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Pleistocene Invertebrates from near Punta San José, Baja California, Mexico

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INTRODUCTION

The present paper records the presence of marine megafossils from late Pleistocene terrace deposits in the vicinity of Punta San José, Baja California, Mexico (latitude 31° 28' N.). Only a small number of metazoan invertebrates (25 species of mollusks and one species of annelid worm) were collected from this previously unreported locality. The assemblage is compared with the composition of other late Pleistocene assemblages known from northwestern Baja California.

Punta San José is a prominent headland situated about 4 miles southeastward of Punta China (see fig. 1). The coast line south of the promontory forms a succession of broken bluffs and small beaches backed by a low mesa, the San José plain. The locality is reached from Ensenada by turning off the main highway 0.04 of a mile past Kilometer 170 and by continuing to the end of a farm road that terminates along the beach several miles south of Punta San José. Here a foot trail continues southward along the coast for some distance. Small exposures of fossiliferous sediments occur in isolated patches in the sea cliff about half a mile from the end of the farm road.

Although Beal (1948) mapped continuous exposures of pre-Tertiary crystalline rocks in this area, the terrace deposits rest on predominantly dark purplish, volcanic breccia that is referable to the early Cretaceous Alisitos formation, according to E. C. Allison (personal communication). The sparsely fossiliferous Pleistocene sediments are cemented on

¹ The American Museum of Natural History.

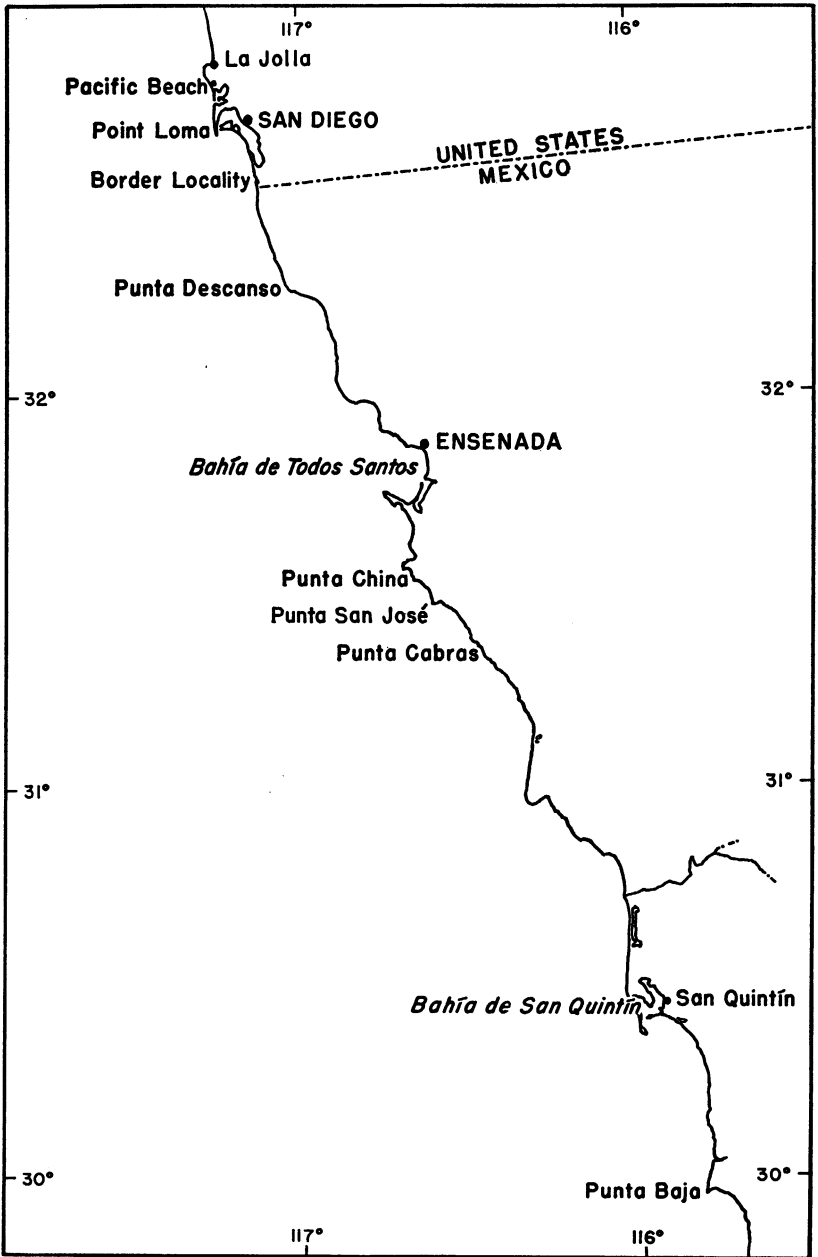


FIG. 1. Map showing location of the principal localities mentioned in the text.

the irregular surface of the pyroclastic rocks at an elevation of 12 to 15 feet above sea level and were noted only in exposures along the sea cliff.

The fossiliferous terrace deposits are largely eroded off the bluffs along the shore and, in areas protected from erosion, form patches attaining a maximum observed thickness of 4 feet of fossiliferous coarse to fine sand and pebble conglomerate. Non-fossiliferous reddish sand and soil locally cover the fossiliferous sediments with 1 foot to 12 feet of overburden. Shell middens, including numerous specimens of *Mytilus*, *Lottia*, *Acmaea*, and *Acanthina*, are common in the surface cover to a depth of 6 inches. Fossils of smaller size are well preserved in the pebble conglomerate that overlies the volcanic rocks, but larger-sized fossils are represented mostly by fragments. The fossiliferous, largely unconsolidated coarse sand that overlies the conglomerate contains angularly worn shell fragments and occasional complete specimens. Pholads occur *in situ* on the terrace platform, and colonies of a tubular annelid (possibly *Phragmatopoma californica*) encrust rocks in the basal conglomerate.

I am indebted to Mr. Edwin C. Allison of the University of California Museum of Paleontology for inviting me to join him on a reconnaissance of the area, in June, 1959, and for assistance in the field.

COMPOSITION AND INFERRED SIGNIFICANCE OF THE PUNTA SAN JOSÉ ASSEMBLAGE

The collected fauna comprises 26 species, including 25 mollusks (12 pelecypods, 12 gastropods, and one scaphopod) and one polychaetous annelid (see below for a list of the species). This obviously represents only a small part of the fauna that lived in this coastal area during the time of deposition, but is large enough to permit comparisons with similar terrace assemblages known from nearby deposits. Although all the identified species are extant forms, four are locally extinct species.

The assemblage apparently lived along a shore similar to the present one, where small rocky bluffs divide the coast into a series of small, cove-like, sandy beaches. Although many of the species are near-shore attaching or burrowing forms, several of the species, for example, *Dentalium*, inhabited deeper waters off shore and were undoubtedly carried shoreward to be deposited on the beaches by wave and current action.

The present assemblage appears to be a lateral continuation of the cool-water, open-coast fauna reported from southern California to Punta Baja (latitude 29° 57' N.) in deposits on the platform of the

lowest emergent terrace along the present coast (Addicott and Emerson, 1959). Although this terrace is not a continuous physiographic feature, owing to the nature of the Pleistocene topography and subsequent erosion, similar fossil communities occurring locally in these deposits reflect a contemporaneous regional faunal regime apparently resulting from a diversity of local hydroclimatic conditions. The composition of these faunas suggests that the hydroclimate was locally either cooler or warmer during deposition of the fossil communities than the present water temperatures occurring at these latitudes.

Along the northwestern coast of Baja California late Pleistocene open-coast faunas characterized by the presence of locally extinct frigidophiles are reported from Punta Descanso (Valentine, 1957), Punta China (Emerson, 1956), Punta Cabras (Addicott and Emerson, 1959) and Punta Baja (Emerson and Addicott, 1958). Semi-protected bay faunas containing a conspicuous, locally extinct, thermophilic element and some representation of the frigidophilic element are recorded from the International Border (Emerson and Chace, 1959) and from Bahía de San Quintín (Jordan, 1926). (See fig. 1 for locations of these localities.) The presence of four locally extinct frigidophiles in the assemblage from Punta San José (see list of species below) indicates that this locality supported a fauna similar to the assemblages from open-coast sites known elsewhere from the extreme northern portion of the peninsula. One ecologically significant constituent of this frigidophilic element is a large growth form of *Macoma nasuta* that was named *Macoma kelseyi* by Dall (1900). In addition to the present assemblage, this form is known to occur in apparently correlative fossil deposits in the Los Angeles and San Diego areas of California (Grant and Gale, 1931) and along the Baja California coast at Punta Cabras (Addicott and Emerson, 1959) and Punta Baja (Emerson and Addicott, 1958). Living representatives of this growth form of *Macoma nasuta* apparently are restricted to Puget Sound, Washington, and Coos Bay, Oregon (Burch, 1945a). The southern end points of range of the other three frigidophiles in this assemblage occur in the region of southern California (see list of species below).

Viewed in terms of west American metazoan chronology (Weaver and others, 1944), the composition of the present assemblage and that of other faunas of this region occurring in sediments deposited on the platform of the lowest emergent marine terrace require an age assignment to the late Pleistocene. The apparently contemporaneous occurrence of locally extinct thermophilic and frigidophilic faunal elements at some of these localities suggests deposition during an inter-

glacial or adglacial stage. Furthermore, a probably late third interglacial or early Wisconsin age is suggested by carbon-14 dates of more than 30,000 years B.P. for similar deposits in southern California (Bradely, 1956; Kulp and others, 1952).

ANNOTATED LIST OF SPECIES FROM THE PUNTA
SAN JOSÉ TERRACE

MOLLUSCA

PELECYPODA

- Amiatis callosa* (Conrad, 1837), Santa Barbara, California to Cape San Lucas, Baja California (Fitch, 1953); one fragment
- Glycymeris* (?) *profunda* (Dall, 1879), Catalina Island and Redondo Beach, California (Willett, 1944); valves, common
- Hinnites multirugosus* (Gale, 1928), Queen Charlotte Islands, British Columbia to Abreojos Point, Baja California (Fitch, 1953); large valves, uncommon
- Lucina* (*Here*) *excavata* Carpenter, 1855, Catalina Island, California, to Mazatlan, Mexico (Keen, 1958); one valve
- Lucina nuttalli* Conrad, 1837, Monterey, California (Smith and Gordon, 1948) to Tres Marias Islands (Keen, 1958); valves, common
- Macoma nasuta* forma *kelseyi* Dall, 1900, Puget Sound, Washington, and Coos Bay, Oregon (Burch, 1945), large valves, common
- Penitella penita* (Conrad, 1837), Chirikof Island, Alaska, to Turtle Bay, Baja California (Fitch, 1953); stunted specimens from burrows in the terrace platform, common
- Prothaca staminea* (Conrad, 1837), Aleutian Islands, Alaska, to Cape San Lucas, Baja California (Fitch, 1953); fragments, uncommon
- Saxidomus nuttalli* Conrad, 1837, Humboldt Bay, California, to San Quintín Bay, Baja California (Fitch, 1953); large valves, common
- Spisula* sp.; fragments, common
- Tellina idae* Dall, 1891, Santa Barbara Island, California (Dall, 1921), and Santa Monica to Newport Bay, California (Burch, 1945b); two valves
- Zirfaea pilsbryi* Lowe, 1931, Nunivak Island, Alaska, to San Juanico Bay, Baja California (Fitch, 1953); stunted specimens from burrows in the terrace platform, uncommon

GASTROPODA

- Clathrodrilla ophioderma*, (Dall, 1908), Bolinas Bay, California, to Ballenas Lagoon, Baja California (Dall, 1921); one specimen
- Conus californicus* Hinds, 1844, Farallone Islands, California, to Ballenas Lagoon, Baja California (Dall, 1921); common
- Elaeocyna hemphilli* (Stearns, 1871), Santa Barbara, California, to Gulf of California (Dall, 1921); uncommon
- Hipponix antiquatis* (Linnaeus, 1767), Crescent City, California, to Panama and Galapagos Islands (Dall, 1921); common
- Kellettia kelletti* (Forbes, 1850), Santa Barbara, California, to San Quintín Bay, Baja California (Dall, 1921); badly worn fragments, uncommon

- Mitra* cf. *M. idae* Melville, 1893, Farallone Islands to Cortez Bank, California (Dall, 1921); one worn fragment
- Nassarius fossatus* (Gould, 1849), Vancouver Island, British Columbia (Dall, 1921), to San Ignacio Lagoon, Baja California (Jordan, 1924); fragments, common
- Nassarius perpinguis* (Hinds, 1844); Puget Sound, Washington, to Magdalena Bay, Baja California (Grant and Gale, 1931); common
- Olivella biplicata* (Sowerby, 1825), Vancouver Island, British Columbia, to Magdalena Bay, Baja California (Dall, 1921); common
- Olivella pedroana* (Conrad, 1855), Puget Sound, Washington, to Cape San Lucas, Baja California (Dall, 1921); uncommon
- Terebra pedroana* Dall, 1908, Redondo Beach, California, to San Ignacio Lagoon, Baja California (Burch, 1945c); worn specimens, common
- Turritella cooperi* Carpenter, 1864, Monterey, California, to Cedros Island, Baja California (Burch, 1945d); uncommon

SCAPHOPODA

- Dentalium neohexagonum* Sharp and Pilsbry, 1897, Monterey, California, to Guacomayo, Costa Rica (Dall, 1921); common

ANNELIDA

POLYCHAETA

- Phragmatopoma* sp.

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