

Identification of Shell Material  
From  
CA-SCR-198H “Cabin B”  
Cowell Lime Works Historic District  
University of California, Santa Cruz.

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## Background

In the second half of the nineteenth century and first half of the twentieth century the Cowell Lime Works Historic District was part of an extensive lime manufacturing and ranching operation. From the 1850s to 1865 the business was owned by the firm of Davis and Jordan. In 1865 this became the firm of Davis and Cowell, and later was owned by Henry Cowell and his descendants.

In 2009, during restoration of one of the historic workers' cabins, archaeological excavations were conducted under and adjacent to the cabin. This report is on the identification of shell material (primarily from marine mollusks) unearthed by these excavations.

## Summary of Taxa

The following is a list of taxa identified. Included are the common name, scientific name, phylum, and class.

- California Mussel. *Mytilus californianus* Conrad, 1837 [Mollusca, Bivalvia]
- Pismo Clam. *Tivella stultorum* (Mawe, 1823) [Mollusca, Bivalvia]
- Owl Limpet. *Lottia gigantea* Sowerby, 1834 [Mollusca, Gastropoda]
- Green False-Jingle. *Pododesmus macrochisma* (Deshayes, 1839) [Mollusca, Bivalvia]
- Asian Clam. *Corbicula fluminea* (Müller, 1774) [Mollusca, Bivalvia]
- Barnacle. *Balanus?* [Arthropoda, Crustacea]
- Unidentified calcareous material

## Condition of Material

### Breakage

Nearly all of the specimens are fragments. Only a few whole shells were found, including two whole specimens of *Lottia*, and a complete valve of *Mytilus californianus* and of *Corbicula fluminea*. The breaks are mostly angular with sharp edges. This is not surprising since it is presumed that the mollusks were gathered for food. The shells may have been broken during the process of prying them off rocks or opening them.

## Color

Many of the shells are dull white or brownish white. Some of the *Mytilus* shells are still blue and/or have a nacreous interior. The *Corbicula* still has its dark brown periostracum. The shells of *Pododesmus* (usually green in life) and *Lottia* (which have some dark brown and black coloration) are light brown or white.

## Shell Alteration

Most of the shells have a chalky appearance and feel. This is typical of shell that has been buried in soil for a number of years and has started to dissolve.

## Borings

Many of the *Mytilus* shells and some of the *Tivella* shells contain tiny borings. These were made by other invertebrates, such as polychaete worms or sponges, probably while the mollusks were still living or at least while the shell was still in the sea.



## Discussion



*Mytilus californianus* — These shells are blue and white in life with a rough exterior and radiating ribs. On fresh specimens, the exterior of the shell is covered by a shiny, black periostracum. The species lives intertidally along exposed rocky shores and to a depth of 100 m (Coan et al., 2000). These clams are filter feeders and attach to rocks with coarse, hair-like fibers called byssus, which they secrete. Dense beds of mussels occur along rocky parts of the Santa Cruz County coast, including along West Cliff Drive (personal observation). Most of the remains at Cabin B are fragmentary, but some of the beaks are intact, showing the interior muscle scar and part of the hinge line. Based on the size of the beaks and thickness of some of the shell fragments, some of the shells were as long as 5 or 6 inches.

Another species, the Bay Mussel (*Mytilus edulis*) also lives along the California coast. This mussel, however, prefers quite, protected waters. It is abundant, for example, in the Santa Cruz Small Craft Harbor, but very rare locally on the exposed coast (personal observation). Because all of the mussel fragments that could be identified are from *Mytilus californianus*, it is assumed that even the smaller fragments are also of this species. It is very unlikely that any are from *Mytilus edulis*, especially since sheltered marine habitats such as the harbor were nonexistent in Santa Cruz in the early 1900s.

Mussels are quite edible and can be taken today with a fishing license. In the summer months, however, mussels may feed on a type of plankton that makes the meat dangerously toxic to humans (Ricketts et al., 1985).



*Tivella stultorum* — This species is characterized by a very thick, white, trigonal shell with a smooth exterior (no ribs and only very fine growth lines). These clams live in the intertidal and subtidal of sandy beaches along the open coast. The Pismo Clam was abundant and widely harvested along the California and Santa Cruz coast in the late 1800s and early 1900s. From 1916 through 1947 nearly 50,000 of these clams were annually harvested in California by commercial clambers (Ricketts et al., 1985). Commercial harvesting

ceased in after 1947, but recreational clamming continued (California Department of Fish and Game, 2001). While the species remains extant, its numbers have sharply declined, especially in the intertidal. “The population in Monterey Bay dropped rapidly in the 1970’s under attacks by both man and the sea otter,” (Haderlie and Abbott, 1980).



*Lottia gigantea* — This limpet lives on surf-swept rocks of the open shore. It is low in profile with a distinctive interior color pattern said to resemble an owl. The interior is smooth while the exterior is commonly rough and eroded. This is a large species, reaching 100 mm in length (Lindberg, 1981). It is considered quite edible, and its shells are common in Indian middens. There was even a commercial harvest in California for a short time in the early 1900s (Haderlie and Abbott, 1980). *Lottia* is still common along the Santa Cruz County coast (personal observation).

*Pododesmus macrochisma* — This unusual clam is related to scallops and lives attached to rocks on the outer coast. Its beautiful green color is caused by algae that live within the shell (Haderlie and Abbott, 1980). It is edible but rarely used as food (Haderlie and Abbott, 1980). Only two small fragments were found at Cabin B. The larger (25 mm in diameter) was from a medium-sized individual, originally perhaps 50 mm in diameter. It can reach 120 mm (specimen in author’s collection). Although this species is edible, it could also be that the shells were accidentally brought in with mussels. It is possible that the shells were already broken pieces attached to the mussels since so few pieces were found.



*Corbicula fluminea* — Known as the Asian Clam, this is an introduced freshwater species native to Asia. It first showed up in California in 1938, probably brought here from China (U.S. Geological Survey, 2001). It is today branded an invasive species. A single, small valve, 19.4 mm high, was found at Cabin B. Its pristine appearance, including the brown periostracum, strongly suggests it is recent and not historic. It is uncertain how it was introduced to the site. This species, however, is known to inhabit

Santa Cruz County waterways (U.S. Geological Survey, 2001). Interestingly, in China (where it is widely eaten) the shells of this species are also used to make a high quality lime (Hanna, 1966).



*Balanus?* — A piece of a small barnacle shell was found. While certain large species of barnacle can be eaten, this individual was too small to have been consumed. It is assumed that it was brought in accidentally with the mussels.



Unidentified calcareous material — Several small, white, rounded pieces of calcareous material were found that could not be precisely identified. Some could be mollusk shell, the shell of some other type of invertebrate, or pieces of carbonated lime.

## Conclusions

Three mollusk species appear to have been harvested by people who lived in and about Cabin B: the California Mussel, Pismo Clam, and Owl Limpet. All three are edible species of native marine mollusca. It seems reasonable to assume that the shellfish were collected from nearby rocks and beaches and consumed at the site of the cabin by cabin residents.

The total amount of shell material is small, but this could be misleading. Jo Ann Cacace, whose grandfather, Carlos Silva, worked at the lime works, said that they also made shell lime (Cacace, 2008). This, said her grandfather, was powdered and added to whitewash to make it “better.” It could well be that much more shellfish was consumed, but that the empty shells were burned to make lime.

## References

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