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# A San Clemente Island Perspective on Coastal Residential Structures and the Emergence of Sedentism

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**U**RBANIZATION of the California coastal plain from Morro Bay to San Diego has obliterated much of the archaeological record of the region. Locales favored for aboriginal residential structures have been the target of intense development by Euroamericans. At the same time, preservation of aboriginal structures consisting of wood, whale bone, grasses, rushes, and animal skins is poor under the best of circumstances (Salls MS; Erlandson 1984; Johnson 1989; Gross 1990; Gamble 1991:45-164). All of this led Chertkoff and Chertkoff (1984:223) to lament, "The development of architecture in California is not as well researched as it might be, at least partly because many forms of architecture have left few archaeological traces."

Despite these limitations, aboriginal habitation structures have received considerable attention in some regions of southern California. The northern Channel Islands and the adjacent Santa Barbara coast are best documented in this regard, perhaps since scores of aboriginal structures in this area have been excavated and described since the 1870s (Gamble 1991:126-176). However, a number of questions remain unanswered. When and where did various types of residential structures first appear and what were the socioeconomic conditions that prompted their construction?

Although residential structures of several types have been described, many of these were excavated prior to the advent of radiocarbon dating. Even from more recent excavations such dates may not be available, leaving archaeologists to estimate the age of structures based on their association with time-diagnostic artifacts. Often, structures can only be assigned to broadly defined cultural periods (cf. Gamble 1991:171). Assessing the role of architecture in the socioeconomic evolution of coastal societies in southern California is hindered by a lack of precise dating. The geographic distribution of architectural forms is equally indistinct. Residential architecture is relatively poorly documented in coastal regions north and south of Santa Barbara and the northern Channel Islands.

We propose that archaeological study of architecture has a significance beyond the reconstruction of life-ways or the applications of the direct historical approach, in which house types are linked to particular cultural groups. Although these are worthy goals, our emphasis here is not on functional or cultural variation in residential structures. Instead, we wish to focus on the general socioeconomic implications of architecture in the evolution of coastal societies. Archaeologists have long held the belief that permanent or semi-permanent residential loci arose on the southern California coast owing to

economies based on a highly productive combination of marine and terrestrial resources. An increasing body of evidence suggests that economies of this type arose at least as early as the mid-Holocene (Erlandson 1991; Glassow 1991; Gallegos 1992; Raab et al. n.d.). Whether developments of this type gave rise to residential sedentism remains unclear. Sedentism might be reflected in several types of archaeological evidence, including faunal indicators of site seasonality, mortuary practices, and patterns of primary and secondary refuse deposition. We argue that sedentism should also be reflected in construction of residential architecture. Only after a substantial degree of sedentism had been achieved can one imagine the investments of labor and materials required to build substantial residential structures. A highly mobile settlement-subsistence pattern logically works against such investments.

This paper contains a brief review of coastal residential structures, illustrating their modes of construction and possible uses. This review provides a basis of comparison with residential structures investigated at the Nursery site (CA-SCLI-1215), San Clemente Island. The latter provides new information from the southern Channel Islands, a region that remains largely *terra incognita* with regard to maritime cultural evolution. The Nursery site data include well preserved architectural features with associated radiocarbon dates. These data show that residential structures similar to those of the northern Santa Barbara Channel were being constructed on San Clemente Island as early as 3,700 radiocarbon years B.P. We also suggest that the appearance of these structures may have been related to important maritime economic trends that affected all of coastal southern California.

### ABORIGINAL STRUCTURES

Architectural constructions of widely varying size, design, and function existed for

millennia across aboriginal California (e.g., Chartkoff and Chartkoff 1984:132; 189, 221-222; Moratto 1984:124, 172, 439). We make no attempt to present ethnohistoric or archaeological examples from every corner of the state. An exhaustive review of just the architectural evidence of coastal southern California far exceeds the limits of this discussion. This evidence ranges, for example, from small, isolated homesteads (Moore 1987) to a variety of constructions related to larger communities, including sweatlodges, residences, windbreaks, ceremonial enclosures, and ramadas (Kroeber 1925:639; Strong 1929:258; Bolton 1930:362; Harrington 1934:39; Blackburn 1963: 24; Landberg 1965:26-27; Gamble 1983, 1991).

Interpretive problems attending the study of coastal architecture cannot be resolved here but should be recognized. One of the most important of these problems is the difficulty of reliably identifying domestic structures. Glassow (1980a:311) suggested that a failure by many archaeologists to differentiate sweatlodges (or *temescales*) from houses is "symptomatic of an unrecognized problem in Chumash archaeology as to what are the diagnostic features of houses vs. temescal." Gamble (1991:84) recognized this problem in her meticulous treatment of Chumash architecture, offering the following attributes of houses and temescal.

Houses contain: 1) lack of evidence of large interior posts; 2) evidence of small posts around the perimeter of the structure; 3) evidence of small interior posts used for beds or bedroom partitions; 4) lack of evidence of an earth roof; 5) evidence of a central fireplace; 6) evidence of a pathway used as a doorway; 7) diameter of approximately 4 to 16 m.; 8) evidence of other houses nearby; and 9) evidence of domestic debris. Temescal would contain: 1) evidence of large interior posts; 2) evidence of earth roof; 3) evidence of large, central fireplace; 4) lack of evidence of a doorway; 5) evidence of a large pole (that was used to enter the sweatlodge) near the hearth; 6) lack of evidence of domestic debris that was deposited at the time of structure use; 7) evidence of a semi-subter-

anean structure; and 8) few artifacts associated with female activities.

These criteria are useful in examining ethnohistoric and archaeological data on residential structures found on or near the southern California coast. The differences between these types of structures are important both in terms of the organization of activities within communities and in identifying structure types from archaeological remains. As indicators of sedentism, however, both types indicate major labor investments that one would associate with a high degree of residential permanence.

The first European overland expedition along the southern California coast was led by Gaspar de Portolá, governor of Baja California, in 1769 (Chapman 1922:222). The expedition chronicler, Fray Juan Crespi, described Indian villages from San Diego to Point Conception as containing houses built from willows, and covered with grass (Bolton 1927:122-176). Near the site of present day city of Ventura, California, "We counted about thirty large and spacious houses of a spherical form, well constructed and roofed with grass" (Bolton 1927:159). Fray Pedro Font, with the second Anza expedition of 1776, described the habitations of the Santa Barbara Channel people as superior to those of the Colorado River and interior. Font (Bolton 1930:361) related that the houses were

. . . round in form, like a half orange, very spacious, large and high. In the middle of the top they have an aperture to afford light and serve as a chimney, through which emerges the smoke of the fire which they make in the middle of the hut. Some of them have also two or three holes like little windows. The frames of all of them consist of arched and very strong poles, and the walls are of very thick grass interwoven. At the doors there is a mat which swings toward the inside like a screen, and another one towards the outside which they ordinarily bar with a whalebone or a stick.

It has been suggested that Chumash Indian houses of this region were distinctive, with

sleeping platforms elevated above the ground, arranged in tiers and separated by mats or screens into individual sleeping compartments (Kroeber 1925:557; Landberg 1965:26).

Conical residential structures, usually thatched, were common throughout southern California. The Gabrieleño, Luiseño, Cahuilla, and Diegueño groups of Los Angeles, Orange, Riverside, and San Diego counties built houses on a similar plan (Kroeber 1925:721).

On the Southern California Bight (the eastward curve of the California coast below Point Conception), these structures were typically built over a basin-shaped pit excavated to a depth of approximately 0.50 m. (2 ft.). Whether interior posts were attributes of residential structures is a matter in question. Gamble (1991:84) and Glassow (1980a:311) suggested that posts set at the periphery of the floor formed the roof of Chumash houses, while stout center posts were used to support the heavy earthen roof structures of temescales. As noted above, Gamble suggested that sweatlodges were entered through the roof. All accounts agree that houses were entered by way of a door situated at ground level. An opening in the center of the roof allowed smoke from a hearth on the house floor to escape. The house frequently was covered with tule mats but less permanent structures were covered only with thatch (Kroeber 1925:650; Bolton 1927:124, 139). On the Channel Islands, where lengths of wood suitable for construction may have been difficult to obtain, whale ribs and mandibles were used for the conical house frame which could then be covered with skins, sea grass mats, or rushes (Kroeber 1925:634; Rogers 1929: 315).

Temescales also were common, being used for sweat-baths, curing ceremonies, and other activities. Temescales and houses might be confused owing to some similarities of design and construction. The temescale was

Somewhat subterranean and very firm with poles and earth, and having at the top, in the

middle, an opening like a scuttle, to afford air and to serve as a door, through which they go down inside by a ladder consisting of straight poles set in the ground and joined together, one being shorter than the other [Bolton 1930:362].

### ARCHAEOLOGICAL EXAMPLES

The remnants of prehistoric structures have been recorded on the Channel Islands and the coastal mainland. The following examples illustrate the available information and some related problems of interpretation. Readers seeking a more extensive treatment of aboriginal architecture of the northern Channel Islands and the adjacent mainland coast are directed to the excellent discussion by Gamble (1991).

#### Island Structures

**Santa Cruz Island.** Rogers (1929) provided one of the first systematic descriptions of prehistoric residential structures of the southern California Bight. His description of house structures, with analogies to ethnohistoric accounts, remains a classic source on the subject (Rogers 1929:369-374). Discussing a house floor at the "Willows Site" with a diameter of 5.8 m. (19 ft.), Rogers (1929:315) noted that

The floor was somewhat concave, the outer rim being a little less than three feet below the present surface, while nearer the center it reached a depth of about three and one-half feet. Around the circumference of the floor, there were, still in place, a few upright stumps of whale ribs, and where these were missing, we found, at quite regular intervals, small orifices leading down through the hard floor. These could well have been the seats of wooden posts that had once stood there. As to verify this conjecture, bits of decayed wooden poles and fragments of whale ribs were found lying criss-cross in the debris above the floor. Wisps of sea grass still adhered to these.

**Santa Rosa Island.** Near Johnson's Lee, Santa Rosa Island, Rogers observed a whale rib protruding from a midden deposit. Subsequent excavation exposed a well preserved house structure approximately 5.5 m. (18 ft.) in di-

ameter with a compacted sand floor. Alternating posts of split "iron-wood" and whale ribs outlined the structure. Large sea grass mats, used as thatch, were preserved, with some of the thatching still attached to the house poles with sea grass rope. "Four whale scapulae had also been placed against the wall around the outside of the hut, probably with the idea of aiding to keep the grass in place" (Rogers 1929:332).

On Santa Rosa Island's northeast coast, Orr (1968:189) directed excavations at "Skull Gulch Village" (CA-SRI-2) from 1946 to 1960. At least 61 well-defined circular house depressions were surrounded by an extensive midden deposit to a depth of at least 2.44 m. (8 ft.). The houses in this area were apparently arranged in rows with a 12-m. (40-ft.) "street" running north and south between them (Orr 1968:212). Excavation revealed the remains of earlier houses filled in with midden debris from later occupations. Orr (1968:212) suggested that excavation of the complete Skull Gulch village might reveal up to 200 structures.

**San Clemente Island.** A number of investigators have reported architectural remains from San Clemente Island. McKusick and Warren (1959) reported a saucer-shaped depression on the first marine terrace near Eel Cove Canyon (CA-SCLI-118), on the central west coast of the island.

Circular, saucer-shaped depressions commonly occur on the surface of middens situated on San Clemente's western coast and undoubtedly represent structures. Judging from the example at this site the small depressions represent simple windbreaks which lacked the large supporting posts. . . [McKusick and Warren 1959:119].

Two maps in the McKusick and Warren report indicate probable house depressions at the Eel Point (CA-SCLI-43) and Seal Cove sites (CA-SCLI-67; McKusick and Warren 1959:Figs. 3 and 4). Although no information was provided on the Eel Point features, a preliminary

description of the nearby Seal Cove House Pit was given. At the time of the McKusick and Warren visit, the Seal Cove site contained pits created by a previous archaeological excavation. The identity of the excavator is unknown. The mystery investigator had laid out a grid system, measuring 5.5 m. (18 ft.) by 11 m. (35 ft.), over the greater portion of the house depression (McKusick and Warren 1959:122). After determining the perimeter of the previous excavation from wooden stakes still in position, McKusick and Warren excavated test pits on the south and west perimeter of the depression (McKusick and Warren 1959:Fig. 4). The house pit measured 10.6 m. (35 ft.) in diameter with an estimated interior depth of 46 cm. (1.5 ft.). Although a considerable number of steatite fragments was recovered (most left behind by the previous excavators), no description of house features such as floors, post holes, or hearths was provided in the report (McKusick and Warren 1959:122).

### Mainland Structures

**Dos Pueblos.** On August 21, 1769, the Portolá Expedition set their evening camp in Dos Pueblos (two towns) Canyon, named for the Chumash villages of *Mikiw* and *Kuyamu* at the mouth of the canyon (Harrison 1965:95; Bolton 1927:170). The villages were located approximately eight miles west of Goleta, Santa Barbara County. The site of *Mikiw* (CA-SBA-78) occupies a mesa approximately 18 m. (60 ft.) in elevation on the west side of Dos Pueblos Creek, while *Kuyamu* (CA-SBA-77) is on a higher bluff on the east side of the creek. The *Mikiw* Village site was excavated in 1958 by archaeologists from the University of California, Santa Barbara (Harrison 1965).

A complete semi-subterranean structure, ovoid in outline, was excavated. This structure measured 6.4 m. (21 ft.) north to south, 5.8 m. (19 ft.) east to west, with a basin-shaped floor. The subterranean portion of the *Mikiw* structure

sloped from the rim of the floor to a depth of 79 cm. (31 in.) (Harrison 1965:151). Near the center of the floor was a feature consisting of an elevated rectangular platform with a raised ridge along its edge, and a post hole at each corner. This rectangular feature measured 2 m. (7 ft.) north to south and 2.6 m. (8.5 ft.) east to west. The surface of this interior feature was somewhat concave. The post holes at the corners of the feature were concentric post molds. It appears that new posts were inserted into burnt out molds and reinforced with rock and mud fill (Harrison 1965:151). The entire floor surface of the structure was covered with several layers of sand and mud plaster ranging between 7 and 14 mm. (1/8 to 1/4 in.) in thickness. The south edge of the plaster rim suggests the entryway to the structure. Also in the south-central portion of the structure (approximately 61 cm. [2 ft.] south of the rectangular feature) was an oval fire pit and a circular flue. These features were separated by several large stone slabs set upright in mud plaster (Harrison 1965:Fig. 73).

Based on the excavation data, Harrison (1965) was able to reconstruct the architectural plan of this structure. The six large center support posts spaced around the rectangular center feature supported a network of smaller roof beams. From these horizontal beams a network of sloping wall posts extended to the ground. This was then covered with thatch and covered over with earth. The function of the structure is unknown but seems consistent with Gamble's (1991:84) description of a sweatlodge. Parenthetically, Kroeber (1925:722) described a similar structure known as a *tawip*, or Diegueño sweatlodge. The center of the Diegueño sweatlodge "rested on four posts set in a square. The roof was like the living house [earth-covered]. The fire was between the posts and the door" (Kroeber 1925:722).

**Santa Ynez Valley.** Three architectural features were excavated at the Elijman Site (CA-SBA-485) in the Santa Ynez Valley to as-

certain the presence of a structure thought to be similar to that at *Mikiw*. Two (structures 1 and 2) appear to have been temescalas, and the third (Structure 3) appears to have been a domestic structure (Macko 1983:85). Structure 2 was partially superimposed over the east edge of Structure 1 (Macko 1983:Map 3). Both of these structures had interior raised rim features which intersected large post holes set in a more-or-less square pattern in the center of the structure; similar to the *Mikiw* structure (cf. Harrison 1965:Fig. 73). Although sharing the raised square rim and post hole configuration, there were some differences between the *Mikiw* and Elijman structures. The *Mikiw* structure had a rock deflector similar to that of pithouses and kivas of the American Southwest, while the Elijman structures had raised platforms near the perimeter walls and firmly compacted plaster floors. The Elijman floors also contained a plastered hole in the floor resembling the sipapu feature in Southwest pithouses and kivas.

Structure 1 was somewhat elongated at 8 m. (26 ft.) north to south and 6.7 m. (22 ft.) east to west. Structure 2 was somewhat smaller, about 5.8 m. (19 ft.) in diameter (Macko 1983: Map 3). The domestic house floor (Structure 3) at Elijman lacked the raised rim feature of structures 1 and 2. Structure 3 was approximately 5.8 m. (19 ft.) in diameter with a series of small post holes about the perimeter, and a hearth located near the south entrance to the structure (Macko 1983).

**Morro Bay.** During a construction project at the Pacific Gas and Electric facility at Morro Bay, midden deposits containing shell were encountered. Although the area had been disturbed by previous construction, archaeological excavation of the remaining midden disclosed the edge of a house floor. "While the northeast edges were poorly preserved and the central portion was extensively damaged by rodents, a large part of the feature was found to be in an excellent state of repair" (Clemmer 1962:

18-19). The house depression was filled with midden material which, when removed, revealed a compacted and slightly polished floor between 3.8 and 5.8 cm. (1.5 to 2.25 in.) thick (Clemmer 1962:19). The structure was generally saucer-shaped, approximately 9 m. (29.5 ft.) in diameter with a series of post holes set approximately 1.4 m. (55 in.) inside the edge of the floor (Clemmer 1962:Fig. 13). Charcoal fragments occurred in every post hole, while several contained the remnants of charred posts.

The saucer-shaped floor was composed of earth transported to the site and either puddled or sprinkled with water to produce its hardened surface. A doorway may have existed on the west edge of the structure where "two thin channels" ran towards the center of the floor, suggesting the impact of foot traffic. Filling the central area of the structure within the circle of posts was a slight ridge, an area in which fires were kindled. Once again, it appears that a hearth pit did not exist; rather, fires were placed directly on the floor. The house had a center post as evidenced by a post hole double the size of the outer structure posts (Clemmer 1962:Figs 13 and 13a). Scattered across the floor of the Morro Bay house were fragments of small poles ranging from 2.5 to 5 cm. (1 to 2 in.) in diameter, which were possibly remnants of the supporting framework.

The age of this house is uncertain. Based on the style of marine shell beads and other artifacts, Clemmer (1962:52-53) assigned this house to Rogers' (1929) "Hunting Culture." Wallace (1955) placed the Hunting Period within his Intermediate Horizon, or between 3,000 and 1,000 B.C. King (1990), on the other hand, placed the Hunting Period within his late Early Period (Ey/Ez) which is approximately 3,500 to 1,200 B.C. If we follow the regional synthesis of King (1990), the Morro Bay house could be assigned to the late Early Period.

**Mescalitan Island.** Recent excavations at the site of *Helo*, near Goleta in Santa Barbara

County, produced evidence of houses. The investigations at *Helo'* (CA-SBA-46C) encountered two architectural structures. The most deeply buried floor (Floor 2) was identified by its unusual mixture of clay, silt and sand compacted into a hard surface (Gamble 1991: 195-258). The floor exhibited multiple layers in its construction utilizing sand, clay, silt and plaster layering. "Judging from the first phase of excavation, the diameter of Floor 2 was a minimum of five meters" (Gamble 1991:218).

Superimposed above Floor 2 was the eastern edge of a second house floor (Floor 1). As a considerable portion of the curvature of the floor was within the trench, the dimensions of the house floor and other features were discernable (Gamble 1991:Fig. 5.9). The clay floor (20 percent more clay than the surrounding matrix) appeared to be about 6 m. (20 ft.) wide and tilted upward towards the rim of the structure (Gamble 1991:Fig. 5.10). A probable redwood center post (Feature 62), slightly offset from the structure centerline and similar to that of the Morro Bay house pit (Clemmer 1962:28), was also present. Approximately 75 cm. (2.5 ft.) southeast of the post feature was an ash and midden-filled pit which may have been a hearth (Gamble 1991:Fig. 5.11). Bead types recovered from the floor and overlying midden suggest historic occupation sometime between A.D. 1782 and 1790 (Gamble 1991:218).

### San Clemente Island

San Clemente Island is the southernmost of the California Channel Islands, lying approximately 96.5 km. (60 mi.) southwest of San Pedro (Fig. 1). The island is slightly less than 33.8 km. (21 mi.) in length, ranging in width between 2.4 km. (1.5 mi.) and 6.4 km. (4.0 mi.) in the relatively broad southern area (Olmstead 1958:56). Virtually every physiographic setting on the island contains archaeological evidence. Some parts of the island are known to contain between 200 and 400 sites per

km.<sup>2</sup> (Yatsko 1989:188). The large number of surviving sites is due, at least in part, to the preservation conditions on the island. A generally arid environment (less than 7 in. of rain per year on average), low soil acidity, the absence of burrowing rodents, and the fact that only about 20 percent of the island has been developed, result in preservation of perishable archaeological remains such as baskets, sea grass matting, cordage, wood, and bone (Raab and Yatsko 1990). Archaeological research on the island expanded greatly during the last decade, as a result of cooperative research agreements between the United States Navy and academic institutions (Raab and Yatsko 1992; Salls 1992).

**Nursery Site (CA-SCLI-1215).** By far, the largest body of information on prehistoric structures on San Clemente Island collected to date is from the Nursery site (CA-SCLI-1215). The site derives its name from a nearby native plant nursery, established by the Navy as part of a program to restore the native vegetation of the island. The site is located at an elevation of 220 m. (723 ft.), within a series of faults trending from the main San Clemente Fault which created the steep eastern escarpment of the island (Fig. 1). The site parallels a stabilized Pleistocene-age dune that rises to a height of about 50 m. (164 ft.) immediately to the west. This relic dune provides protection from strong prevailing winds.

This site has been the object of several archaeological investigations. Michael Axford, of Mesa College, California, recorded the Nursery site in 1976. Axford (1976) noted that midden deposits within the site had been exposed some years earlier by military construction activities. Not until 1984, however, was the site examined in greater detail. In that year, backhoe excavation for a pipeline encountered a large stone mortar and other cultural remains. Concerned about the possibility of destroying cultural remains, the contractor stopped and



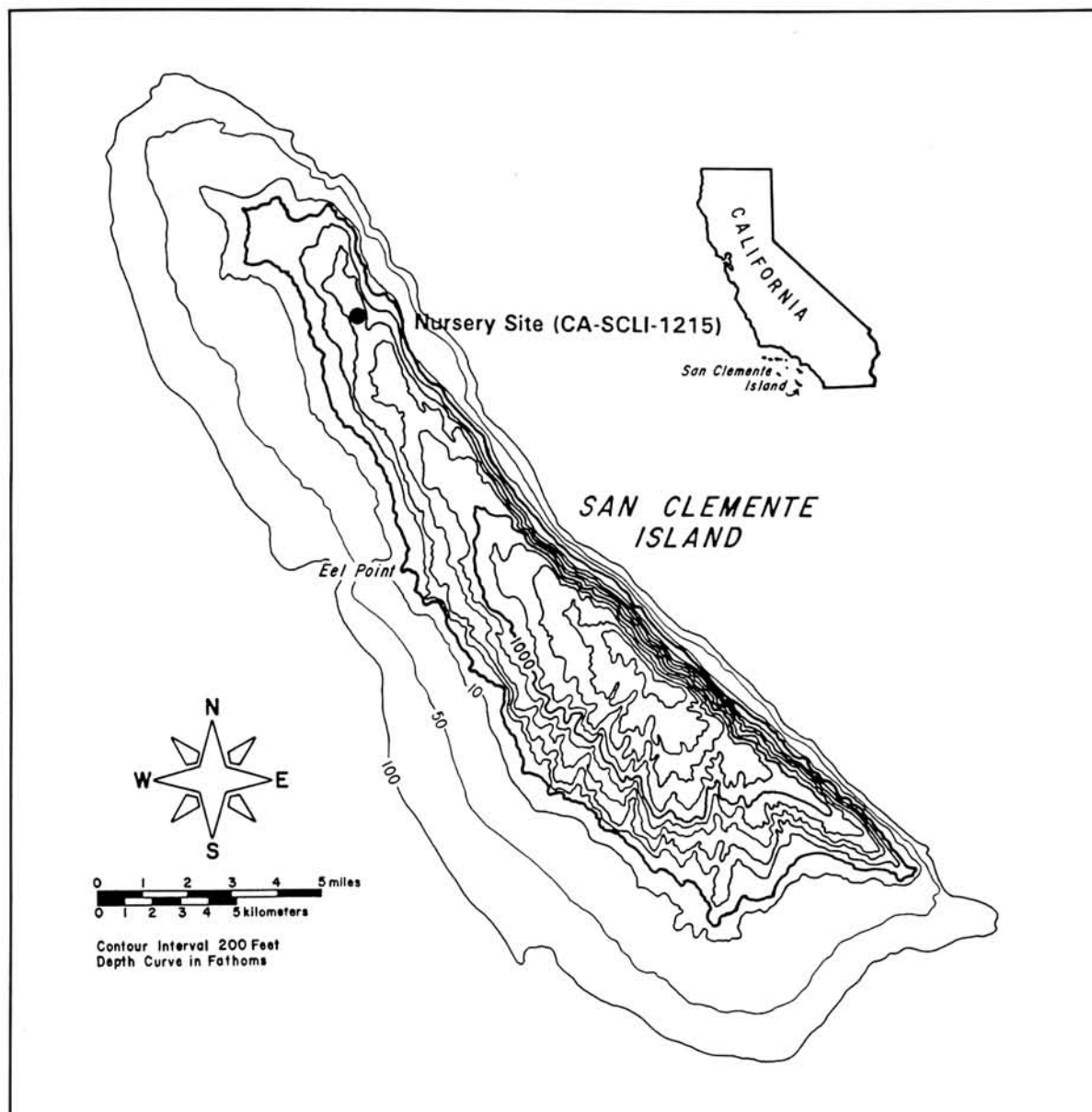


Fig. 1. San Clemente Island.

notified Andy Yatsko, the Navy's archaeologist for the island. By chance, a University of California, Los Angeles, archaeological field school was in progress on the island. Clement Meighan, the field school director, immediately dispatched a team to the site to assess the discovery. Test excavations found that midden deposits and cultural features paralleled the relic

dune for a distance of at least 195 m. (642 ft.), and extended outward from the dune at least 25 m. (82 ft.). Black, ashy midden deposits between 0.5 and 2 m. (20 and 79 in.) deep were found, containing large quantities of marine shell, fish and sea mammal bones, and ground and chipped stone artifacts. Excavations and systematic soil augering between 1984 and 1987

by UCLA personnel and Yatsko completely exposed the floor of House 1, exposed part of another floor, and identified at least 16 other houses within the site.

**House Pit 1.** Several 1-m.<sup>2</sup> test pits were excavated at the Nursery site during a 1984 UCLA field season. Special attention was given to possible deeply buried cultural features revealed by soil auger testing. Test Unit C produced a concentration of stones and abalone (*Haliotis cracherodii*) shells, which caused the area of excavation to be expanded. In an adjoining excavation unit, a whale rib post (Feature 1) was exposed protruding from the sterile reddish-brown dune sediments which form the culturally sterile substratum of the site (Rigby 1985:8).

Expanding the excavation to the west exposed the edge of a house depression filled with shell-bearing midden. Excavation within the depression revealed the edge of a circular structure which sloped down to a flat, hard floor of a lighter color than the reddish-brown dune substratum. This structure is designated here as House Pit 1. Once the dimensions of the house pit were determined and the edge excavated, a backhoe was used to remove the fill. Approximately 65 cm. (2.2 ft.) of fill was removed from the southwest area and 25 cm. (10 in.) from the northeast area of the house pit. The backhoe excavation was halted, and the last 25 cm. (10 in.) of fill removed with trowels and brushes (Rigby 1985:8).

The house floor was 4.70 m. (15.27 ft.) north to south, 4 m. (13 ft.) east to west, and 50 cm. (19.5 in.) deep (Fig. 2). The house floor was hard with a dull polish, similar to that described for a house floor at Morro Bay by Clemmer (1962:21). Three features were encountered on the house floor. Feature 24 was identified as a mold impression of the center support post (Rigby 1985:9). Features 26 and 27 were hearths which contained a large amount of burned sea mammal bone and charcoal. A

charcoal sample from Feature 27 yielded a date of  $3,750 \pm 35$  radiocarbon years B.P. (RCYBP) (UCLA-2586). Rigby also noted a possible entryway on the east edge of the house where the rim shows a "polish" and evidence of two post holes. Eight post holes were found surrounding the rim of this house pit. Many storage pits were concentrated just outside the edge of the house pit along the south and east walls. These pits were contemporary with the house, as they were sunk in the sterile dune deposit at the same level as the structure. Some of the storage pits are of special interest. Feature 2 was a 200 x 150 cm. (79 by 59 in.) pit 10 cm. (4 in.) deep which contained "S" twist coiled basketry and a black abalone shell.

During subsequent excavations in 1985, several additional storage pits were discovered along the outside of the house rim. Two of the pits contained hundreds of land snail shells while one contained over 200 small marine snail shells (*Tegula funebris*). This pithouse, and others, offer an opportunity to study comparatively uncommon cultural features. Chartkoff and Chartkoff (1984:223) noted that, "The use of pits in the ground for storage was relatively rare in California."

**House Pit 2.** During the summer of 1990, an archaeological field school directed by Raab and Yatsko completely excavated one house pit (House Pit 2) and exposed parts of two others (Fig. 2). The present discussion focuses on the characteristics of House Pit 2. This house is similar to coastal houses discussed earlier. Plan and sectional drawings are presented in Figures 3 and 4. The house was constructed in a circular pit 4.5 m. (14.8 ft.) wide, and about 50 cm. (19.5 in.) deep. The roof structure consisted of members set in holes between 10 and 30 cm. (4 and 12 in.) in diameter at the floor perimeter. No evidence remained of the material used in these uprights. It appears, however, that the roof structure was supported by at least two uprights located near

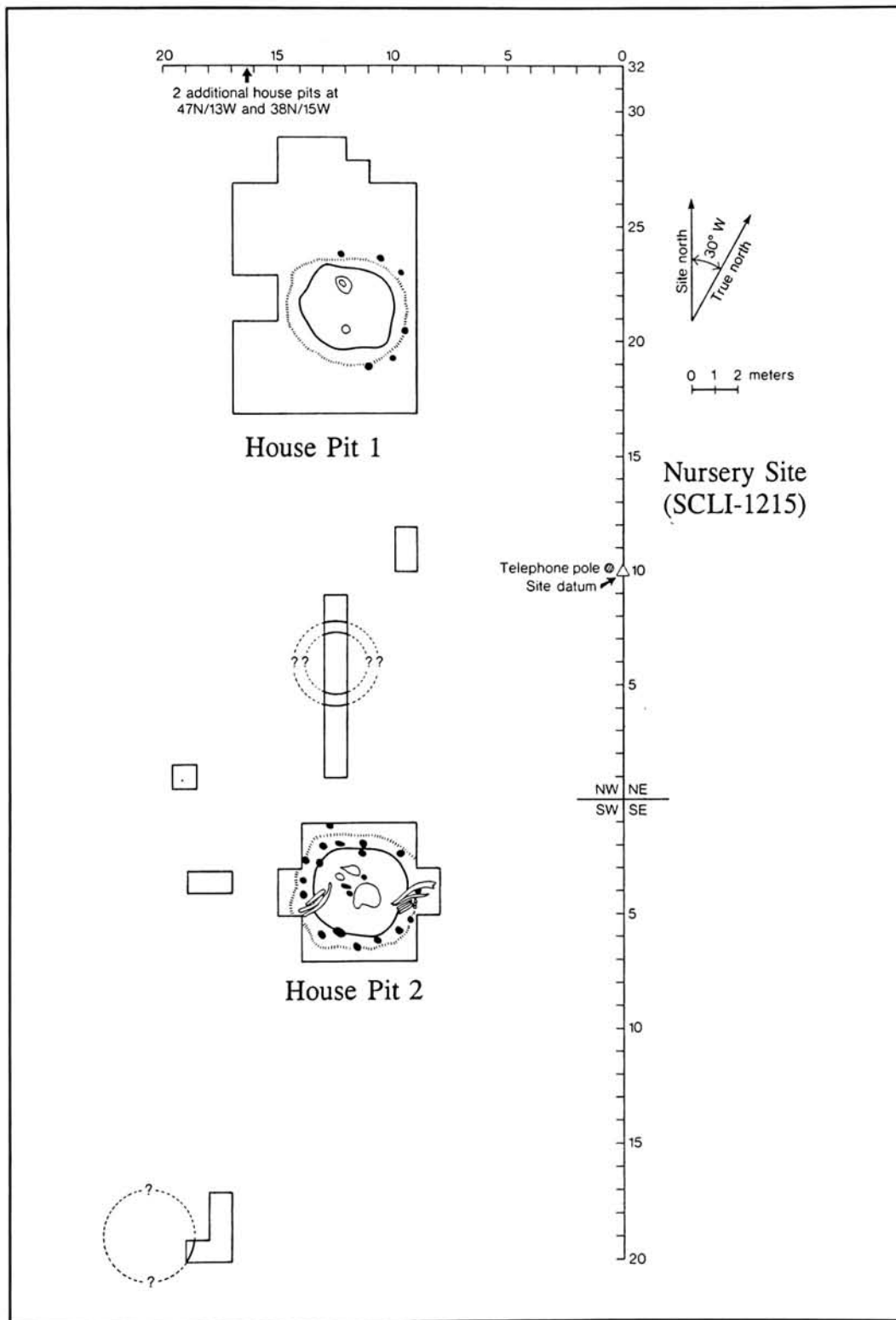


Fig. 2. The Nursery Site (CA-SCLI-1215).

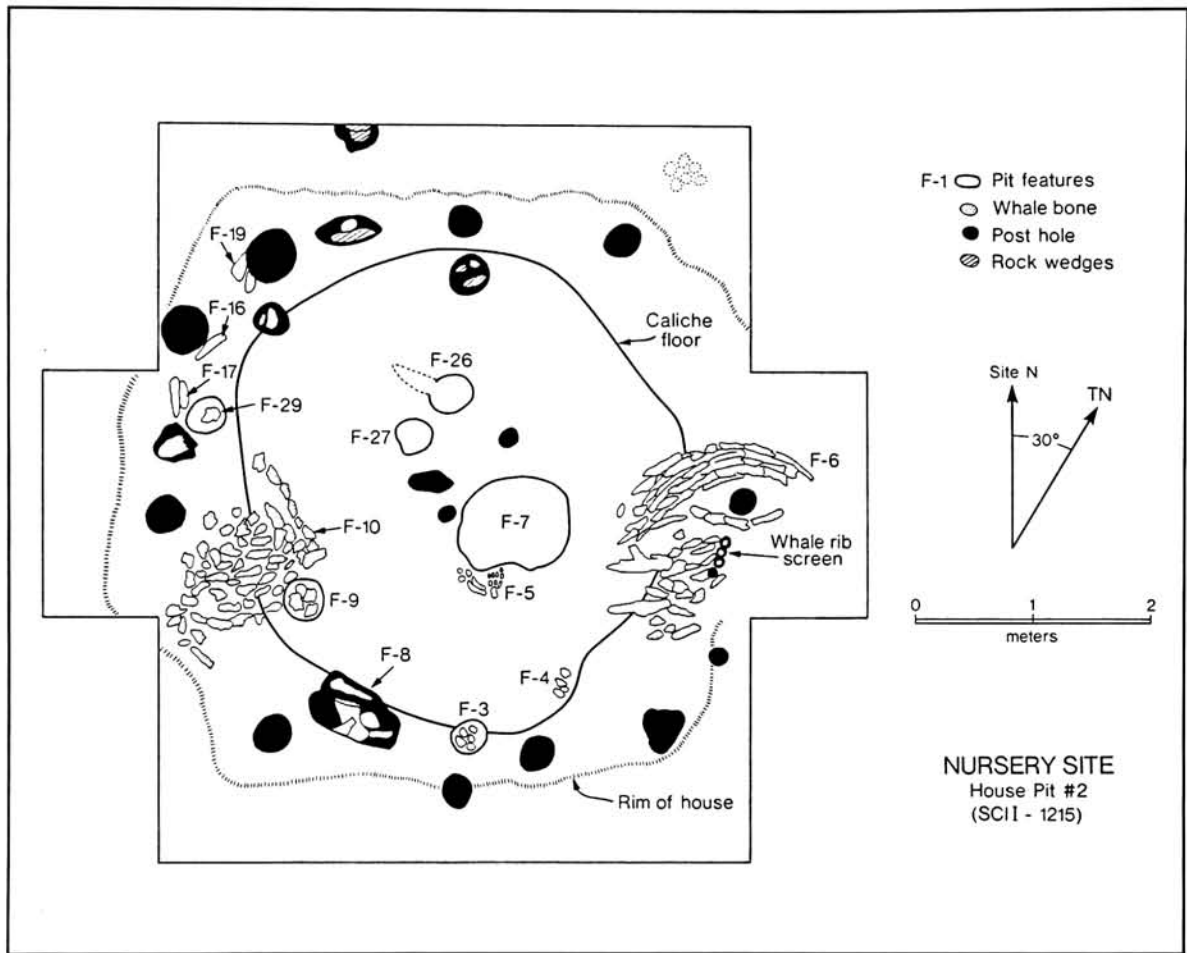


Fig. 3. Plan view of House Pit No. 2, the Nursery site.

the east and west periphery of the floor. A support rafter connecting these posts would have formed a secondary ridge supporting the roof structure of whale-rib "stringers" which clearly were placed in some of the pits located at the periphery of the house floor. In one instance, the stub of a whale rib was still in place in one of these holes. Wooden stringers may have been used as well, though no evidence of wooden roof members was found. This basic roof structure may have been covered with a number of materials, judging by the house examples noted earlier, and may have included sea grass, animal skins, or reeds. These construction techniques appear to be much the same as those

described earlier by Gamble (1991) for domestic structures of the Santa Barbara Channel region.

Large quantities of whale bone were found on the house floor at the east and west periphery of the floor (Fig. 5). This material was left in place after the excavation, and covered with culturally sterile dune sand. However, the mass of bone at the eastern floor edge was composed of cetacean scapula and rib fragments (species unknown). These bones appear to have formed part of the entrance to the house, as a tongue of hard-packed floor sloped upward to a gap in these bones, forming a short ramp from the floor to the outside surface. To the left of the entryway (viewed from the outside), a wall

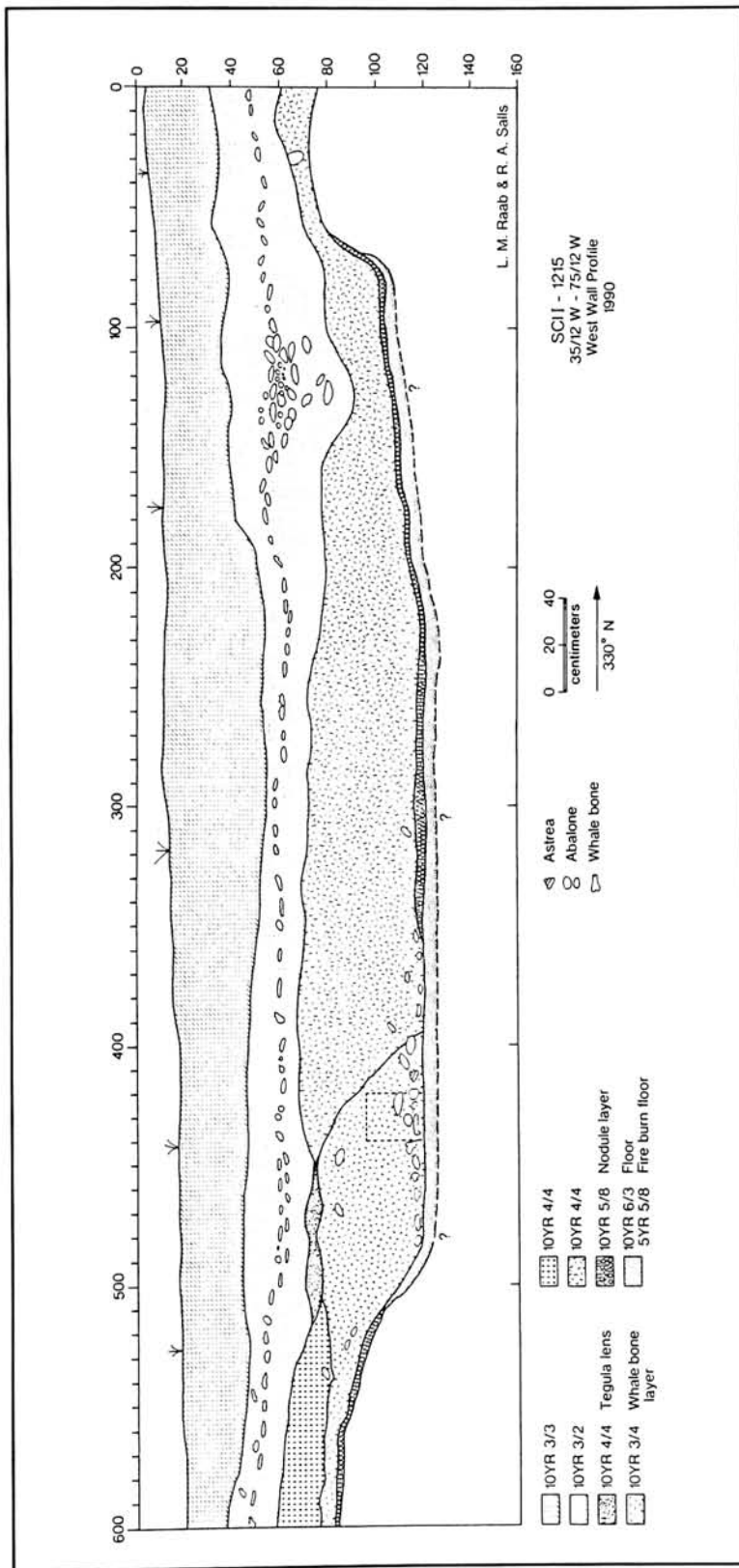


Fig. 4. Sectional view of House Pit 2, SCL1-1215.



Fig. 5. Floor of House Pit No. 2 showing scatters of whale bone.

screen was created by setting at least six whale ribs into the earth, stockade fashion. One is reminded here of the earlier description in Bolton (1927:159) of whale bones used at house entrances. The mass of bones at the west periphery of the floor also appears to have been part of the roof structure, being composed of ribs and possibly scapula fragments as well.

The floor of the house was extremely compact, and in parts had the hardness of brick. This floor, however, does not appear to have been specially prepared. Rather, the house pit was dug into a calcareous soil formed on a relic dune. The high calcium carbonate content of

this soil, compacted by foot traffic, may account for the indurated floor layer. Features within the floor included a shallow pit (90 x 72 cm.) filled with fine white ash but no evidence of burning. This ash was likely derived from a nearby hearth, revealed by a portion of the floor (Feature 26, Fig. 3) burned to a deep "brick red." It appears that fires were not made in a hearth pit but, rather, directly on the floor surface, as in the case of the Morro Bay house described earlier.

Several pits were found within the Nursery site House Pit 2 at the periphery of the floor, while others were found just outside the ring of

post holes that anchored the roof structure. Feature 3, for example, was a small, 12 cm.-wide pit excavated to a depth of 15 cm., which contained two cores, three flakes, and two small abalone shells. Features 9 and 29 were similar "lithic" caches. On the other hand, several pits (features 8, 18, 20, 21, 23, and 28) contained the remains of whale bone posts and/or stone wedges that had once supported posts.

No large artifacts were found on or near the house floor. Thus, it appears that the house was abandoned in an orderly fashion, with large artifacts, such as ground stone bowls and manos, having been removed. The absence of most of the structural members of the roof may suggest that some of these members were salvaged after the house was abandoned. After its abandonment, refuse was then thrown into the open house pit.

Presently, no radiocarbon date is available for this structure. However, in addition to the date available from House Pit 1, three other radiocarbon dates are reported from the site (Salls 1988:388-390). A date of  $1,490 \pm 30$  RCYBP (UCLA-2592) was derived from human bone; a "carbonized wood offering associated with burial 3" yielded an assay of  $5,495 \pm 45$  RCYBP (UCLA-2585) (Rigby 1985:5); and a date of  $8,900 \pm 105$  RCYBP (UCLA-2538) was obtained from a sea grass mat associated with Burial 2 (Rigby 1985:5). Rigby (1985:5) questioned the validity of the latter assay, attributing its early age to possible contamination of sea grass in the marine environment.

## DISCUSSION

The characteristics of the Nursery site structures are consistent with Gamble's (1991:84) description of houses of the Santa Barbara Channel region. These structures also appear to be earlier than previously supposed by other researchers on San Clemente Island. Rigby (1985) tended to discount his early dates for Burial 3 and House Pit 1 at the Nursery site.

The carbonized wood offering associated with burial 3 also appears to be too early for the excellent state of preservation of bone and associated artifacts in an open-air site like the Nursery. The artifacts associated with burial 3, for example, circular fish hooks, are more typical of a later period Canaliño culture. The earliest date for the Canaliño Period has been set . . . at about 1000 B.C. Some archaeologists feel that this date is too early for the beginning of the Canaliño Period and that in some areas like the Santa Monica Mountains area this date would seem to fit more comfortably with the Intermediate Period . . .

Although the  $C^{14}$  date from the hearth lying on the basal stratum of the house floor (*House Pit 1*) is possible, it also is in question due to contradictory obsidian hydration readings obtained from the fill of the house floor itself. If this  $3750 \pm 35$  B.P. date is correct, it would place the house floor and probably the beginning of Nursery's occupation at circa 1765 B.C. which would equate with Wallace's (1955) Intermediate Period and Rogers (1929) Hunting Culture. More precisely, this carbon date fits into C. King's (1990) Ez time period for the Santa Barbara Channel region [Rigby 1985:5-6; *emphasis added*].

Rigby's reluctance to assign features such as House Pit 1 and Burial 3 to the Early Period, as defined by King (1990), is understandable on the basis of interpretations extant in 1985. However, more recent data offer support to the possibility that the Nursery site was occupied during the Early Period, and this occupation may well have included pithouses.

Two lines of evidence point to this conclusion. First, Howard and Raab (1993) described a southern Channel Islands cultural interaction sphere based on the geographic and temporal distribution of distinctive *Olivella* grooved rectangle beads. These beads have been found in a cultural component at the Little Harbor site, Santa Catalina Island (CA-SCAI-17) with a mean age of 5,200 years B.P. (cal.) for six radiocarbon dates (Howard and Raab 1993). These same beads have been found in sites on the Orange County coast (CA-ORA-665 and -667) with uncalibrated dates between about

4,300 and 5,300 RCYBP (Raab et al. n.d.; Gibson 1992a, 1992b; Howard and Raab 1993). Grooved rectangle beads are also known from undated contexts on San Nicolas Island (CA-SNI-12) and from fill within House Pit 2 at the Nursery site (Howard and Raab 1993). This type of bead appears to be virtually unknown in the northern Channel Islands or on the adjacent mainland coast. Howard and Raab (1993) interpreted these data as possible evidence of a distinctive southern Channel Islands cultural interaction sphere. The Nursery site may have a cultural component with an age of over 5,000 years, as indicated by the presence of these beads and by the age of Burial 3 ( $5,495 \pm 45$  RCYBP). The presence of the grooved rectangle beads in the fill of House Pit 2 may also suggest an Early Period age for this structure.

Second, coastal houses of an age comparable to House Pit 1 at the Nursery site appear to exist elsewhere. The Morro Bay house (Clemmer 1962) described earlier may be one such instance, although dating of this house is admittedly uncertain. During excavation at CA-SCRI-333, Santa Cruz Island, Wilcoxon (1981, personal communication 1993) obtained a sample of shell from the floor of House 2 that produced a radiocarbon date of  $3,700 \pm 70$  RCYBP (Beta-35005; Breschini et al. 1992:56); this date is quite close to the age of Feature 27, House Pit 1 at the Nursery site.

These data hint that adoption of substantial residential structures was a trend that affected a large area at the same time, suggesting that the southern California coast responded to widespread socioeconomic forces. This development is particularly interesting if one concludes that the distribution of the *Olivella* grooved rectangle beads is indicative of a cultural interaction sphere linking the southern Channel Islands and adjacent mainland coast. From this perspective, sedentism is not attributable to ethnicity or regional cultural differences, but to fundamental socioeconomic forces that cross-cut ethnic

boundaries. The temporal and geographic distribution of house structures invites explanation of their appearance and persistence in these terms.

The emergence of relatively sedentary coastal occupations appears to be a key aspect of such an explanation. Long-term changes in maritime settlement-subsistence patterns which gradually increased the length of occupation of coastal sites may have eventually brought about conditions favorable to new technological emphases, including house-building. In reference to San Clemente Island, one of us (Raab 1993: 31-32) argued elsewhere that

. . . early Middle Holocene populations were pressing the limits of growth that could be sustained by the foraging adaptation . . . If the introduction of shell fishhooks circa 4500 radiocarbon years B.P. resulted in the ten-fold boost in fishing productivity that is suggested in Sall's (1988) Eel Point data, this innovation may be one factor that permitted southern islands populations to reach higher plateaus of population growth during the early Middle Holocene. The adoption of elaborate fishing gear may be one indicator of increasing stress on marine resources, as Glassow argued (1980b:89):

Implicit in the literature treating the development of fishing in the Channel Islands and adjacent mainland is the assumption that the elaboration of fishing technology reflects an increasingly successful or improved cultural adaptation. Such an assumption neglects the fact that this development represents increasing investments in the manufacture and maintenance of the various tools and facilities associated with fishing technology. Because of these investments, it is doubtful that the development of fishing technology was simply the result of discovering better ways to obtain food. The determinants of this development may be directly related to broadly based population growth throughout the Channel Islands and adjacent mainland, and indirectly to trade networks. The increasing importance of fishing, in other words, may have resulted from increasing pressure on terrestrial and intertidal resources.

Pálsson (1991), in a world-wide ethnographic survey, showed that intensification of



fishing is strongly correlated with coastal sedentism. Did intensification of fishing and other socioeconomic innovations sustain population growth and eventually encourage a more "logistically organized" division of labor and sedentism? Construction of House Pit 1 at the Nursery site and House 2 on Santa Cruz Island about 3,700 RCYBP should be viewed perhaps as one of the eventual consequences of such a trajectory of cultural evolution (Raab 1993: 31-32).

If this scenario has merit, it directs the attention of archaeologists to formulation and testing of hypotheses that view demographic, technological, settlement, and economic forces as systemically linked in the evolution of coastal societies. Within such a framework, the appearance of substantial residential structures might be viewed as an important indicator of a quickening of cultural evolution toward the complex maritime hunter-gatherer adaptations that emerged on the southern California coast.

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