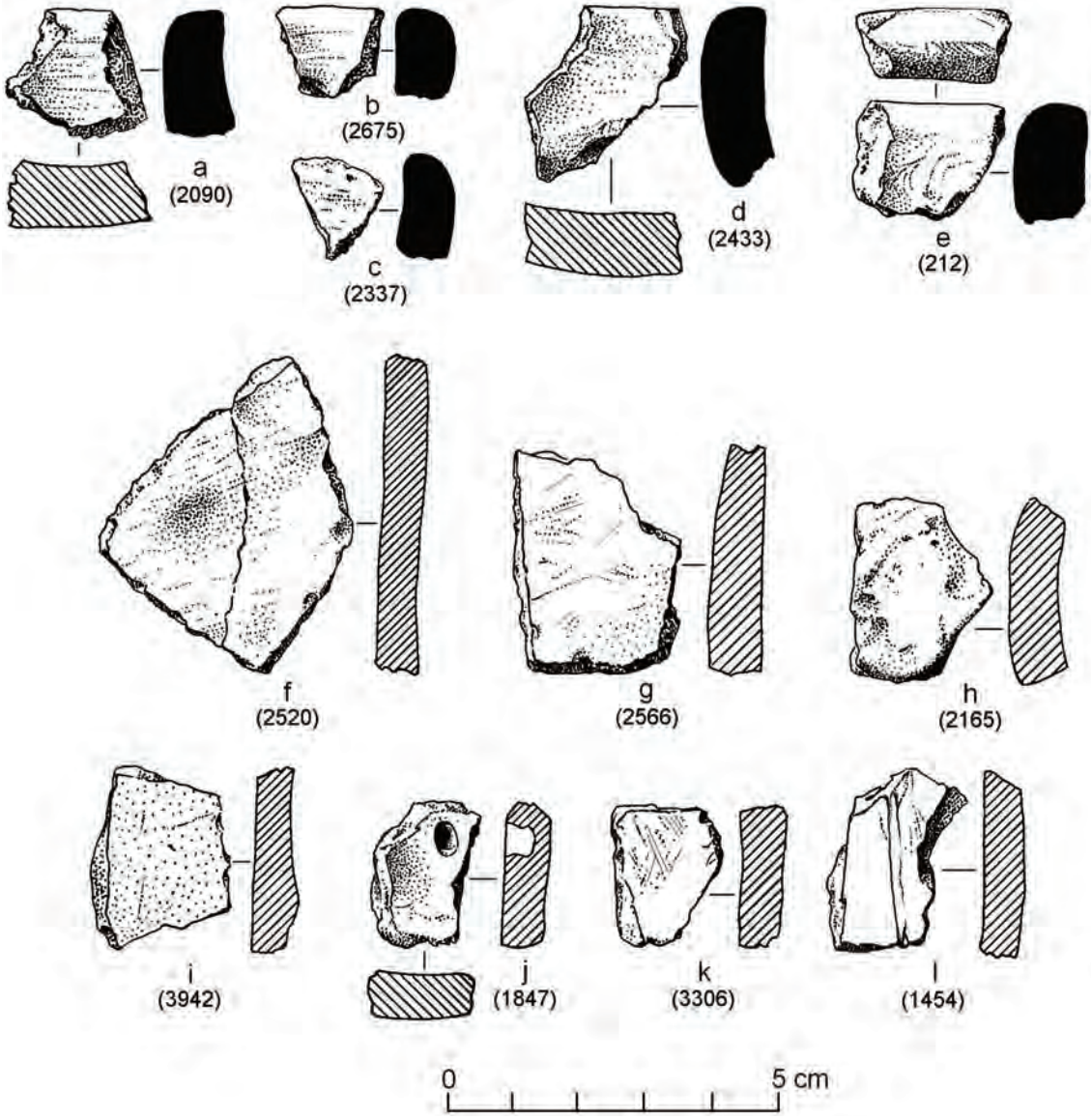


Figure 7. Rim sherd (a–e) and body sherd (f–l) profiles from CA-LAN-2630. Drill hole for NAA sampling is exhibited in Figure 7j. Drawing by Rusty van Rossmann.

This dark gray surface contains conspicuous bumps, suggesting coiling as the production method.

Category 2 potsherds comprise about 3 percent of the collection. These specimens are reddish-orange in color and contain medium-sized (.5 mm) sand with mica, quartz, and feldspar inclusions. The core and surfaces of these potsherds are sandier and coarser than the Category 1 sherds. The CSULB pottery was low-fired, which explains the fire clouds and general friability of the specimens. It is entirely possible that our Category 1 and Category 2 designations are irrelevant, representing the color variations within the same ceramic vessel.

Neutron activation analysis (NAA) and comparison of LAN-2360 pottery samples with local clay

sources support our conclusion that the CSULB Parking Structure ceramics were locally produced. Consequently, no interpretations involving trade or barter with other better known or longer studied local prehistoric ceramic cultures need be entertained. The LAN-2360 study collection sherds closely resemble Southern California Brown Ware (Van Camp 1979:67–68), which was a term that Griset (2009:122) used to denote the brown ceramics of cismontane southern California formerly lumped under Tizon Brown Ware (see also Dobyns and Euler 1958; May 1978; Lyneis 1988; Griset 1990, 1996).

All the LAN-2630 pottery is low-fired. We believe that fuel availability may have been the most significant limitation on ceramic production, although there is no evidence for this. According to Malcolm Rogers, reporting on ceramic technology from the Southern Diegueño territory some 177 km to the south:

> Pottery-making was engaged in solely by women and only during the summer months; unless, because of necessity, a special piece was required. Several reasons are advanced in explaining this seasonal restriction; in July and August, both the ground and the fuel used in firing are driest; only during the summer months will the incipient pot dry rapidly enough during the process of construction to permit the procedure to progress without delay … [Rogers 1936:4–5].

That may have been so along Bouton Creek as well, when the clay sources were still soft enough for excavation yet enough warm days had passed to sun-dry the pots to the condition preparatory to firing that modern potters term "leather hard." Firing between June and August would have allowed the stockpiling of enough fuel collected up to that point and the passage of enough days to render such fuel completely dry.[1] It is likely that weather and the difficulties involved in collecting enough fuel made firings at best only an annual event; there may have been some or even many years without any firings at all if fuel was too scarce.

Age of the Ceramics

The LAN-2630 assemblage has been assigned to the Late Prehistoric period through both relative and absolute dating methods. We conclude that the site was probably utilized for roughly 500 years during the Late Prehistoric period and protohistoric times, from about AD 1200 to 1700. This chronological placement is indicated by the complete absence of artifacts dating earlier than AD 1000 or later than AD 1715. It is also supported by the complete absence of historic pottery and historic artifacts that predate the catastrophic Los Angeles flood of 1868, by the presence of both steatite and fused shale, and by the presence of projectile points or shell beads in every unit of Strata 4 and 5 (Figures 8 and 9) that are diagnostic of the Late Prehistoric period and protohistoric times.

The LAN-2630 ceramic collection also can be cross-dated. The pottery assemblage is directly associated with artifact types and materials known from other well-dated local sites. Cottonwood projectile points, steatite, fused shale, and various shell beads are widely recognized markers of the Late Prehistoric era. All the LAN-2630 projectile points resemble Late Prehistoric and protohistoric types identified by Waugh (1988), Koerper et al. (1996), and Sutton (2010). Leonard (1971:126) placed the earliest occurrence of steatite in southern California at around AD 1300. According to Meighan (1959:393), steatite artifacts indicate occupations into the late Canaliño Phase. Wlodarski (1979:351) suggested that a climax in soapstone manufacturing and island-mainland trade occurred after AD 1000. Rosen (1978b:73, 1979) and Whitley et al. (1979:19) regard fused shale as a Late Prehistoric diagnostic material. Since shell beads were not found in direct association with directly datable features (e.g, cache pits, hearths, human burials, or animal burials), we can only speak of the ages of the

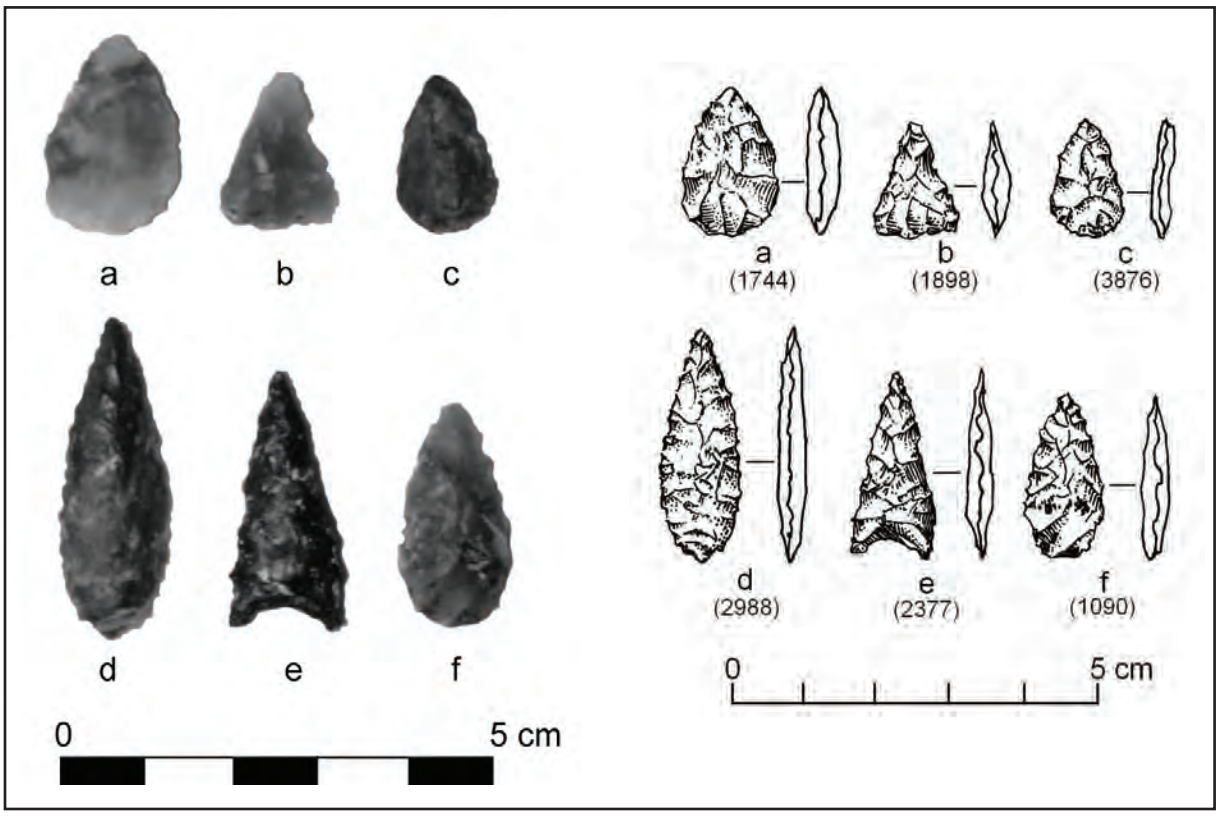


Figure 8. Diagnostic Late Prehistoric projectile points from CA-LAN-2630, stratigraphically associated with the ceramics. Photos (left) and drawings (right). Chalcedony (a–b, and f) and chert (c–e). Specimens b and f exhibit traces of asphaltum, doubtless for hafting, on their proximal ends. Drawings by Rusty van Rossmann.

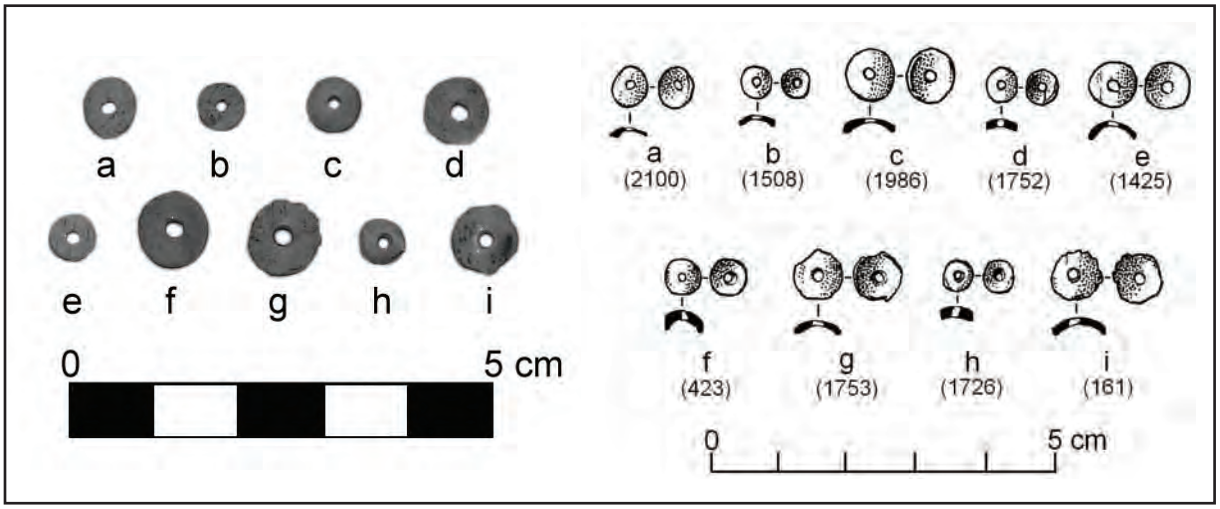


Figure 9. Examples of Late Prehistoric *Olivella biplicata* shell beads from CA-LAN-2630. Photograph and drawings by Rusty van Rossmann.

LAN-2630 beads in general terms. The study collection was compared with shell bead sequences devised by King (1974, 1990), Gibson (1975, 1992), Bennyhoff and Hughes (1987), and Groza et al. (2011).

Radiocarbon determinations also support a Late Prehistoric age for the LAN-2630 pottery. Our stratigraphic excavations produced enough samples to run 55 radiometric dates (Table 1). Forty-nine radiocarbon determinations were obtained from estuarine shells. The remaining six dates were from charcoal, cow bone, and carbonized plant materials. Radiocarbon analysis was conducted by Beta Analytic, Inc. All the radiocarbon dates reported from LAN-2630 were $^{12}C/^{13}C$ normalized and calibrated using the computer models developed by Stuiver and Reimer (1993). The shell dates are based on a global ocean Delta R of approximately 402 years, plus a local offset of 225 ± 35 years (Taylor 1987:129). The intercept (mean) and 2-sigma range of each date are reported in years AD/BC. The CSULB dates may be compared with a wide range of other radiocarbon age determinations from Los Angeles County already published (Dillon and Boxt 1989:143–147; Breschini et al. 1996).

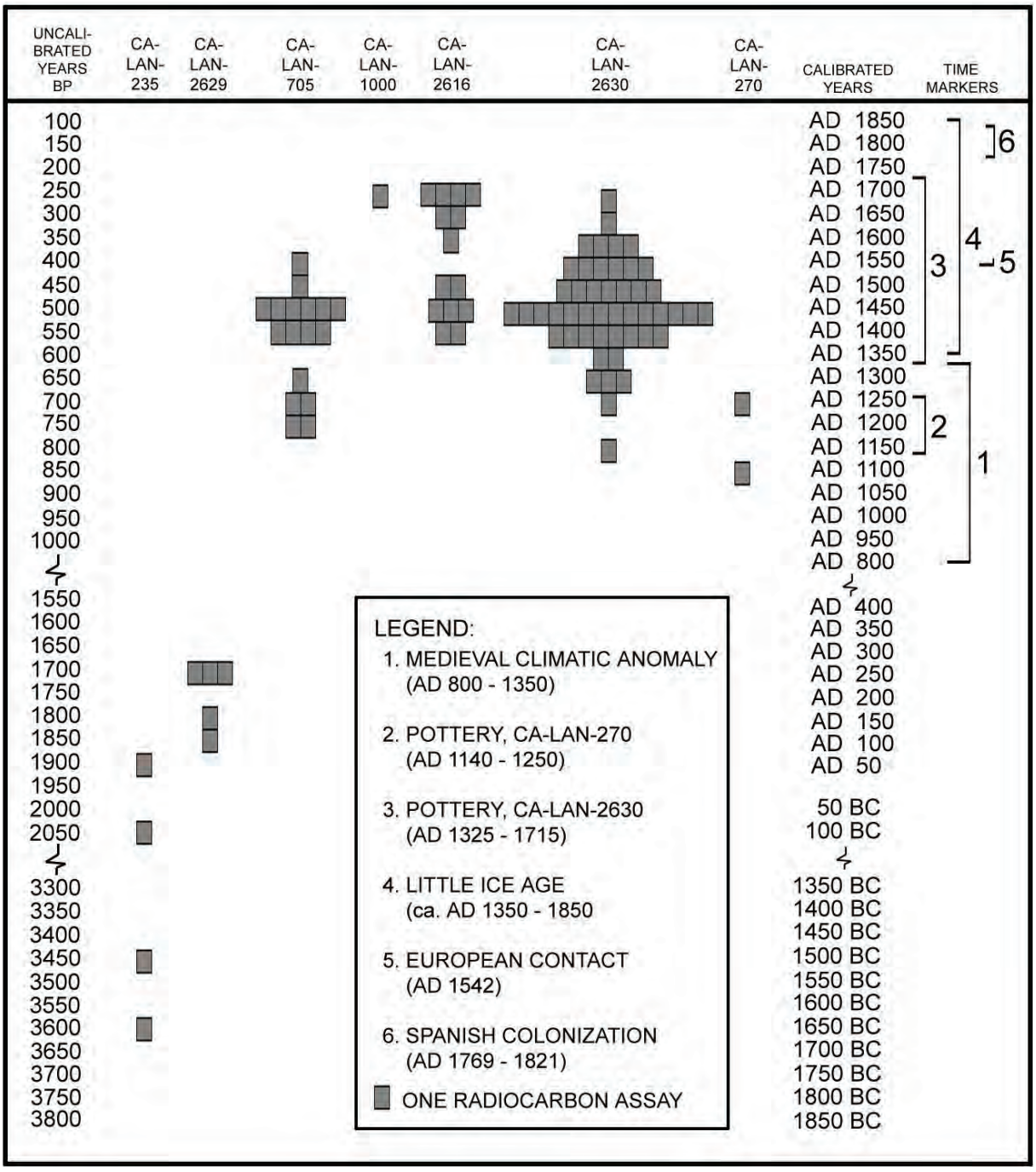
With radiocarbon dates as a proxy indicator of site-use intensity, we conclude that pottery was used at LAN-2630 from about cal AD 1325 to 1715 (Table 1). Of the 55 radiocarbon dates obtained for LAN-2630, 35 are clustered between cal AD 1400 and 1600, 12 are more recent than cal AD 1600, and eight are earlier than cal AD 1400. Despite some obvious site mixing from bioturbation and historic farming, we are confident that LAN-2630 pottery was manufactured decades, if not centuries, before the construction of Mission San Gabriel (1771).[2] Of the 12 "recent" dates, five between cal AD 1625 and 1645, fall close to the majority cluster. Even the earliest dates of cal AD 1290, cal AD 1320, cal AD 1325, and cal AD 1330 are not wildly divergent. Although several ^{14}C dates are inconsistent with the vertical stratigraphy of the site, the bulk of the Stratum 4 radiocarbon assays date to the fifteenth and sixteenth centuries AD. Moreover, 95 percent of the potsherds were recovered from the upper 50 cm of Stratum 4.

Table 2 offers an inventory of ceramics recorded at archaeological sites in mainland Los Angeles County; this table reveals that, contrary to the popular perception, prehistoric pottery is widely distributed throughout the county. However, a detailed review of each situation reveals that many of these specimens either are claimed as extremely old (Desautels-Wiley, this double issue) or known to be of exotic origin, representing either intertribal trade or prehistoric exchange with the Southwest. Trade routes and intertribal relations between southern California and the American Southwest are both well documented, which might explain a scattering of isolated Southwestern pottery sherds from Lancaster to Torrance (Farmer 1935; Forbes 1961; Ruby and Blackburn 1964; Heizer 1978; Griset, this double issue). A controversial report of Southwestern sherds from Wilmington, less than 16 km west of the CSULB campus, remains unconfirmed.[4] Verde Black-on-Gray at Bowers Cave (Van Valkenburgh 1952; Elsasser and Heizer 1963), Hohokam sherds at Big Tujunga (Walker 1951), and Cibola White Ware at the Century Ranch (King et al. 1968) suggest at least casual contact with the Southwest, probably through Mojave Indian "middlemen." Some of these exotic sherds may have appeared in what is now Los Angeles County as early as AD 900 or 1000, centuries before the homegrown pottery industry began (Table 2). Simply put, pottery is neither as rare nor as concentrated within Los Angeles County as generally thought (Table 2). We emphasize that almost all the examples from Table 2 are isolated finds without specific chronometric associations.

Ceramic Surprise: CA-LAN-270, the Los Altos Site, Revisited

Just how unique is the LAN-2630 site in terms of its ceramic content? Is it the one and only ceramic island floating in an aceramic sea, or is it simply the tip of

Table 1. Radiocarbon Age Determinations from CA-LAN-2630 and from Six Neighboring Sites in the CSULB Vicinity.



Note: Site designations at top, calibrated years at right. Note that none of the pottery-producing sites date into the Spanish Colonial period. The “battleship” date distribution at center reveals that CA-LAN-2630 is the best-dated, pottery-producing archaeological site in California.

Table 2. Prehistoric Ceramics from Mainland Los Angeles County Sites.

Site	Source	Description	Location	Age
CA-LAN-36 Bowers Cave (Cave of San Martins)	Van Valkenburgh 1952; Elsasser and Heizer 1963	Verde Black-on-Gray	Castaic, Transverse Ranges	AD 1200s
CA-LAN-43	Desautels-Wiley, this double-issue	Figurine fragments	Encino	2250 BC
CA-LAN-62A	Koerper et al. 2009:64	Fired clay	Ballona Wetlands	-
CA-LAN-82	Moore 1990; Antelope Valley Indian Museum	Southwestern, Colorado River, and local brown ware sherds	Barrel Springs Site	–
CA-LAN-167	Walker 1951	Hohokam	Tujunga	AD 600–900
CA-LAN-192	Toney 1968:7; Griset 2009, also this double-issue	Assorted	Lovejoy Springs	Late Prehistoric
CA-LAN-227	King, Blackburn, and Chandonet 1968	Tizon Brown Ware, Cibola White Ware	Santa Monica Mountains	AD 1000
CA-LAN-246	Galdikas-Brindamour 1970:157	Figurine	Santa Monica Mountains	AD 1200–1500
CA-LAN-270	Bates 1972; Boxt and Dillon, this article	Brown ware fragments	Long Beach	AD 1250
CA-LAN-283	Butler 1974:70	Fired clay fragment	San Pedro	–
CA-LAN-298 (AVC-9)	Site record form	Burned clay fragments	Fairmont Buttes	–
CA-LAN-306	Zahniser 1974	Brown ware sherd	Rancho Los Alamitos[3]	–
CA-LAN-357	R. Pence, J. Foster, and G. Gates, personal communications 9/14/2010	Southwestern sherds	Chatsworth	–
CA-LAN-361	King et al. 1974; Garza 2012	Fired clay objects; baked clay fragments	Vasquez Rocks, Agua Dulce	–
CA-LAN-365	CSUN Anthropology Curation Facility	Sherd	Vazquez Rocks	–
CA-LAN-481 (AVC-1)	R. Robinson, personal communication 9/15/10	Brown ware sherds	Antelope Valley	–
CA-LAN-488	R. Robinson, personal communication 9/15/10	Brown ware sherds	Antelope Valley	–
CA-LAN-498	Site record forms: 1972 (Croasdale); 1990 (Norwood, DeWitt, and Love)	Two partial, fragmentary pots (1972); Red-on-Brown and well-made brown ware (1990)	Rocky Butte	–
CA-LAN-771	Sutton 1979	Figurine fragments	Antelope Valley	–
CA-LAN-902	Site continuation sheet, Milburn, 06/08/11	Two reddish-colored body sherds	San Gabriel Mountains	–
CA-LAN-1100 (EAFB 203)	Site record form	Rim fragment	Edwards Air Force Base, Lancaster	–
CA-LAN-1130	Archaeological site record form; McIntyre and Turner, 5/26/1983	Tizon Brown Ware sherd	Castaic, Transverse Ranges	–
CA-LAN-1296 (EAFB 1000)	R. Loetzerich, personal communication 11/4/2010	Spindle whorl	Lancaster	–
CA-LAN-1421H	Edberg 1988 Site record form	Several prehistoric sherds	Tujunga	–
CA-LAN-1585 (EAFB 1040)	R. Loetzerich, personal communication 11/4/2010	Baked clay “effigy” fragment	Lancaster	–
CA-LAN-1732	Site record form	Brown ware sherds	Piute Butte	–

Table 2. Continued.

Site	Source	Description	Location	Age
CA-LAN-1739	Site record form	Brown ware; red-on-brown painted, and possible "stucco-ware sherd	Antelope Valley	–
CA-LAN-1798 (EAFB 1040)	R. Loetzerich, personal communication 11/04/2010	Black on White Anasazi sherd	Lancaster	–
Watson Station	LAMNHA.3087	Hohokam Red-on-buff	Wilmington	–
CA-LAN-2630	Boxt and Dillon, this article	642 sherds	–	AD 1195–1717
CA-LAN-2682	Frazier 2000:172	Pipe or tube fragment? One incised Tizon Brown Ware rim fragment	–	Late Prehistoric/ Protohistoric
Pine Canyon Pottery Site (CA-LAN-3644, CA-LAN-3437, CA-LAN-3438)	Primary Site Record Update, Brasket, 4/26/2006	Two coarse, grit-tempered, coil-made sherds	Castaic, Transverse Ranges	–
Bull Pen	LAMNH A.3160	Hohokam Red-on-buff	Wilmington	–
Torrance	C. Colemen, personal communication 9/14/10	Hohokam	Torrance	–
Sullivan Canyon	True and Warren 1961	Figurine (private collection)	Santa Monica	–
Chilao Pottery site	Primary Site Record Form, Angeles National Forest	Three body sherds, one clay object	San Gabriel Mountains	–
"Palmer Redondo"	Gladwin and Gladwin 1935:204	(Endnote 2)	Redondo	–
19-120005	MacDougal 1996 (Isolate form)	Owens Valley Brown Ware sherd	Malibu	–

a local ceramic iceberg, up to this point unnoticed by most archaeologists working in the area? LAN-2630 is the only prehistoric site on the CSULB campus known to have produced pottery, but it is not the only site in southern Los Angeles County with archaeological ceramics. We need go no further than 2.4 km north-northwest on the same drainage to LAN-270 to find another site containing prehistoric ceramics. LAN-270 also provides a cautionary tale for southern California ceramic study, where dogmatic interpretation has obscured important ceramic evidence.

Portions of LAN-270 were uncovered in 1952 during construction of a housing tract. Archaeological work was initiated by Ruth D. Simpson (1953) and members of the Archaeological Survey Association of Southern California late in 1952 (Figure 10). Soon after, Ethel Ewing of Long Beach State College directed a salvage crew for three weeks, excavating 34 units and three trenches. Excavations produced 2,700 artifacts, including 45 potsherds (Bates 1972:38). Ewing's crew uncovered 21 human burials and one cremation. Bates concluded that LAN-270 represents a Late Prehistoric period village that saw fairly steady year-round occupation and had a concentrated burial area (Bates 1972:55).

Perhaps, LAN-2630 and other neighboring sites downstream from LAN-270 on Bouton Creek were seasonal satellites of that village. After all, they lacked cemetery components. It was the artifact types (e.g., small projectile points, circular fishhooks, and hundreds of

Figure 10. Archaeological excavations ongoing at CA-LAN-270 on December 29, 1952. Identified in middle foreground are, left to right, Benjamin E. McCown, Mrs. Benjamin E. McCown, and Ben McCown, Jr. The crew included Charles Rozaire, Don Meadows, Agnes Bierman, Peter Kunkle, David Rice, Willis Grafton, Elizabeth Hagar, Bob Hammond (USC student of William A. Wallace), Ruth D. Simpson, and Ethel Ewing. Photograph courtesy of Charles Rozaire.

shell beads) that convinced Bates of the Late Prehistoric time placement. True (1990:86), however, suggested that LAN-270 may have been a multiple component site and "that at least some elements are of a respectable age."

Readers who only skim the Bates (1972) report on LAN-270 can come away without realizing that the site contained ceramics. Pottery was so rare that all the sherds encountered could have come from only two vessels. Unfortunately the pottery was neither described in any detail nor illustrated. This notwithstanding, two seemingly contradictory conclusions about the age and the genesis of the LAN-270 ceramics are offered. Bates (1972:38) identified it as "Tizon Brown Ware … of the Palomar Brown Type … the culinary ware of the historic Diegueño and Luiseño Indians of San Diego County." By doing so, she ascribed a historic age to it, but no obvious historic artifacts were recovered during the LAN-270 excavations. The historic ascription is then contradicted in the concluding section of the report.

> Chronologically, the site fits well within Horizon IV: Late Prehistoric Cultures (Wallace 1955) … there is nothing to indicate that this site [LAN-270] was occupied at the time of European arrival [Bates 1972:55].

Bates went on to embrace the fallacious assumption we called attention to at the opening of the present paper.

> Since the Los Altos site lies beyond the margin of aboriginal pottery distribution, the vessels presumably represent trade pieces [Bates 1972:55].

She repeated this viewpoint in the summary portion of her report.

> The presence of pottery [at LAN-270] suggests trade relationships with aboriginal peoples of the south [Bates 1972:55].

No radiocarbon age determinations were ever made by the excavators of LAN-270, who began work, it should be remembered, only three years after the invention of the dating process, nor were dates run by the site's later chroniclers.

We were intrigued by the presence of pottery so close to LAN-2630 with its abundant ceramics. The minimal descriptions of and contradictory interpretations offered for the LAN-270 ceramics invited a revisit to this site. In fairness to Bates, a physical anthropologist, not an archaeologist, it should be stated that her primary interest in the LAN-270 site, which she studied and published 20 years after it had been excavated by others, was its human skeletal remains. Fortunately the LAN-270 site collections remain intact, and we have been able to reevaluate this important neighbor of CA-LAN-2630.

Two shell specimens recovered from Ethel Ewing's 1953 salvage excavation were selected and submitted to Beta Analytic, Inc. for radiocarbon age determinations. These represent the only chronometric dates available for LAN-270. Specimen Beta-73646, an *Aequipecten* shell recovered from Unit H3 (0 in to 3 in), yielded a radiocarbon age of cal AD 1260. Sample Beta-73647, a *Haliotis* shell recovered from Unit D5 (18 in to 27 in), dates to cal AD 1150 as the most likely absolute calendar year. These radiocarbon data suggest possible temporal overlap with the earliest occupation for LAN-2630 (Table 1).

A sample of the pottery from LAN-270 is also illustrated for the first time (Figure 11). Visual inspection of some LAN-270 pottery involved direct comparison with selected sherds from LAN-2630 and with historic sherds from the Rancho Los Cerritos site (Evans 1969; Koerper and Flint 1978). This was not an in-depth, statistical analysis, simply an impressionistic comparison of one ceramic collection to two others from nearby sites, on the same table, on the same day, under the same conditions of natural light. In terms of surface finish and surface evidence of firing, the LAN-270 ceramics are very similar to those from LAN-2630. Some minor differences in surface color (a few LAN-270 sherds appear somewhat "redder" than comparable sherds from LAN-2630) could be attributed to expectable variation over the body of a single vessel and are therefore not considered significant. Sherds from both sites are low-fired, typically with reduced interiors and oxidized exteriors. This possibly indicates that vessels were fired while upside down, with fuel atop them, rather than the reverse. Individual sand temper grains are occasionally quite large but are found as isolated inclusions rather than as major nonplastic constituents in the sherds from both sites. Sherds from both sites incorporate much mica, and most interiors, regardless of reduction, exhibit a pronounced micaceous glint. Paste and temper are visually similar enough to suggest a common source. Wall thickness seems slightly greater among the LAN-2630 sherds, but with many hundreds to select from

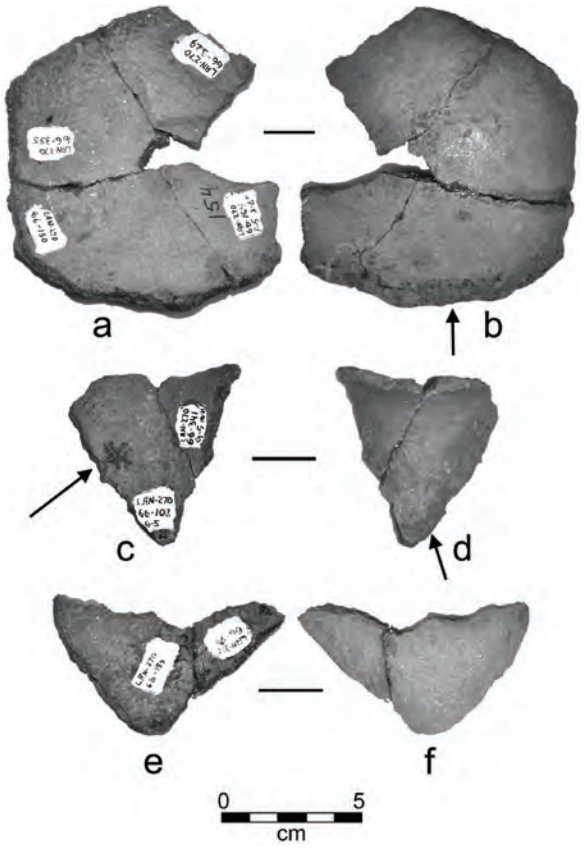


Figure 11. Examples of CA-LAN-270 vessel sherds. Interior (a) and exterior (b) base; (c) and (d) interior and exterior neck fragments; (e) and (f) are interior and exterior views of body sherds. Note evidence of asphaltum as indicated by arrows. Photographs by Ronald Jones.

against the very few known from LAN-270, this could easily be simply an accident of sampling.

The sherds from LAN-270 and LAN-2630 are much more similar to each other than either collection is to that of known historic age from the Rancho Los Cerritos site (CA-LAN-696). These latter sherds are hard-fired and exhibit a reduced carbon core "sandwich" completely unlike the "bright outer, dark inner" pattern exhibited by the LAN-270 and LAN-2630 sherds. This difference is probably the result of covered versus open firing. The historic sherds have the expectable quasi-metallic "ring" when struck, unlike the low-fired "thunk" of the more friable prehistoric sherds. Finally, the prominent micaceous and large sand grain inclusions of the LAN-270 and LAN-2630 sherds are absent from the Rancho Los Cerritos specimens. Our initial conclusion was that the LAN-270 ceramics were similar enough to the LAN-2630 ceramics of known prehistoric age and dissimilar enough from the Rancho Los Cerritos sherds of known historic age to be identified as prehistoric. They are also probably of the same ceramic tradition as the CSULB pottery. It is also likely that the clays used to produce LAN-270 and LAN-2630 vessels derived from the same parent material.

A final impression is that the LAN-270 pottery is much better preserved than pottery from LAN-2630; the sherds are larger in size and exhibit much less edge-rounding, blunting, and abrasion. This difference might be explained as an accident of preservation if different natural soil conditions contributed to one site having better ceramic preservation than the other, or it may be the result of slightly higher firing temperatures achieved by the LAN-270 potters over those of LAN-2630. On the other hand, if the LAN-270 ceramics were offertory, as part of some mortuary function, while the LAN-2630 pottery was not, this could also explain the difference in preservation. There is no reason to interpret the LAN-270 vessels as crematory or infant burial containers, but they still could have been left at this site as funerary offerings, just as many non-ceramic artifacts of stone, bone, or perishable materials were. More important from a preservation standpoint than why the ceramics were originally introduced at either site is how both were treated after deposition. Many, if not most, California burial sites and burial precincts of larger sites were seen as "taboo" locations, reserved for the dead alone, to be avoided by the living. By comparison, occupation sites experienced regular and constant human foot traffic. The difference in ceramic preservation between the two sites may best be understood simply as the result of differing degrees of trampling underfoot.

The LAN-270 pottery lacked direct association with the site's burials, yet these ordinary water jars or cooking or storage vessels, similar to those identified at LAN-2630, were less affected by natural deterioration processes and cultural degradation than those at the other site. LAN-270 was, in fact, initially interpreted by its excavators as a burial site, and only later was it identified as a village with a burial component. On the other hand, LAN-2630 has from the outset always been considered a prehistoric seasonal encampment with no associated cemetery. We believe that the probable different site functions are reflected in the differential ceramic preservation between the two sites. If the ceramics from the LAN-270 site had even minimal funerary associations, they would much more likely have been left undisturbed post-depositionally than would have been the case in normal residential contexts.

Why the Gabrielino Stopped Making Pottery

We see no merit to the long-held assumption that aboriginal ceramics in the Los Angeles area were of European inspiration. We believe that the arrival of the Europeans brought the developing local ceramic tradition to a sudden stop. The disruption of Native society, uprooting of people from their familiar collecting

areas, not just of food, but for clay resources and, more importantly perhaps, for fuel sources for firing, brought ceramic production to an end. Native culture under pressure from many different directions began to shed its more complicated aspects. Ceramic technology, rooted to the residential location, specifically because of the known clay and fuel resources nearby, had to be jettisoned once the Indians themselves were forced to move to the missions. The historical records of Los Angeles County and eastern Long Beach may shed light on why at least one aboriginal group embraced ceramic technology before the arrival of the Europeans only to abandon it afterwards.[5]

Coastal southern California experienced sporadic contact with Europeans for two and a half centuries before permanent settlement in Alta California. The first historic mention of our study region comes from summaries of the Cabrillo expedition (Wagner 1928a). On October 8, 1542, three Spanish caravels anchored in the *Bahía de los Fumos*, or Bay of Smokes, thought by Bancroft (1886:71) to be San Pedro Harbor, lying roughly 16 km southwest of what is now the CSULB campus. The translation of Cabrillo's log reads:

> … Here they engaged in intercourse with some Indians they captured in a canoe, who made signs to them that towards the north there were Spaniards like them. The bay is in 35º; it is an excellent harbor and the country is good, with many valleys, plains, and groves of trees … [Wagner 1928a:47].

Sixty years later, on November 29, 1602, merchant-adventurer Sebastián Vizcaíno sailed from Catalina Island (Wagner 1928b, 1929:180–273; Mathes 1965:1:595–599), entering a bay which he named San Pedro and making landfall less than 20 km from our study site (Figure 12).

> While on shore, Vizcaíno placed a cross on an Indian idol and attempted to instruct the Indians in the Christian form of worship. That evening a council meeting was held, and it was decided that since supplies were running low, and some of the men were sick, the voyage should continue [Mathes 1968:92].

Intriguingly, the frequency of CSULB radiocarbon determinations plummets at around AD 1580, or shortly after the initial contact of European explorers in this region. We infer a dramatic decline in Native American settlement at LAN-2630 roughly 40 years after Juan Rodríguez Cabrillo's expedition and some 22 years before Sebastián Vizcaíno's anchorage at the *Ensenada de San Andrés,* the bay Cabrillo had earlier named *Bahía de los Fumos*:

> … where smoke and green vegetation were seen, but there seemed to be no protection from the winds. This was probably the bay called San Pedro, a name still retained like those of the islands ... [Bancroft 1886:99].

This is particularly notable in view of the fact that moisture conditions remained high during this time interval (Pielou 1991), suggesting that deterioration of the food potential of the area is not an adequate explanation for the inferred decline. Cabrillo came up the Pacific coast from his starting point in Guatemala, where introduced European diseases were already running rampant by 1542, the time of his departure. These observations weigh into current debates about the possible impacts of European-introduced diseases in aboriginal coastal southern California.

On October 21, 1784, 242 years after initial European contact, California Governor Pedro Fages gave a provisional grant of land encompassing 101,215 hectares, or 250,000 acres, to Manuel Nieto, a retired "leatherjacket" soldier who had participated in the Gaspar de Portolá expedition from July 14, 1769, to January 24, 1770. The original grant terms clearly stressed that settlement by Europeans should not cause any

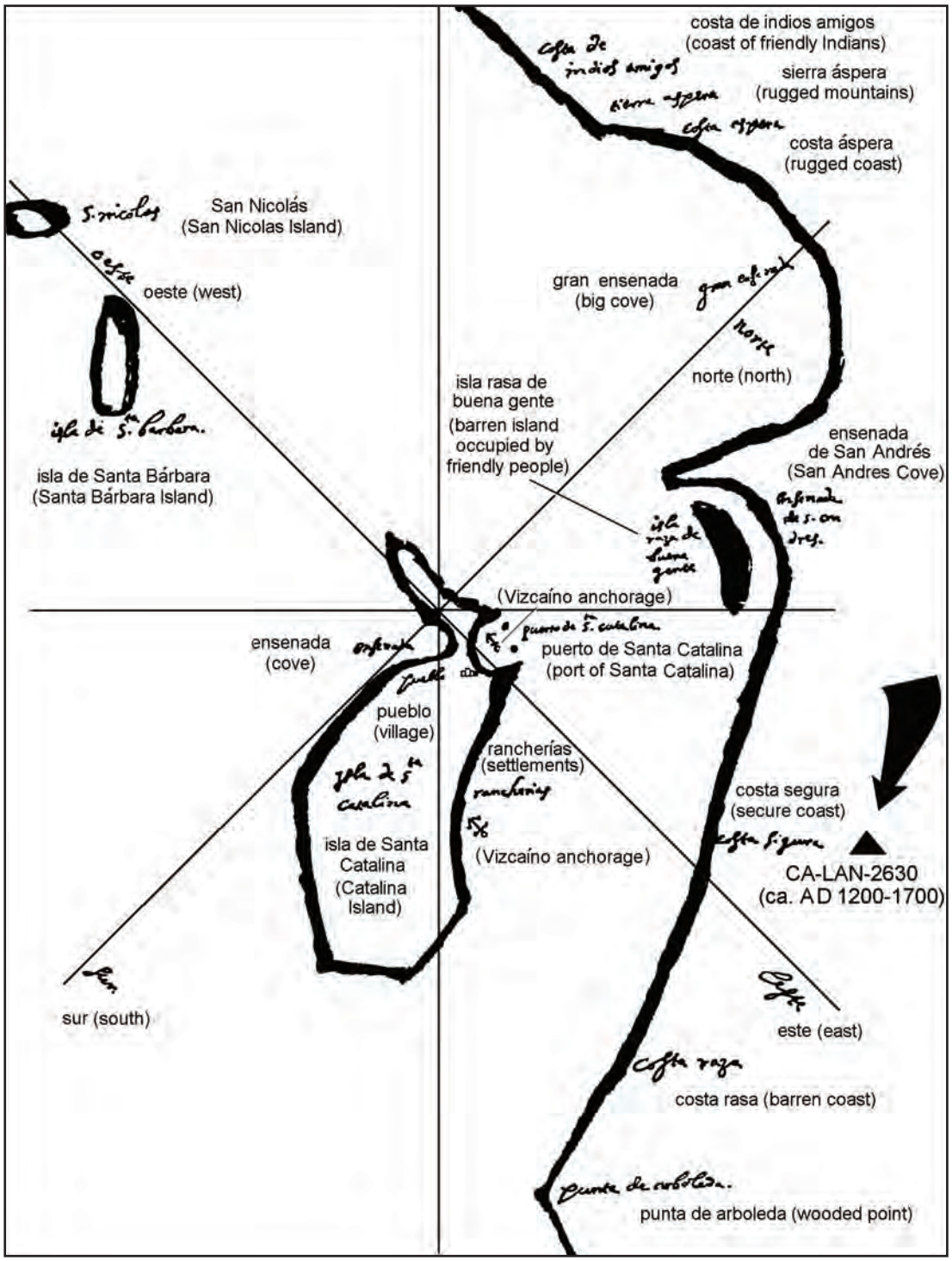


Figure 12. Sebastián Vizcaíno sailed into San Pedro Bay and made landfall on November 29, 1602. Enrico Martínez' 1603 map was redrawn from the original drafted during the voyage by Gerónimo Martín Palacios, chief cosmographer. CA-LAN-2630 (arrow) would have been occupied at the time of the earliest European contact but was already in decline by the time of Vizcaíno. Translation of palaeography by W. Michael Mathes; map additions by Rusty van Rossmann and Matthew A. Boxt (after Mathes 1968:Plate 29:91).

damage to the missions, pueblos, Indian rancherías, or to their corn fields (National Archives n.d.:172). The Nieto grant encompassed several ethnographically-known Gabrielino settlements, including *Nakaungna, Chokishngna* (Johnston 1962:83–85), *Ahauwit, Pubu* (*Puvunga*), *Sehat, Shua,* and *Tibahangna* (Kroeber 1925:Plate 57). The exact locations of these places are still disputed by both archaeologists and historians.

The expansive Nieto land grant included that area now incorporating the cities of Long Beach, Huntington Beach, Norwalk, Downey, and all the intermediate communities including Signal Hill and Santa Fé Springs. Physiographic features delineated the Nieto property; the Santa Ana and San Gabriel rivers formed the eastern and western boundaries. The San Gabriel Mountains and Pacific Ocean bounded the parcel to the north and south, respectively. The small area of the grant referred to as *Los Alamitos* (after the dwarf cottonwoods nearby), although probably not a permanent settlement at the time, was the site of a natural spring and watering place (Lavender 1987a:77).

During the Mexican period (AD 1821–1848) Abel Stearns made Rancho Los Alamitos the center of a huge empire, containing at its peak more than 230,000 acres and over 18,000 head of cattle (Gates 1967:129; Dakin 1978:288; SRS 1979:16). An early Indian labor surplus created by secularization (1834) facilitated the creation of the Stearns empire, founded in good part on the demand for hides and trade with the eastern seaboard of the United States after Mexico's independence from Spain in 1821. Hides from California were shipped around the tip of South America to be made into shoes, leather belts, and machine parts for eastern industries. Tallow from southern California was widely used in the manufacture of soap and candles (Lavender 1987b). In 1835 while the Mexican flag was still flying over California, Richard Henry Dana (1916:118) stated that to his surprise San Pedro furnished more hides than any other port on the coast.

Stearns created a major enterprise out of the Los Alamitos property itself, employing hundreds of laborers, many Indians among them (Harlow 1982:150; Monroy 1990:169). The ranchos were devoted largely to raising cattle for the export of hides and tallow. They gradually replaced the Franciscan missions as the dominant force in the economic and social life of the region (Schuyler 1978:75; Phillips 1993:107). They were also the epicenter of expatriate Spanish culture and sat at the top of a regional social structure based upon ethnic heritage, property ownership, and patronage. In the middle was a large group of persons of mixed ethnicity—troops, artisans, and town residents; at the bottom were those with local Indian ancestry and common laborers, many of whom lived in the *jacales* (adobe or tule huts) that comprised the *Indiada,* which stood near the mission itself.

> In the early fifties, the main street or roadway of the Mission San Gabriel ran about a mile and three-quarters from the church in the shape like a reclining letter L, the lines of the long shank of the letter-shaped street vanishing among the live-oak trees to the north of the mission. On the side and between rows of willows, ran the zanja which watered the "milpas" of the Indians. And on either side of the street were the "jacals" or huts built of adobe and thatched with tule, which was cut in the lake near Pasadena, tied in bundles, dried in the sun, and bound on the roofs with thongs of the same, making a picturesque and weather-proof covering. There dwelt the remnants of the Mission Indians. They planted corns, beans, pumpkins, peas and chiles, and flowers of the brightest hues nodded to their reflections in the rippling zanjas [King 1899:139-140].

Others dwelt in rancherías distributed widely over the estate and served as hostlers, cattle wranglers, masons or adobe brick makers (*albañiles*), artisans, laborers

(*labradores*), sheep shearers, and menials, or servants (*sirvientes*), on the ranchos (Jackson 1883a:512; Bryant 1936:435; Cleland 1941:30; Jackson 1977:165–166). Many were also employed in stevedoring, fishing, whaling, and building roads and railroads (Shipek 1987:33). None were mentioned as making pottery, either of traditional or European form.

Of 2,228 persons living in Los Angeles in 1836, 553 were Indians (Layne 1936:83). Six hundred and fifty Indians represented approximately 30 percent of Los Angeles' 1844 recorded population of 2,422 people (Los Angeles City Archives 1830–1844:626). By 1852, after California statehood, Los Angeles had a population of about 3,700 "domesticated" natives living among a non-indigenous community of a little over 4,000 "whites" (Newmark 1916:25). The 1836 *Padrón* [census] *de la Ciudad de Los Angeles y su Jurisdicción* (Layne 1936:162) lists 33 Indians at Rancho Los Alamitos, ranging in age from one to 80. Roughly half this labor force came from San Buenaventura and San Diego, reflecting the trend of Native American emigration set in motion by full secularization of the California missions. The 1844 census lists 10 Native American men on the Stearns rancho (Los Angeles City Archives 1830–1844:623). The 1850 Census of the City and County of Los Angeles reports a "Domesticated Indian" population of 2,778 men and 1,415 women (Alliot 1929:21), which included dozens of Indian families in the vicinity of the present CSULB campus, living and working at the Dominguez, Los Palos Verdes, Los Cerritos, Los Alamitos, Bolsa Chica, Las Bolsas, or Santa Gertrudes ranches (Alliot 1929:24, 76–80).

Various personal accounts provide scraps of information about the Indians of the area who came under the influence of Stearns' operations and make it clear that Indians played an important role in day-to-day functions. Correspondence between Abel Stearns and his business associates (e.g., Brinley [1852], Stearns [1854, 1857], and Alexander [1866]) make frequent references to Indian employees on the rancho. Similarly, Juan Temple's (1859) ledger sheets document cash payments made to Indians employed at Rancho Los Cerritos. Maps dating from the 1850s and 1870s (Figure 13) clearly identify Indian "huts" and encampments on the Santa Gertrudes (Robinson 1873), Los Cerritos (Hancock 1857; cf. Gillingham 1961:424), and Los Coyotes ranchos.

A Los Angeles newspaper reporter commented:

> On Tuesday morning last, two poor Indians were found murdered; the first on Main street, who had thirteen stabs on his body and arms, and another near the church, caused by blows inflicted upon his head. They were decently interred by the City Marshal. We have not heard of any arrests having been made in order to bring the assassins to justice. These poor creatures are fast disappearing from our midst, victims of those who still continue to furnish them with intoxicating drinks, until they are lost to all sense of right or wrong, and in their intoxicated moments prey upon each other [Los Angeles Star 1855 Vol. IV, No. 52:2].

Hugo Reid observed that:

> ... most of the Indians remaining in the county are from other parts—from Santa Ynez to San Diego. A few are to be found at San Fernando, San Gabriel and the Angeles. Those in service on ranchos are a mere handful. You will find at present more of them in the county of Monterey than in this, excluding the three places named above [Heizer 1968:100].

As is the case with much of the census data from the period, however, we have no reliable way to distinguish North American Indians from Mexican Indians

Figure 13. Map of a portion of Los Angeles County, showing the "Abel Stearns ranches," La Habra, Los Coyotes, San Juan Cajon, Las Bolsas, and La Bolsa Chica (Baker 1873–1875). Two "Indian camps" (large arrows) are identified on this map, less than 10 km north of CA-LAN-2630, on the same drainage. Map courtesy of the Bancroft Library, University of California, Berkeley.

or cultural Indians from mestizos. Most of the Indians that settled in Los Angeles came from outlying regions beyond the Los Angeles-San Gabriel area (Phillips 1980:432). More than half of them, however, lived in non-Indian households, working as house servants; male workers lived on nearby ranchos since lodging for entire Indian families was not usually available (Hurtado 1988:198–199).[6]

In Los Angeles the economic integration of the Indian was at least partially forced and led to social disintegration:

> What to do with the Indian was the burning issue of that day [1850]—not the wild ones from the mountains who stole the rancheros horses and cattle … It was the tame Indians—the Christianized neophytes of the Missions that worried the city fathers. The Mission Indians constituted the labor element of the city and country. When sober they were harmless and fairly good laborers, but in their drunken orgies they became veritable fiends, and the usual result of their Saturday night revels was a dead Indian or two on Sunday morning. And all the others, old and young, male and female, were dead drunk. They were gathered up after a carousal and carted to a corral and herded there until their day of judgment came, which was Monday; then they were sentenced to hard labor. At first they worked on chain gangs on the streets, but the supply became too great for city purposes [Guinn 1902:116].

Economic integration revolved around the access of local employers to inexpensive Indian labor procured through cooperation with city officials. Indians were frequently paid for their week's labors in alcohol (Jackson 1977:210), their ensuing drunkenness used as grounds for arrest by bounty hunters or by a marshal's posse. They were then bought by employers for the price of their fine for another week's work (Phillips 1980:444-447). Indians could not protest, as courts refused to hear their testimony in cases that involved white men (Lavender 1987a:213). This system, which relied in part on Indian collectors who were paid to bring other Indians to trial, apparently provided a substantial revenue to the city (Guinn 1902:117). In 1861 (Records of the Common Council 1861–1865, Vol. 5:20), the Los Angeles mayor verbally recommended that the city marshall and police officers be paid 50 cents for each Indian arrested, who would then be employed by the Water Works. Indentured servitude was finally outlawed in 1863. Indians living in southern California cities were also victims of poverty, ill heath, and violence. In the 1850s, one observer reported, there was not less than one Indian death each day, mostly from violent causes (McGroarty 1923:66-67).

One doctor estimated in 1855 that nine-tenths of the Indian population of Los Angeles was infected with syphilis (Phillips 1980:441). Most Indians lived either on private estates owned by Euro-Americans or in dismal camps on the outskirts of settlements, for which they served as a cheap labor pool (Phillips 1981:6). Alcoholism among Indians living in such conditions was widespread (Robinson 1938:157, 164–165).

Probably within only a few months of initial European contact, introduced diseases began to diminish the local Indian populations. The resulting demographic changes doubtless also led to displacements by the survivors. Two hundred years later, forced acculturation was the result of the first permanent European presence in southern California. Within a single generation the local Indians were no longer hunters and gatherers and only occasionally made pottery; they were now farmers or vaqueros working the lands of the newcomers. Success under the new regime was largely the result of how rapidly and how completely the local Indians had become acculturated. Eventually, many old skills and practices, such as chipped stone

tool making, controlled burning of the chaparral, and pottery making, just faded away.

Conclusions

Excavations at LAN-2630 produced the largest assemblage of prehistoric pottery in Gabrielino territory. The quantity of ceramic specimens at LAN-2630, which may represent only 10 or 12 vessels, suggests casual, even experimental, use of pottery by the site's Native population. In no regard can pottery be considered an essential technology. The archaeological ceramics of Long Beach were not trade goods; rather, they represent a nascent indigenous industry on the eve of European contact. They are remnants of a technology that was lost and forgotten in the cultural maelstrom resulting from the permanent European intrusion into southern California two and a half centuries ago.

We believe that once ceramic vessels were made in or near the site along the banks of Bouton Creek, this is where they stayed throughout their uselife. In other words, the Gabrielino Indians, most likely women, who made the vessels ranged between many different localities that we now recognize as separate archaeological sites, but their fragile and rare ceramic vessels were left at home. The quantity of sherds and their stratigraphic placement suggests that while ceramic vessels were made and used over a 400-year period, they were nevertheless limited to only a few sites of the hundreds known to have been occupied by the Late Prehistoric Gabrielino.

Returning to our original question, did the Late Prehistoric Gabrielino make pottery? The answer now must be a resounding **"**yes." Archaeological, historic, and stratigraphic evidence argues that the LAN-2630 ceramic tradition predates European colonization in this region by several centuries. The complete absence of mission or rancho era artifacts at LAN-2630 is additional proof that the excavated ceramic collection is not the product of historic acculturation or importation during the Spanish or Mexican periods.

One hundred and two radiocarbon determinations from the CSULB campus, including 55 dates from LAN-2630, suggest that human occupation of the area closely correlates with variation in moisture conditions in Late Prehistoric times (Boxt et al. 1999; Table 1, Appendix 1). A precipitous decline in the number of radiocarbon assays equating with the end of the sixteenth century may correlate with demographic decline resulting from first appearance of Europeans in the region. The logical conclusion is that European-introduced diseases had begun to ravage the local California Indian populations long before a permanent European presence became established. With the permanent European foothold in what is now Los Angeles County, the nascent pottery industry came to an abrupt end.

Unlike some within the archaeological community, we do not believe that the handful of Southwestern sherds, most likely brought to ancient southern California by Colorado River middlemen, sparked a local ceramic revolution. We do not think that such imports were so inspirational as to compel aceramic cultures to change into pottery-producing ones. Rather, we suspect that the varied Southwestern sherds were brought to prehistoric southern California as curiosities.These sherds were unlikely to have been considered as models to be imitated by local potters. The LAN-2630 potters would have made their own ceramics regardless of whether Indian traders imported exotic sherds from the distant Southwest or left them behind.

The geographic distribution of the Southern California Brown Ware ceramic tradition, previously reported at ORA-119A, a site only 32 km south of the CSULB campus, can now be extended northward into coastal Los Angeles County. This ceramic expansion took place entirely during the Late Prehistoric period, sometime around AD 1300. Both LAN-2630 and

LAN-270, unlike most southern California sites where pottery is primarily a surface manifestation, yielded pottery only from excavated contexts. Although such pottery may not have played a major role in the lives of the Late Prehistoric peoples of LAN-2630, its discovery opens up new research vistas for future archaeologists in coastal southern California. How far north can pottery be found along this coast? Is there an inevitable connection between major drainages and ceramic technology? Did easy access to steatite or, conversely, the absence of soapstone influence the rejection or acceptance of pottery? Most importantly, did ethnic relationships facilitate or obstruct the spread of ceramic technology?

Six decades ago Meighan (1954:222) concluded that "the art of pottery making was still spreading in southern California at the time of European entry." The prehistoric pottery at LAN-2630 and LAN-270, discovered where conventional wisdom said it should not exist, supports Meighan's statement.

Los Angeles, no less than its surrounding satellite communities such as Long Beach, is a modern city of concrete and asphalt, where prehistoric archaeological deposits which escaped obliteration during rapid twentieth century urbanization are mostly invisible, obscured by pavements (Chartkoff and Chartkoff 1972; Dillon and Salls 1989; Dillon 1993, 1997). Research on the CSULB campus reminds us that such hidden deposits remain valuable in objective archaeological terms and are still capable of producing evidence that can force the revision of long-held assumptions about prehistoric culture in southern California. We anticipate that future investigations will continue to expand the boundaries of ancient ceramic technology in southern California. The LAN-2630 site is the first site in Los Angeles County where excavated pottery is directly associated with dozens of radiocarbon dated samples from the same sealed unit of contemporaneity. We hope it will not remain the only one.

End Notes

1. The moderate abundance of jack mackerel and Pacific mackerel at LAN-2630 suggests a summer and fall occupation, as these schooling fish tend to frequent the southern California littoral at this time of year. The site could have been occupied during other parts of the year.

2. The negative effects of bioturbation on archaeological sites in southern California are well reported (Bocek 1986). To the best of our knowledge, the first historic mention of the creature most responsible for the mixing of archaeological strata comes to us from no less an authority on Los Angeles history than Harris Newmark, one of the modern city's founding fathers. The common ground squirrel "burrowed" into Newmark's memory, so much so, that even after 60 years in southern California he commented upon their numbers: "… there were millions of ground squirrels all over this country …" (Newmark 1916:215). The same rodent had been there to greet him upon his arrival to Los Angeles in 1853:

> Soon after [leaving] San Pedro [en route for Los Angeles], we passed thousands of ground squirrels, and never having seen anything of the kind before, I took them for ordinary rats. This was not an attractive discovery; and when later we drove by a number of ranch houses and I saw beef cut into strings and hung up over fences to dry, it looked as though I had landed on another planet [Newmark 1916:24].

3. Thirteen potsherds were reported from CA-LAN-306, a site that is so thoroughly mixed that accurate chronological assessment is impossible. Zahniser (1974:22) stated that, "at least some of these sherds should probably be classified with the Cerritos Brown …" (cf. Evans 1969).

4. Notes and lists of artifacts associated with the Van Bergen Los Angeles Museum Expedition to the Palmer Redondo site in 1932 indicate that no Hohokam sherds or sherds of any other type were recovered. Apparently, the handwritten notes for the Palmer Redondo site also contain a brief description of work done at the Wilmington Bull Pen site, which produced "Hohokam" pottery; this note may have resulted in some confusion about the identification of pottery at the Palmer Redondo site. However, the original lists of the Wilmington Bull Pen site state they are trade wares from the Mono Basin and Mohave [Desert?]. Perhaps these sherds were later identified as Hohokam Red-on-buff (Chris Colemen, personal communication 2010).

5. For detailed studies of the Rancho Los Alamitos, we refer the interested reader to Smith (1931), Robinson (1966), Lavender (1987a, 1987b), Young et al. (1987), and McCawley (1996).

6. In the 1850s and 1860s the economy of southern California, and Los Angeles in particular, was dominated by grape-growing and winemaking. Vines from Baja California had been cultivated in southern California since 1769, when Franciscan friars began planting at the San Diego Mission. Southern California would remain the center of regional winemaking until the late 1850s (Wilson 1965:143–144), dependent on the labor of Indian men, with male Indian labor playing a key role in both activities. Indians planted the vines, picked the fruit, crushed the grapes, and tended the fermentation process, frequently on a contract basis using skills learned at the missions (Jackson 1883b:814; Jackson 1977:194–195; Foster 1887:50; Mason 1984:124).

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Appendix

Radiocarbon Assays from CSULB and Regional Archaeological Sites.

Laboratory Number[1]	Site	Location/ Depth (cm)[2]	Measured Radiocarbon Age	Material	13C/12C Ratio	2 Sigma Calibrated Result (Intercept)
B-68881	CA-LAN-2630	A-10/0–10	960 ± 60	*Chione undatella*	0.5	AD 1460–1695 (1580)
B-69139	CA-LAN-2630	A-13/0–40	930 ± 60	*Chione undatella*	0.4	AD 1330–1500 (1430)
B-63489	CA-LAN-2630	A-13/70–80	970 ± 60	Shell[3]	0.5	AD 1455–1690 (1555)
B-68816	CA-LAN-2630	A-22/0–10	920 ± 60	*Chione californiensis*	0.7	AD 1480–1730 (1645)
B-68817	CA-LAN-2630	A-22/60–70	1030 ± 60	*Chione californiensis*	0.5	AD 1425–1660 (1500)
B-68818	CA-LAN-2630	A-28.7/10-20	960 ± 60	*Chione californiensis*	-0.2	AD 1460–1695 (1580)
B-63488	CA-LAN-2630	A-28.7/80-90	1080 ± 60	Shell[3]	0.6	AD 1395–1625 (1470)
B-68880	CA-LAN-2630	A-6/20-30	830 ± 60	*Chione undatella*	0.1	AD 1555–1950 (1690)
B-63490	CA-LAN-2630	C-19/0-10	1080 ± 60	Shell[3]	0.4	AD 1395–1625 (1470)
B-68820	CA-LAN-2630	C-19/30-40	1110 ± 60	*Aequipecten aequisulcatus*	1.2	AD 1350–1555 (1455)
B-68819	CA-LAN-2630	C-4/90-100	1130 ± 60	*Aequipecten aequisulcatus*	0.9	AD 1330–1535 (1445)
B-68821	CA-LAN-2630	I-2/0-10	1110 ± 50	*Chione undatella*	0.5	AD 1385–1535 (1455)
B-68822	CA-LAN-2630	I-2/100-110	1220 ± 60	*Aequipecten aequisulcatus*	0.7	AD 1280–1470 (1395)
B-68823	CA-LAN-2630	Q-3/20-30	1030 ± 80	*Aequipecten aequisulcatus*	1	AD 1405–1675 (1500)
B-68824	CA-LAN-2630	T-1/0-10	960 ± 60	*Chione undatella*	0.9	AD 1460–1695 (1580)
B-63487	CA-LAN-2630	T-1/40-50	990 ± 60	Shell[3]	1.2	AD 1445–1680 (1535)
B-64272	CA-LAN-2630	TT.5-2/30-40	960 ± 60	Shell[3]	1.2	AD 1460–1695 (1580)
B-64271	CA-LAN-2630	TT.5-5/40-50	940 ± 70	Shell[3]	0.4	AD 1460–1730 (1625)
B-68825	CA-LAN-2630	U.5-2/20-30	790 ± 60	*Chione undatella*	0.6	AD 1635–1950 (1715)
B-63492	CA-LAN-2630	V-4/50-60	1280 ± 70	Shell[3]	0.8	AD 1215–1450 (1325)
B-64270	CA-LAN-2630	V-6/70-80	1110 ± 70	Shell[3]	0.4	AD 1330–1610 (1455)
B-68517	CA-LAN-2630	V-7/100-110	1180 ± 60	*Aequipecten aequisulcatus*	0.6	AD 1305–1495 (1420)
B-68882	CA-LAN-2630	X-4/10-20	1050 ± 60	*Chione undatella*	0.6	AD 1415–1650 (1490)
B-72323	CA-LAN-2630	X-4/10-20	1340 ± 60	*Chione fluctifraga*	-0.9	AD 1170–1400 (1290)
B-68883	CA-LAN-2630	X-7/40-50	1050 ± 60	*Chione undatella*	0.4	AD 1415–1650 (1490)
B-72324	CA-LAN-2630	X-7/20-30	1020 ± 50	*Chione undatella*	0.5	AD 1440–1650 (1510)
B-72325	CA-LAN-2630	X-7/60-70	1070 ± 60	*Chione undatella*	1	AD 1400–1630 (1470)
B-68884	CA-LAN-2630	X-9/40-50	980 ± 60	*Chione undatella*	0.6	AD 1450–1685 (1545)
B-64274	CA-LAN-2630	X-9/90-100	1100 ± 80	Shell[3]	2	AD 1330–1635 (1460)
B-68885	CA-LAN-2630	Y-10/20-30	1060 ± 60	*Chione undatella*	0.6	AD 1405–1645 (1480)
B-68886	CA-LAN-2630	Y-10/40-50	940 ± 60	*Chione undatella*	0.7	AD 1470–1710 (1625)
B-69140	CA-LAN-2630	Y-4/0-23	900 ± 60	*Chione undatella*	-0.5	AD 1360–1520 (1450)
B-63491	CA-LAN-2630	Y-4/80-90	1070 ± 60	Shell[3]	0.6	AD 1400–1635 (1475)

Radiocarbon Assays from CSULB and Regional Archaeological Sites (continued).

Laboratory Number[1]	Site	Location/Depth[2]	Measured Radiocarbon Age	Material	13C/12C Ratio	2 Sigma Calibrated Result (Intercept)
B-68374	CA-LAN-2630	Y-4,Y-5/50-60	1460 ± 70	*Chione undatella*	0.1	AD 1020–1315 (1195)
B-64273	CA-LAN-2630	Z-6/10-20	1000 ± 90	Shell[3]	1.8	AD 1415–1700 (1525)
B-69142	CA-LAN-2630	Z-6/20-30	150 ± 50	Corn	-10.4	AD 1660–1950 (Historic)
B-69141	CA-LAN-2630	Z-6/20-30	30 ± 70	Bean	-27.5	AD 1680–1940 (Historic)
B-68887	CA-LAN-2630	Z-7/10-20	1050 ± 50	*Chione undatella*	0.5	AD 1425–1635 (1490)
B-64275	CA-LAN-2630	Z-7/60-70	1130 ± 70	Shell[3]	1.9	AD 1320–1555 (1445)
B-68888	CA-LAN-2630	Z-9/10-20	960 ± 60	*Chione undatella*	0.8	AD 1460–1695 (1580)
B-68826	CA-LAN-2630	Locus 4, Unit 1/ 0-10	1190 ± 60	*Chione undatella*	0.1	AD 1300–1490 (1415)
B-64266	CA-LAN-2630	Locus 4, Unit 1/ 60-70	1110 ± 60	Shell[3]	1.5	AD 1350–1555 (1455)
B-64268	CA-LAN-2630	Locus 4, Unit 2/30-40	920 ± 60	Shell[3]	0.4	AD 1480–1730 (1645)
B-68827	CA-LAN-2630	Locus 4, Unit 2/60-70	1270 ± 60	*Chione undatella*	-0.2	AD 1245–1445 (1330)
B-68828	CA-LAN-2630	Locus 4, Unit 3/0-10	1140 ± 60	*Aequipecten aequisulcatus*	1.1	AD 1325–1525 (1440)
B-64269	CA-LAN-2630	Locus 4, Unit 3/80-90	980 ± 60	Shell[3]	-0.2	AD 1450–1685 (1545)
B-68829	CA-LAN-2630	Locus 4, Unit 3/140-150	1190 ± 70	*Aequipecten aequisulcatus*	1.2	AD 1290–1500 (1415)
B-64265	CA-LAN-2630	Locus 4, Unit 7/ 40-50	1150 ± 60	Shell[3]	1.7	AD 1320–1515 (1435)
B-64267	CA-LAN-2630	Locus 4, Unit 7/ 80-90	1250 ± 70	Shell[3]	0.6	AD 1245–1465 (1350)
B-68830	CA-LAN-2630	Locus 4, Unit 7/ 130-140	1290 ± 40	*Chione undatella*	0	AD 1255–1420 (1320)
B-68372	CA-LAN-2616	Unit 4/170-180	810 ± 60	*Chione undatella*	-2.7	AD 1610–1950 (1700)
B-74178	CA-LAN-2616	Unit 4/ 230-240	810 ± 50	*Chione undatella*	0.4	AD 1630–1950 (1700)
B-68373	CA-LAN-2616	Unit 4/ 270-280	1010 ± 70	*Chione fluctifraga*	-0.8	AD 1425–1680 (1515)
B-72311	CA-LAN-2616	Unit 5/ 80-90	980 ± 70	*Chione undatella*	1	AD 1440–1690 (1540)
B-72312	CA-LAN-2616	Unit 5/ 150-160	890 ± 50	Shell[3]	0.7	AD 1510–1740 (1660)
B-72313	CA-LAN-2616	Unit 5/ 210-220	1090 ± 60	*Chione undatella*	0.4	AD 1380–1600 (1460)
B-72314	CA-LAN-2616	Unit 5/ 270-280	1670 ± 80	*Ostrea lurida*	-5.1	AD 770–1160 (980)
B-72315	CA-LAN-2616	Unit 6/100-110	920 ± 70	*Chione undatella*	0.6	AD 1470–1800 (1640)
B-72316	CA-LAN-2616	Unit 6/140-150	880 ± 60	*Chione undatella*	0.5	AD 1510–1820 (1660)
B-72317	CA-LAN-2616	Unit 6/210-220	800 ± 60	*Chione undatella*	0.8	AD 1620–1950 (1710)
B-72318	CA-LAN-2616	Unit 7/100-110	1080 ± 50	*Chione undatella*	0.3	AD 1400–1560 (1470)
B-72319	CA-LAN-2616	Unit 7/180-190	1170 ± 60	*Chione undatella*	0.7	AD 1310–1500 (1420)
B-72320	CA-LAN-2616	Unit 7/220-230	1050 ± 60	*Chione undatella*	0.7	AD 1410–1650 (1490)
B-73473	CA-LAN-2616	Unit 8/150-160	810 ± 60	*Chione undatella*	0.5	AD 1600–1950 (1700)
B-74596	CA-LAN-2616	Unit 8/320-330	1170 ± 70	*Aequipecten aequisulcatus*	0.1	AD 1300–1510 (1420)
B-63140	CA-LAN-705	Unit 1/70-80	1320 ± 70	Shell[3]	0.1	AD 1175–1430 (1305)
B-63139	CA-LAN-705	Unit 1/130-140	1180 ± 70	Shell[3]	0.4	AD 1295–1510 (1420)
B-63142	CA-LAN-705	Unit2/60-70	1180 ± 50	Shell[3]	-0.4	AD 1315–1480 (1420)

Radiocarbon Assays from CSULB and Regional Archaeological Sites (continued).

Laboratory Number[1]	Site	Location/ Depth (cm)[2]	Measured Radiocarbon Age	Material	13C/12C Ratio	2 Sigma Calibrated Result (Intercept)
B-63141	CA-LAN-705	Unit 2/140-150	1060 ± 50	Shell[3]	-0.1	AD 1420–1625 (1480)
B-63601	CA-LAN-705	Unit 2/200-210	810 ± 110	Wood charcoal	-26.9	AD 1010–1400 (1245)
B-63131	CA-LAN-705	Unit 4/80-90	1030 ± 60	Shell[3]	1	AD 1425–1660 (1500)
B-63132	CA-LAN-705	Unit 5/60-70	1120 ± 60	Shell[3]	-0.2	AD 1340–1545 (1450)
B-63133	CA-LAN-705	Unit 6/70-80	1130 ± 60	Shell[3]	-0.1	AD 1330- 11535(1445)
B-63134	CA-LAN-705	Unit 6/130-140	1050 ± 70	Shell[3]	-0.4	AD 1400–1660 (1490)
B-63135	CA-LAN-705	Unit 7/120-130	1100 ± 70	Shell[3]	-0.1	AD 1340–1625 (1460)
B-63136	CA-LAN-705	Unit 8/130-140	1130 ± 70	Shell[3]	-0.8	AD 1320–1555 (1445)
B-63602	CA-LAN-705	Unit 8 200-210	730 ± 60	Wood charcoal	-25	AD 1215–1390 (1285)
B-63137	CA-LAN-705	Unit 9/100-110	1400 ± 70	Shell[3]	-0.4	AD 1060–1370 (1255)
B-63138	CA-LAN-705	Unit 11/ 80-90	1090 ± 70	Shell[3]	0.2	AD 1350–1635 (1465)
B-67538	CA-LAN-705	Unit 13/50-60	1120 ± 70	*Aequipecten aequisulcatus*	0.8	AD 1325–1580 (1450)
B-67537	CA-LAN-705	Unit 13/100-110	960 ± 60	*Aequipecten aequisulcatus*	0.9	AD 1460–1695 (1580)
B-67540	CA-LAN-705	Unit 14/60-70	1000 ± 60	*Chione undatella*	-0.6	AD 1440–1675 (1525)
B-67539	CA-LAN-705	Unit 14/90-100	1140 ± 60	*Chione undatella*	-0.3	AD 1065–1330 (1245)
B-63603	CA-LAN-705	Trench 1/ 190-200	1420 ± 70	Soil (NC)[4]	-26.8	AD 535–760 (645)
B-77275	CA-LAN-2629	Unit 1/50-60	2310 ± 60	*Aequipecten aequisulcatus*	0.7	AD 130–455 (290)
B-77274	CA-LAN-2629	Unit 1/70-80	2340 ± 60	*Aequipecten aequisulcatus*	0.8	AD 100–430 (260)
B-77273	CA-LAN-2629	Unit 1/80-90	2470 ± 60	*Aequipecten aequisulcatus*	0.8	BC 45–AD 265 (110)
B-77276	CA-LAN-2629	Unit 1/90-100	2410 ± 60	*Aequipecten aequisulcatus*	0.8	AD 25–355 (175)
B-77277	CA-LAN-2629	Unit 1/102	2320 ± 60	*Aequipecten aequisulcatus*	0.5	AD 120–445 (280)
B-82388	CA-LAN-1000	Trench/ 40	800 ± 70	*Aequipecten aequisulcatus*	0.4	AD 1580–1950 (1710)
B-76720	CA-LAN-235	Unit 6/40-60	2460 ± 60	*Aequipecten aequisulcatus*	0.5	BC 295–AD 80 (BC 85)
B-76723	CA-LAN-235	Unit 6/40-60	2510 ± 90	*Laevicardium*	0.5	BC 175–AD 290 (AD 70)
B-76722	CA-LAN-235	Unit 6/60-80	3910 ± 70	*Chione undatella*	-0.3	BC 1855–1440 (BC 1640)
B-76721	CA-LAN-235	Unit 6/80-90	3780 ± 80	*Aequipecten aequisulcatus*	1.1	BC 1695–1285 (BC 1480)
B-73647	CA-LAN-270	Unit D5/18"-27"	1500 ± 70	*Haliotis*	2.2	AD 990–1290 (1140)
B-73646	CA-LAN-270	Unit H3/0-3"	1400 ± 70	*Aequipecten aequisulcatus*	0.3	AD 1060–1360 (1250)

1. Beta Analytic, Inc.
2. Depth below surface in cm unless otherwise noted.
3. Composite shell sample.
4. Mean Residence Time (MRT) date from non-cultural (NC) soil horizon.