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## REPORTS

### **An Asphaltum Coiled Basket Impression, Tarring Pebbles, and Middle Holocene Water Bottles from San Miguel Island, California**

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*A stratified and deeply buried Middle Holocene shell midden (CA-SMI-396) on San Miguel Island recently produced evidence of the earliest securely dated water bottle and tarring pebbles in southern California. Several asphaltum basketry impressions, including what appears to be a fragment of a coiled basket, and two tarring pebble features were found eroding from shell midden deposits dating as early as 5130 cal BP. We suggest that water bottle production may have developed during the Middle Holocene on the Channel Islands, where fresh water resources were scarce, as a response to the relatively warm and dry periods of the Middle Holocene. The coiled basketry impression is unique for this time period in the Chumash area and its implications are difficult to assess.*

Southern California contains some of the earliest and most diverse evidence of basketry technology in North America (Adovasio 1977; Connolly et al. 1995; Vellanoweth et al. 2003). San Miguel Island's Daisy Cave and Cave of the Chimneys, for example, have yielded twined basketry and cordage fragments from Early Holocene deposits dating between 9900 and 7500 cal B.P. Connolly et al. (1995) and Vellanoweth et al. (2003) have interpreted these as possible fragments of sandals, straps, belts, fishing nets and lines, or bags.

Among the Chumash and Tongva, a distinctive type of basket was bottle-shaped and sealed with bitumen (asphaltum) (see Blackburn 1963; Hudson and Blackburn 1983). Gamble (2005) has suggested that such water bottles were an important component of strategies designed to cope with arid landscapes, especially during drought periods.

At European contact, a variety of large and small bottles were used by both island and mainland peoples. Missionaries described these as vessels, flasks, or pitchers (Bolton 1916:88; Wagner 1929:237) in which water was stored. An early description comes from Costansó in A.D. 1769, who noted:

...the large vessels which contain water are made of a very strong texture of rushes, coated inside with pitch, and they give them the same shape as our jars [Hemert-Engert and Teggart 1910:45].

Historical accounts describe water bottles in a variety of shapes and sizes constructed from processed reeds, rushes, grasses, juncus, or sumac. These items have been classified into two general types: small bottles with a rounded body and (often) a neck, used for individual consumption, and large bottles with a tubular body and a small neck, used by a household (Hudson and Blackburn 1983:39-54). Both types were normally twined and internally sealed with asphaltum, readily available from onshore or offshore oil seeps (see Dederer 1976; Dittman 1973; Grant 1962; Heizer 1940).

Ethnographic accounts also describe the water-sealing process (see Craig 1966:210, 1967:98). Nidever described the process used by the "Lone Woman" of San Nicolas Island:

I came across her lining one of the vessels she used for holding water. She had built a fire and had several small stones about the size of a walnut heating in it. Taking one of the vessels, which was in shape and size very like a demijohn, excepting that the neck and mouth were much longer, she dropped a few pieces of asphaltum within it, and as soon as the stones were well heated they were dropped in on top of the asphaltum. They soon melted it, when, resting the bottom of the vessel on the ground, she gave it a rotary motion with both hands until its interior was completely covered with asphaltum. These vessels held water well, and if kept full may be placed with safety in a hot sun [1973:14].

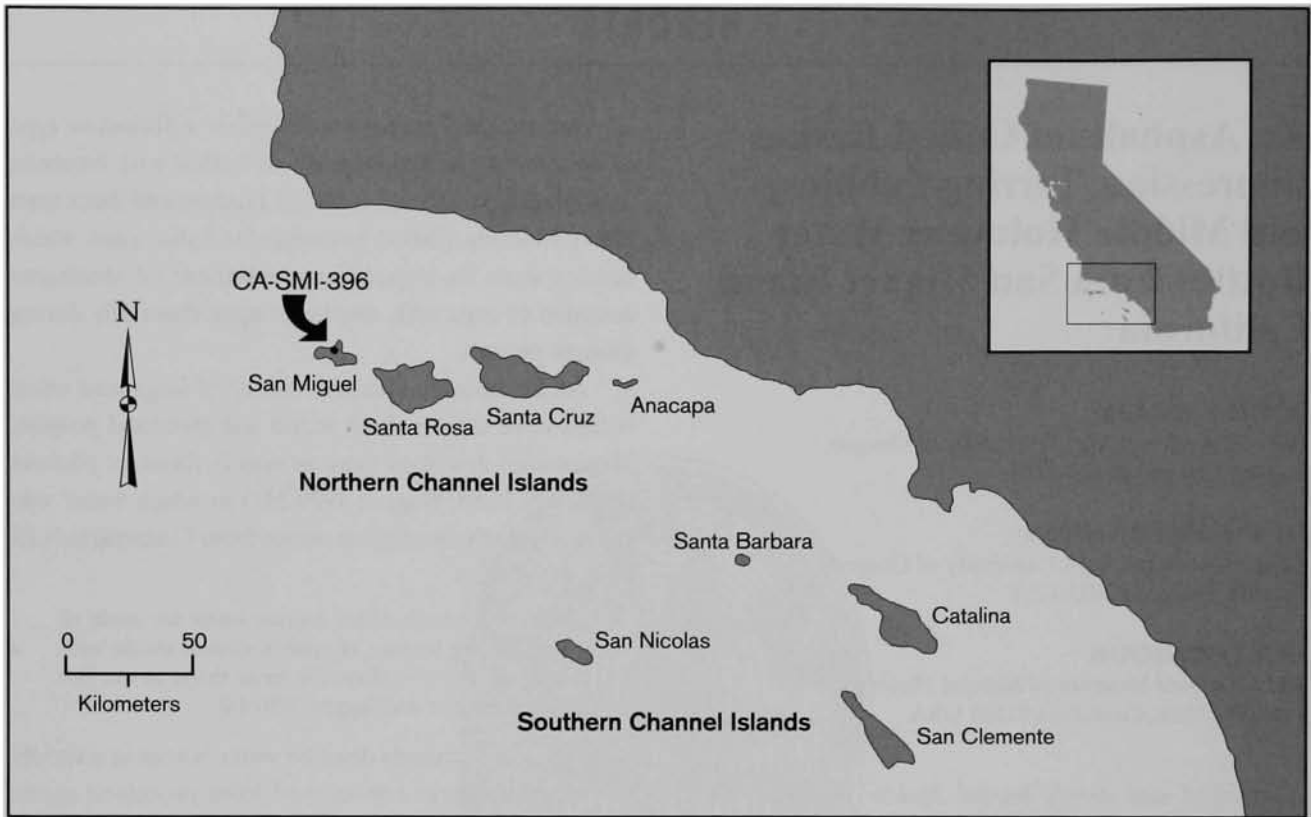


Figure 1. Map of southern California and the adjacent Channel Islands and the location of CA-SMI-396 (by R. Gerke).

Except under rare preservational conditions, archaeological evidence of this process is found as negative impressions of the woven fiber preserved in asphaltum or as small, round stones (tarring pebbles) with traces of asphaltum on their surfaces. Our recent research on San Miguel Island yielded both tarring pebbles and basketry impressions—including an impression of coiled basketry—dated to the Middle Holocene. These appear to be among the earliest such remains that have yet been found in the region.

#### THE ANTIQUITY OF SEALED WATER BOTTLES

Although ethnographic examples are well documented, the antiquity of sealed water bottles among the Chumash and Tongva is poorly known. Tarring pebbles are relatively common constituents of archaeological sites along the southern California coast and asphaltum basketry impressions have been found in many sites. Due to stratigraphic disturbance from gophers, plowing,

and other processes, it is often difficult to be certain of the age of tarring pebbles or basket impressions found in mainland sites. This problem is compounded by the fact that even where preserved fiber from possible water bottles is recovered, direct dating is problematic due to oil contamination. Fortunately, the stratigraphic integrity of many Channel Islands sites allows a relatively secure determination of the age of *in situ* artifacts.

Prior to our research, the earliest archaeological evidence for water bottles in coastal southern California came from San Nicolas Island, where asphaltum impressions from CA-SNI-40 may date to as early as 3550–3800 cal BP and at CA-SNI-11 to about 4450–4850 cal BP (Bleitz 1991; Erlandson 1997). Other early evidence comes from San Miguel Island, where an asphaltum basketry impression recovered by Vellanoweth et al. dated to ca. 4100 cal BP and extensive asphaltum processing features dated to about 3000 cal BP (Rick 2004:92). On Santa Cruz Island, basketry impressions and tarring pebbles were found in CA-SCRI-333 midden deposits dated between about 3300 and 4000 cal BP (Wilcoxon 1993;

**Table 1.**  
**<sup>14</sup>C DATES FROM CA-SMI-396**

Provenience	Material	Lab #	Measured <sup>14</sup> C Age	Conventional Age	Age Range (calBP)
Abalone paleosol, western area	Black abalone	Beta-181392	4220 ± 70	4650 ± 70	4780 - 4440
Abalone paleosol, northeast area	Marine shell	Beta-194508	4240 ± 70	4650 ± 70	4710 - 4490
Abalone paleosol, southeast area	Marine shell	Beta-194509	4580 ± 50	4990 ± 50	4900 - 5130

Notes. Dates were calibrated using Calib 5.0.1 (Stuiver and Reimer 1993, 2000) using a  $\Delta R$  of 225 ± 35 years was used for all shell collected. <sup>13</sup>C/<sup>12</sup>C ratios were either determined by the radiocarbon lab, or an average of + 430 years was applied. All <sup>14</sup>C dates in table and text are given with ranges at one sigma.

Connolly et al. 1995). On the Santa Barbara coast, tarring pebbles at CA-SBA-2067 were found in a buried shell midden dated between about 3900 and 4200 cal BP (Erlandson 1997:98; Erlandson et al. 1993). North of San Luis Obispo, CA-SLO-977 produced numerous pebbles, cobbles, and flat rocks coated in asphaltum, described by Dallas (1993:338) as “asphaltum spreaders” and dated to ca. 3750–4000 cal BP.

In 2004, two asphaltum basketry impression fragments and two tarring pebble features were identified eroding from a deeply buried component in a large shell midden at CA-SMI-396 on San Miguel Island (Figure 1). Three radiocarbon (<sup>14</sup>C) dates on well-preserved marine shells from this midden produced calibrated ages ranging between 5130 and 4490 cal B.P. (Table 1), somewhat extending the antiquity of asphaltum-sealed basketry along the California coast. One of the asphaltum basket impressions appears to be from a coiled basket, an unusual find for basketry remains from the Chumash area at such an early date, and perhaps the earliest example of coiled basketry yet discovered from southern California. Here, we describe the setting of CA-SMI-396, our initial findings, and their implications.

#### SITE SETTING AND BACKGROUND

CA-SMI-396 is located on a prominent dune ridge overlooking Simonton Cove on the northwest coast of San Miguel Island, the westernmost of the Northern Channel Islands (Figure 1). The site is large, extending for approximately 300 meters north-south and 250 meters east-west. There appear to be two major shell midden strata in eroding dune exposures, each between 20 and

50 cm. thick, eroding from prominent paleosols. The lower midden component, embedded in what Johnson (1972) referred to as the Abalone soil, is deeply buried by dune sand capped by midden deposits dating to the Late Holocene. The Middle Holocene Abalone soil stratum is eroding from the north side of a flat ridge approximately three-fourths of the way up the dune, at about 60 m. in elevation. Here we defined three archaeological loci—east, central, and west—within a horizontally-continuous shell midden soil. Below the site, a low sea cliff overlooks a mosaic of sandy beaches and rocky intertidal habitats. A small intermittent spring is located in a canyon about 100 m. to the west, and a large offshore oil seep located about three kilometers to the northwest deposits large amounts of asphaltum on nearby beaches (see Heye 1921:20).

Except for reconnaissance, no archaeological work had been conducted at CA-SMI-396 prior to our investigations. In 2004, University of Oregon archaeologists visited the site to surface collect artifacts and ecofacts, gather <sup>14</sup>C samples, and excavate two 25-liter bulk samples from eroding midden exposures, rich in shells of large red abalone, black abalone, mussel, owl limpet, stone artifacts, and other site constituents.

Our research revealed the remnants of what appear to be two water bottle production features, both clearly *in situ* in the Middle Holocene component at CA-SMI-396. The western midden locus produced two asphaltum basketry impressions and a cluster of sandblasted tarring pebbles, eroding from the dense shell midden deposit. Embedded in the surface of the midden in the east locus, 25–30 tarring pebbles were found in a cluster with a heavy concentration of asphaltum. In 2005, several small and poorly preserved fragments of an asphaltum-sealed



**Figure 2. Asphaltum coiled basket impression from CA-SMI-396 (photo by C. Ruiz).**

basket were also found near the tarring pebble feature in this eastern site area. Unfortunately, these impressions were too fragile and fragmentary to recover for analysis.

The two basketry impressions from the western site area were examined by Timbrook at the Santa Barbara Museum of Natural History. One of these basket impressions appeared to be of twined weave but was badly degraded, limiting any definite conclusions about the materials or methods used in the construction of the basket. The other specimen produced an impression approximately 50 mm long and 26 mm wide, with a well-preserved surface texture of the stitches (Figure 2). It appears to be from a coiled basket sewn with split *Juncus* stems, similar to the basketry of the historic Chumash. The exposed foundation appears to be constructed from a bundle of grass stems or of slender *Juncus* rods.

In addition to its unusually early date, the basket's origin and function are problematic. Although Craig (1966:209–210) cited ethnographic evidence that the base of Chumash water bottles may sometimes have been coiled, all known ethnographic and archaeological specimens were made by twining. Coiled basketry technology is generally considered to have spread into California from

the western Great Basin during the Middle Holocene (Adovasio 1986:200; Dawson 1990; Jolie and Hattori 2005), but not adopted by the Chumash and Tongva (Gabrielino) until sometime after AD 1200 (L. E. Dawson, personal communication to J. Timbrook 1978, 1990). Recent research suggests that southern California coiled basketry may have a separate origin, possibly in northern Mexico at a somewhat earlier date (E.A. Jolie, J.K. Polanich, personal communications to J. Timbrook 2005). The fragment from CA-SMI-396 suggests that coiled baskets may have been used by the Island Chumash as early as the Middle Holocene. Whether the coiled basket was made on the Northern Channel Islands, where *Juncus textilis* is not known to have grown (Timbrook 1993:50), or in the larger Santa Barbara Channel area remains uncertain. It could have originated elsewhere, as Middle Holocene trade links with interior tribes of California and the western Great Basin are well documented.

Asphaltum was used in combination with a variety of basketry technologies along the southern California coast. For example, bottomless baskets were glued onto hopper mortar bases with asphaltum. Asphaltum impressions of mortar hoppers might well be preserved, but the rows

of coiling would be expected to have a greater radius of arc than the SMI-396 specimen. This fragment has a tighter curve and appears to have come from an area near the center of the basket, an area absent in the bottomless hoppers. On the other hand, the exteriors of some large, coiled Chumash storage baskets were coated with asphaltum to protect them from moisture (see Craig 1966:212; Hudson and Blackburn 1983:65), and the coiled asphaltum impression from CA-SMI-396 could be a fragment of such a basket. Ethnohistoric accounts also describe tar-lined coiled baskets used to hold offerings or water for ritual purposes (Hudson and Blackburn 1986:243–246).

Tarring pebbles, while well documented for waterproofing basket interiors, are unlikely to have been used to coat the exteriors of baskets with asphaltum. Consequently, the presence of tarring pebble features at CA-SMI-396 suggests that water bottles were being manufactured (or at least sealed) at the site between about 5100 and 4500 years ago, using a process well documented for the ethnographic Chumash and Tongva.

## DISCUSSION AND CONCLUSIONS

The tarring pebble features and asphaltum basketry impressions found at CA-SMI-396 add to our current knowledge of the development of traditional technologies in southern California. The excellent preservation conditions at the site provide glimpses into the daily lives of coastal Californian residents and early maritime technologies. Basketry impressions and tarring pebbles have been found at many mainland and Channel Islands sites, but to our knowledge the CA-SMI-396 examples are the earliest securely dated specimens yet documented. Although it seems unlikely that we have found the earliest examples, excavations at several island and single-component mainland sites dated between about 7500 and 10,000 years old have produced no similar artifacts. The lack of earlier finds suggests that asphaltum-sealed baskets and water bottles were probably not a part of technologies along the southern California coast during the Early Holocene (see Erlandson 1994).

The presence of multiple tarring pebble features at CA-SMI-396 around 5100–4500 years ago suggests the possibility that asphaltum-sealed water bottles may have been developed during the Middle Holocene on

California's Channel Islands before they came into use on the adjacent mainland. Water was probably always a scarce and valuable commodity on the Channel Islands, especially on San Miguel, Anacapa, Santa Barbara, San Nicolas, and San Clemente islands. Asphaltum-sealed water bottles may have been developed in response to the relatively warm and dry conditions that characterized much of the Middle Holocene. Although the "Altitheermal" of the Middle Holocene encompassed considerable climatic variability (see Kennett 2005:70), a general decrease in rainfall and increase in temperature probably affected the number and productivity of fresh water springs and the reliable availability of fresh water in seasonal drainages. Sealed water bottles may have developed as people needed to travel increased distances to water sources and to store fresh water for prolonged periods.

Water storage technologies were an important part of maritime lifeways along the arid southern California coast no less than for people living in the arid interior of eastern California and the Great Basin, who apparently kept water in containers other than baskets until relatively late in prehistory (Catherine S. Fowler, personal communication to J. Timbrook 2005). Nevertheless, conclusions concerning the antiquity of sealed water bottles in southern California must be made with caution, as much remains to be learned about Middle Holocene peoples along the California coast. The development of asphaltum-sealed basketry among Channel Islanders between at least 5100 and 4500 years ago adds to the evidence of a well-established basketry tradition among Middle Holocene peoples of California.

The use of ancient coiled basketry on the Northern Channel Islands also suggests that woven technologies may have been more diverse than currently represented in archaeological assemblages, where basketry is rarely preserved. Until additional examples of similar age are discovered, however, there is a strong possibility that the SMI-396 coiled basket was obtained through trade rather than made in the local Chumash region. Although its size, shape, and purpose are impossible to determine from the fragment, one can speculate that the basket may have had its asphaltum coating applied at the site to make it suitable for holding water.

Although they are often fragmentary and difficult to interpret, asphaltum basketry impressions are frequently

found in archaeological sites along the southern and central California coast. The systematic study of such finds may help fill some of the gaps in our knowledge of ancient coastal basketry traditions in the area.

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### REFERENCES

- Adovasio, J. M.  
1977 *Basketry Technology: A Guide to Identification and Analysis*. Chicago: Aldine Publishing.  
1986 Prehistoric Basketry. In *Handbook of North American Indians: Great Basin*, W. L. D'Azevedo, ed., pp.194–205. Washington D.C.: Smithsonian Institution.
- Blackburn, T.  
1963 Ethnohistoric Descriptions of Gabrielino Material Culture. *UCLA Archaeological Survey Annual Reports*, 1962–1963, pp. 5–48. Los Angeles.
- Bleitz, D.  
1991 A Discussion Concerning Evidence of Coiled Basketry from SNI-11 on San Nicolas Island, California. *California Anthropologist* 18(1):25–27.
- Bolton, H.E.  
1916 *Spanish Exploration in the Southwest, 1542–1706*. New York: Scribners.
- Connolly, T. J., J. M. Erlandson, and S. E. Norris  
1995 Early Holocene Basketry and Cordage from Daisy Cave, San Miguel Island, California. *American Antiquity* 60(2):309–318.
- Craig, S.  
1966 Ethnographic Notes on the Construction of Ventureño Chumash Baskets from the Ethnographic and Linguistic Field Notes of John P. Harrington. *UCLA Archaeological Survey Annual Reports* 8:201–214. Los Angeles.  
1967 The Basketry of the Ventureño Chumash. *UCLA Archaeological Survey Annual Reports* 9:82–149. Los Angeles.
- Dallas, H.  
1993 Results of Limited Testing at SLO-977. *Proceedings of the Society for California Archaeology* 6:337–356.
- Dawson, L.E.  
1990 The Spread of Coiled Basketry in California. Exhibit Text from *Fields of Clover: Larry Dawson's Thirty-Eight Years with the Lowie Museum Collections*, June–August 1990, Phoebe Apperson Hearst Museum of Anthropology [formerly Lowie Museum of Anthropology], Berkeley, California.
- Dedera, D.  
1976 Petroleum and the American Indians. *Exxon USA* 15(3):16–21.
- Dittman, C.  
1973 Narrative of a Seafaring Life on the Coast of California. In *Original Accounts of the Lone Woman of San Nicolas Island*, R. Heizer and A. Elsasser, eds., pp. 1–7. Ramona: Ballena Press.
- Erlandson, J. M.  
1994 *Early Hunter-Gatherers of the California Coast*. New York: Plenum.  
1997 The Middle Holocene on the Western Santa Barbara Coast. In *Archaeology of the California Coast during the Middle Holocene*, J.M. Erlandson and M.A. Glassow, eds., pp. 91–109. Los Angeles: UCLA Institute of Archaeology.
- Erlandson, J., R. Carrico, R. Dugger, L. Santoro, G. Toren, T. Cooley, and T. Hazeltine  
1993 *Archaeology of the Western Santa Barbara Coast: Results of the Chevron Point Arguello Project Cultural Resources Program*. Santa Barbara: Ogden Environmental and Energy Services.
- Gamble, L. H.  
2005 Culture and Climate: Reconsidering the Effect of Paleoclimatic Variability among Southern California Hunter-Gatherer Societies. *World Archaeology* 37(1):92–108.
- Grant, C.  
1962 The Carpinteria Tar Pits. *Noticias: Quarterly Bulletin of the Santa Barbara Historical Society* 8(4):11–20.
- Heizer, R.  
1940 Aboriginal Use of Bitumen by the California Indians. *Geologic Formations and Economic Development of the Oil and Gas Fields of California*, *Bulletin* 118:73–75. San Francisco: California Division of Mines.
- Hemert-Engert, A. and F. Teggart, eds.  
1910 The Narrative of the Portolá Expedition of 1769–1770 by Miguel Costansó. *Publications of the Academy of Pacific Coast History* 1(4). Berkeley.
- Heye, G. G.  
1921 Certain Artifacts from San Miguel Island, California. *Indian Notes and Monographs* 7(4):1–211. New York: Museum of the American Indian.

- Hudson, T. and T. C. Blackburn  
 1983 *The Material Culture of the Chumash Interaction Sphere: Volume II: Food Preparation and Shelter*. Menlo Park: Ballena Press.  
 1986 *The Material Culture of the Chumash Interaction Sphere: Volume IV: Ceremonial Paraphernalia, Games, and Amusements*. Menlo Park: Ballena Press.
- Johnson, D. L.  
 1972 *Landscape Evolution on San Miguel Island, California*. Ph.D. dissertation, University of Kansas.
- Jolie, E. A. and E.M. Hattori  
 2005 The Spread of Coiled Basketry in the Great Basin. Paper prepared for *Unraveling the Boundary: Perishable Technologies Across and Between the Prehistoric Great Basin and Southwest*, symposium chaired by E.A.Jolie and M.E. McBrinn at annual meeting of the Society for American Archaeology, Salt Lake City.
- Kennett, D. J.  
 2005 *The Island Chumash: Behavioral Ecology of a Maritime Society*. Berkeley: University of California Press.
- Nidever, G.  
 1973 The Life and Adventures of a Pioneer of California Since 1834. In *Original Accounts of the Lone Woman of San Nicolas Island*, R. Heizer and A. Elsasser, eds., pp. 7–15. Ramona: Ballena Press.
- Rick, T. C.  
 2004 *Daily Activities, Community Dynamics, and Historical Ecology on California's Northern Channel Islands*. Ph.D. dissertation, University of Oregon.
- Stuiver, M., and P.J. Reimer  
 1993 Extended <sup>14</sup>C Data Base and Revised Calib 3.0 <sup>14</sup>C Age Calibration Program. *Radiocarbon* 35:215–230.  
 2000 *Calib 4.3 Radiocarbon Calibration Program 2000*. Seattle: Quaternary Isotope Lab, University of Washington.
- Timbrook, Jan  
 1993 Island Chumash Ethnobotany. In *Archaeology on the Northern Channel Islands of California: Studies of Subsistence, Economics, and Social Organization*, M. A. Glassow, ed., pp. 47–62. Salinas: Coyote Press.
- Vellanoweth, R. L., M. R. Lambright, J. M. Erlandson, and T. C. Rick  
 2003 Early New World Maritime Technologies: Sea Grass Cordage, Shell Beads, and a Bone Tool from Cave of the Chimneys, San Miguel Island, California, USA. *Journal of Archaeological Science* 30:1161–1173.
- Wagner, H. R., ed.  
 1929 *Spanish Voyages to the Northwest Coast of America in the Sixteenth Century*. San Francisco: California Historical Society.
- Wilcoxon, L. R.  
 1993 Subsistence and Site Structure: An Approach for Deriving Cultural Information from Coastal Shell Middens. In *Archaeology on the Northern Channel Islands of California: Studies of Subsistence, Economics, and Social Organization*, M.A. Glassow, ed., pp. 137–151. Salinas: Coyote Press.

