

most like *Pycnodonte* (*Pycnodonte*), especially in the shell interior features. *Pegma* differs, however, in having a plicate left valve, an inflated right valve, no radial sulcus, no auricles, and no hyote spines.

Harry and Dockery (1983) used an unnamed possible subgenus for two species of *Pycnodonte* from upper Eocene through lower Oligocene strata in the Gulf Coast, southeastern United States. These two species are discussed below. Each one may belong in its own subgenus, but both would be distinct from *Pegma* n. subgen.

Etymology.—Latin, *pegma*, shelf (for the commissural shelf on both valves).

Material.—The new subgenus includes only its type species, *Pycnodonte* (*Pegma*) *bajaensis* n. sp.

Occurrence.—Middle lower Eocene "Capay Stage" (Ypresian Stage) to the middle Eocene CP14a Zone of Okada and Bukry (1980), which plots within the middle Eocene part of the "Tejon Stage" (Lutetian Stage).

PYCNODONTE (PEGMA) BAJAENSIS n. sp.

Figure 3.5–3.12

Diagnosis.—Same as for subgenus.

Description.—Medium sized; shell up to 60 mm high, subcircular to elongate, umbones central, shell moderately thick; commissure plicate; hinge line in both valves fairly short; ligament opisthogyrate; ligamental pit in both valves small but well developed; vermiculate chomata usually very noticeable, may continue downward from ligamental area to lower margin of adductor-muscle scar; adductor-muscle scar subcircular, just posterior of center of each valve; commissural shelf fairly well developed to well developed with vesicular internal structure evident in some left-valve and some right-valve specimens; left valve (attached) flat bottomed to locally convex (depending on nature of substrate), attachment area large, can cover entire valve in some specimens, attachment area troughlike in some specimens, may be as long as entire valve; valve margins plicate, upturned into short, wall-like enclosures around valve; right valve usually with inflated smooth central area extending from umbo to venter, surrounded by variable number of narrow to moderately narrow plicae around valve margin; noticeable indentation between smooth area and plicate area.

Remarks.—Most specimens of the new species were found at locality CSUN 1220b. Only a single left valve was found at locality CSUN 1293. Cementation of the left valves to the substrate usually encompasses the entire lower surface of the valves. Shell and coral debris commonly are the substrate, but a few specimens (e.g., Figure 3.5) have a troughlike attachment scar that strongly suggests possible attachment to a mangrove root. Extensive erosion can cause the right valves to be fairly flat without plicae.

Pycnodonte (*Pegma*) *bajaensis* is somewhat intermediate in morphology between *Pycnodonte* (subgenus?) *vicksburgensis* (Conrad, 1848, p. 126, Pl. 13, figs. 5, 37; Dockery, 1982, p. 53–55, Pl. 17, figs. 7–12, text-fig. 34.2) and *Pycnodonte* (subgenus?) *paroxis* (Leseur MS in Dockery, 1982, p. 53, Pl. 17, fig. 13, Pl. 59, fig. 10, Pl. 60, figs. 1–3). *Pycnodonte* (subgenus?) *vicksburgensis* is known from upper Eocene through lower Oligocene strata in the southeastern United States, whereas *P.* (subgenus?) *paroxis* is known from lower Oligocene strata in Mississippi (Dockery, 1982). *Pycnodonte* (*P.*) *bajaensis* n. sp. differs from *P.* (subgenus?) *vicksburgensis* in the following features: weaker, more numerous ribs that are more closely spaced, central region on right valve smooth rather than ribbed, chomata not on entire margin, and attachment area of left valve much larger. The new species differs from *P.* (subgenus?) *paroxis* in the following fea-

tures: plicae on left valve, right valve is not entirely smooth along margins, a plicate commissure, chomata not restricted to beak area, and commissural shelf is better developed. *Pycnodonte* (*P.*) *bajaensis* is substantially different enough from these two Gulf Coast forms to justify placement in its own subgenus.

Pycnodonte (*Pegma*) *bajaensis* is the only Paleogene oyster from the west coast of North America that has plicate valves (as well as a plicate commissure). These features were previously known in Miocene or younger oysters from the west coast of North America that belong to *Dendrostrea* and *Lopha*? (Moore, 1987).

Etymology.—The species name is for Baja California, Mexico.

Material.—Sixty-two right valves and 10 left valves. All of the valves show the interior. No matched valves were found.

Occurrence.—Middle lower Eocene West Coast "Capay Stage" (Ypresian Stage) to middle Eocene CP14a Zone of Okada and Bukry (1980), which plots within the middle Eocene part of the "Tejon Stage" (Lutetian Stage). "Capay Stage": Bateque Formation, Baja California Sur, Mexico, locality CSUN 1220b. "Tejon Stage": Bateque Formation, Baja California Sur, Mexico, locality CSUN 1293.

Repository.—Holotype, IGM 5069 (=plasto-holotype), LACMIP 8072; paratypes, IGM 5070–5072 (=plasto-paratypes), LACMIP 8073–8075; locality CSUN 1220b.

Family OSTREIDAE Rafinesque, 1815
Subfamily OSTREINAE Rafinesque, 1815
Genus CUBITOSTREA Sacco, 1897

Type species.—By original designation, *Ostrea cubitus* Deshayes, 1832.

CUBITOSTREA MEZQUITALENSIS n. sp.

Figure 4.1–4.9

Diagnosis.—*Cubitostrea* with left valve having very strong, widely spaced radial ribs; right valve can be plicate or not, with anachomata around entire margin.

Description.—Small to medium sized; shell up to 78 mm long, strongly inequivalved, opisthogyrate, very crescentic to recurved; adductor-muscle scar subcircular to ovate, situated approximately one-third distance between hinge and branchitellum in each valve; ligamental pit well developed in each valve; left valve (attached) with very strong but narrow, radial ribs; ribs number 20–25 in specimens of 30 mm length, separated by deep interspaces usually wider than ribs and crossed by commarginal growth rugae, branching into 2 or 3 radial ribs in posterior region of valve; left valve keeled in large specimens, valve margin strongly plicate, flat attachment scar usually only in umbonal area but can extend over the entire upper surface of left valve; short row of catachomata pits in gutter on each side of hinge; ligamental area moderately deep; right valve slightly smaller than left, size discrepancy increasing posteriorly, convex in anterior half becoming flat to slightly concave posteriorly, mostly smooth except for commarginal growth squamae, valve margin (except for posterior) may be plicate or nonplicate; plicae best developed along ventral margin, fitting into corresponding plicate folds on left valve; plicate specimens may have low, broad radial ribs, usually extending only a short distance, rarely extending to umbo area; entire interior margin of right valve with anachomata, relict anachomata may be present in and adjacent to ligamental area.

Remarks.—Roughly equal numbers were found of same-size plicate or nonplicate right valves. The two forms are gradational (Figure 4.5, 4.6, 4.8, 4.9).

Cubitostrea mezquitalensis n. sp. closely resembles *Cubiostrea cubitus* (Deshayes, 1832, p. 365–366, Pl. 47, figs. 12–15; Coss-

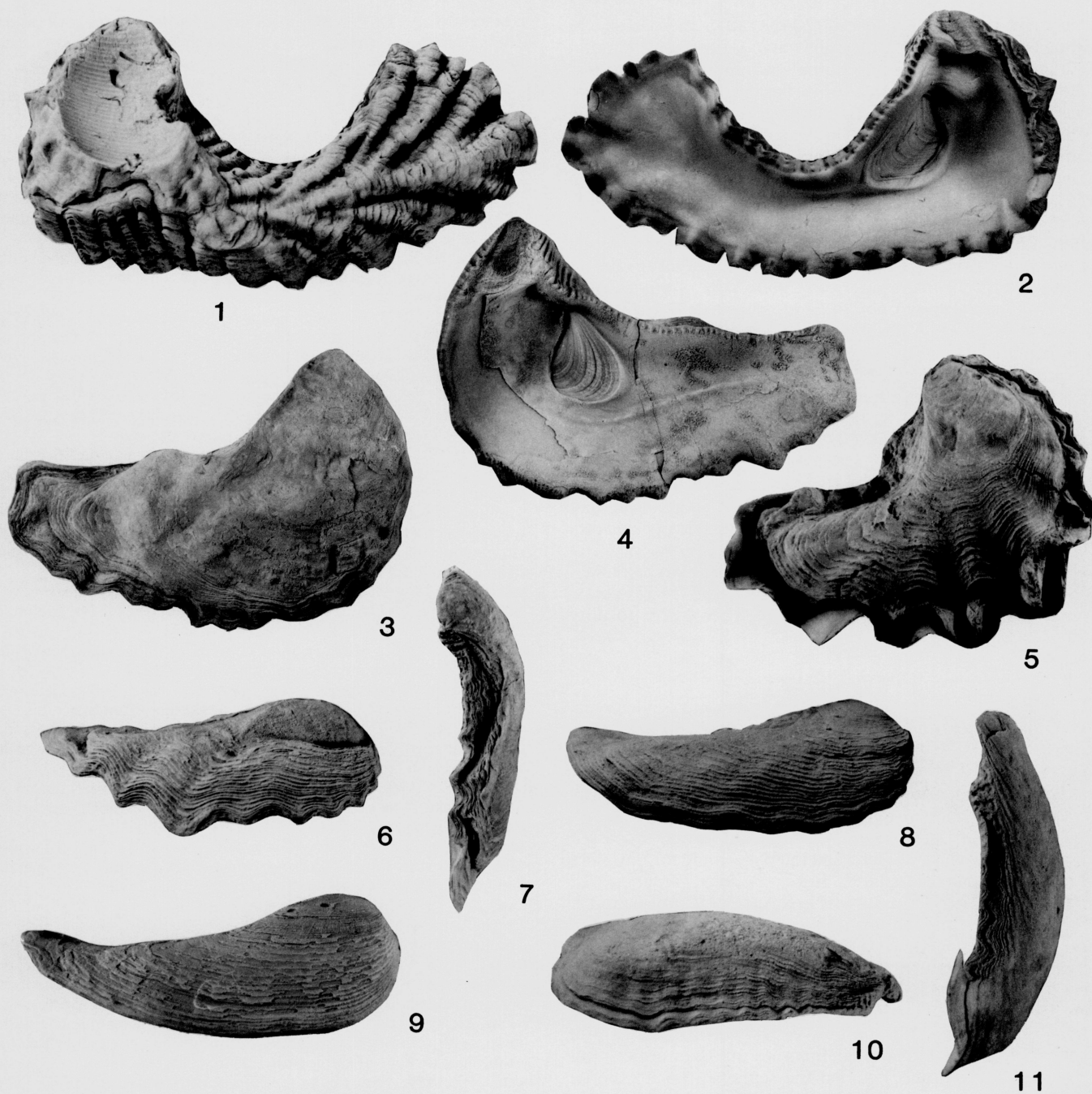


FIGURE 4—1-9, *Cubitostrea mezquitalensis* n. sp., locality CSUN 1293. 1, 2, holotype, IGM 5073, left-valve exterior and interior, $\times 1.1$; 3, 4, paratype, IGM 5074, right-valve exterior and interior, $\times 1$; 5, paratype, IGM 5075, right-valve view of an articulated specimen, $\times 1.6$; 6, 7, paratype, IGM 5105, right valve, ventral margin (oblique view), $\times 2.2$; 8, paratype, IGM 5106, right valve, ventral margin (oblique view), $\times 2.2$; 9, paratype, IGM 5107, right valve, ventral margin (oblique view), $\times 1.9$; 10, 11, *Cubitostrea cubitus* (Deshayes, 1832), locality LACMIP 29389, hypotype, LACMIP 8279, right valve, ventral (oblique view) and dorsal margins, $\times 2.9$.

mann and Pissarro, 1904-1906, Pl. 44, fig. 135-32; Stenzel et al., 1957, Pl. 9, fig. 6; Stenzel, 1971, figs. J17a, J116-1; Pomerol and Feugueur, 1974, Pl. 16, fig. 7) from upper Eocene (Bartonian Stage), Paris Basin, northern France. Although Stenzel (1971, p. N1141) mentioned that *C. cubitus* (the type species of *Cubitostrea*) does not have ribs on the right valve, some of the right-valve specimens of the LACMIP collection of *C. cubitus* from Bartonian Stage strata at Le Guépelle, Paris Basin, France, are

plicate and do have small radial ribs along the entire margin of the valve (except the posterior end). One of these specimens, hypotype LACMIP 8279, is illustrated in Figure 4.10, 4.11. Collections of *C. cubitus* made by Squires from Le Guépelle also reveal that some of the right-valve specimens are plicate. A comparison between *C. mezquitalensis* and *C. cubitus* from Le Guépelle, Paris Basin, revealed that *C. mezquitalensis* differs in the following features: left valve with radial ribs that are

stronger and more widely spaced (20–25 rather than 30–40, in specimens of 30 mm length), right valve with stronger radial ribs, and right valve with anachomata around entire margin.

The geological range of *Cubitostrea* has been reported by most workers as middle Eocene (Lutetian Stage) to middle Oligocene (Davies, 1971; Stenzel, 1971). The genus was widespread during the middle Eocene with common occurrences in the Gulf Coast region of the United States and in the Paris Basin, France. Ward (1985), however, recently reported the earliest known *Cubitostrea* from the lower Eocene (Ypresian Stage) Nanjemoy Formation, Virginia. The middle Eocene (Lutetian Stage) *Cubitostrea mezquitalensis* n. sp. is the first occurrence of this genus on the west coast of North America. *Cubitostrea mezquitalensis* and *Pycnodonte (Pegma) bajaensis* n. subgen. and sp. are the only known Paleogene plicate oysters from the west coast of North America.

Etymology.—The specific name is for Arroyo Mezquital, along which the type locality of the new species is located.

Material.—About 150 well-preserved specimens with nearly equal numbers of right and left valves, all of which show interiors. Many specimens are articulated.

Occurrence.—Middle Eocene CP14a Zone of Okada and Bukry (1980), which correlates within the "Tejon Stage" (Lutetian Stage), Bateque Formation, Baja California Sur, Mexico, locality CSUN 1293.

Repository.—Holotype, IGM 5073 (=plasto-holotype), LAC-MIP 8076, paratypes, IGM 5074–5075 and 5105–5107 (=plasto-paratypes), LACMIP 8077–8078 and 8276–8278; locality CSUN 1293.

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APPENDIX

Localities.—Unless otherwise stated, the CSUN localities are approximately 1.25 km southeast of the intersection of 113°00'W and 26°45'N, San Jose de Gracia, Baja California Sur, Mexico, 1:50,000 quadrangle map (number G12A64), issued in 1983 under the authority of the Direccion General de Geografia.

CSUN 1220b—North side of a minor canyon, at an elevation of 120 m, on the west side of Mesa La Salina, 100 m above the bottom of a measured section of the Bateque Formation. = LACMIP

CSUN 1220c—On a traverse bearing due north from locality CSUN 1220b, 160-170 m above the bottom of the same measured section mentioned under locality 1220b.

CSUN 1293—North-facing, 35-m-high bluff on south side of Arroyo Mezquital, just south of dirt road leading to San Juanico (13.5 km north), approximately 112°23'W and 26°14'N, San Isidro, Baja California Sur, Mexico, 1:250,000 quadrangle map (number NG 12-4), issued in 1973 under the authority of the Instituto Panamericano de Geografia e Historia.

LACMIP 29389—Quarry about 1 km south of St. Witz, which is 28 km northeast of Paris, France.

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