and inflated posteriorly having a double siphonal fold. Beaks low, very near posterior end. Hinge with posteriorly directed resilifer and flange-like nymph for the ligament; two cardinal teeth in each valve. Right valve with two thin lamellar cardinals 3a, 3b on either side of large socket, anterior to the resilifer; well-developed, elongate, dorsally striate anterior lateral AI and weaker, ventrally striate AIII very near shell margin; two short posterior laterals. Left valve with deltoid anterior cardinal 2b and very thin posterior cardinal 4b; anterior lateral well developed, striate dorsally and ventrally, very elongate; posterior lateral short, striate dorsally and ventrally. Pallial sinus a wide but shallow embayment.

Remarks: ***Califadesma*** differs from *Mesodesma* in having the resilifer posteriorly slanted and the cardinals upon the hinge plate. In *Mesodesma* the resilifer has moved to a more medial position and crowded the cardinals up off of the hinge plate onto a thin shelf overhanging the dorsal end of the resilifer (Figures 45, 46, 50, 51). The hinge of ***Califadesma***, with cardinals 3a, 3b, deltoid 2b, and 4b on the hinge plate, is more clearly mactroid (see Figure 3 for hinge diagrams) than is that of *Mesodesma*. SAUL (1988) erroneously reported that the laterals of these genera are striate only on the dorsal side, but AII and PII are finely striate on the ventral as well as the dorsal side, and AIII and PIII are finely striate on the ventral side in both *Mesodesma* and ***Califadesma***.

The posterior of ***Califadesma*** is clearly marked by a double siphonal fold, the ridges of which are more angulate on the right valve and more rounded on the left valve. Possibly the double siphonal fold in these shells is a reflection of the separate siphons.

Three species are here assigned to the genus ***Califadesma***: ***C. aspris*** sp. nov., ***C. elaphium*** sp. nov., and ***C. tuscanum*** sp. nov. All are from Upper Cretaceous deposits of northern California. The geologically oldest of these species, ***C. aspris***, is least cuneate and most mactriform.

The generic name is compounded of *Calif* for California and the Greek *desma,* meaning "band, bundle," from *Mesodesma* to which it is apparently related and perhaps antecedant. A generic name ending in *desma* is of neuter gender.

Califadesma aspris Saul, sp. nov.

(Figures 53–61)

Diagnosis: Relatively high, inflated ***Califadesma*** having abrupt posterior angulations and the ventral margin of the left valve overhanging that of the right valve.

Description: Shell small, moderately thick, broadly wedge-shaped. Valves compressed anteriorly, truncated and inflated posteriorly; posterior with strong double angulation; more anterior angulations sharper and stronger, especially in right valve; left valve noticeably more inflated than right valve. Dorsal margin straight; anterior margin squarely rounded; ventral margin convex, especially medially; posterior margin obtusely rounded and notched by sulcus between posterior two angulations. Beaks low, opisthogyral, very near posterior end. Lunule long, narrow, and slightly depressed.

Hinge with short, but well-developed flange-like nymph for external ligament and posteriorly directed resilifer immediately beneath beaks. Right valve with 3a and 3b very thin and lamellar, 3a scarcely detached from hinge margin and contiguous with long, thin, ventrally striate AIII; AI elongate; PI and PIII dorsally striate, short. Left valve with triangular 2b and very thin lamellar 4a adjacent to resilifer; AII bimodal, very long, lamellar, and striated; PII short, striated. Pallial line rather distant from valve margin; pallial sinus a wide but shallow indentation extending from posterior muscle scar to point ventrally below the beaks. Muscle scars subequal; posterior muscle scar round; anterior muscle scar elongate.

Holotype: LACMIP 7844, a large left valve.

Paratypes: LACMIP 7845 right valve from UCLA loc. 4104; 7846, a small right valve from CIT loc. 1893; 7847 medium left valve from CIT loc. 1893.

Dimensions: Of holotype LACMIP 7844 length 26.3 mm, height 18.8 mm, inflation of single valve 8.6 mm, beak 5.5 mm from posterior; paratype LACMIP 7845 length 23.8 mm, height 14.8 mm, inflation of single valve 4.9 mm, beak 4.6 mm from posterior; paratype LACMIP 7846 length 14.4 mm, height 9 mm, inflation of single valve 4 mm, beak 2.3 mm from posterior.

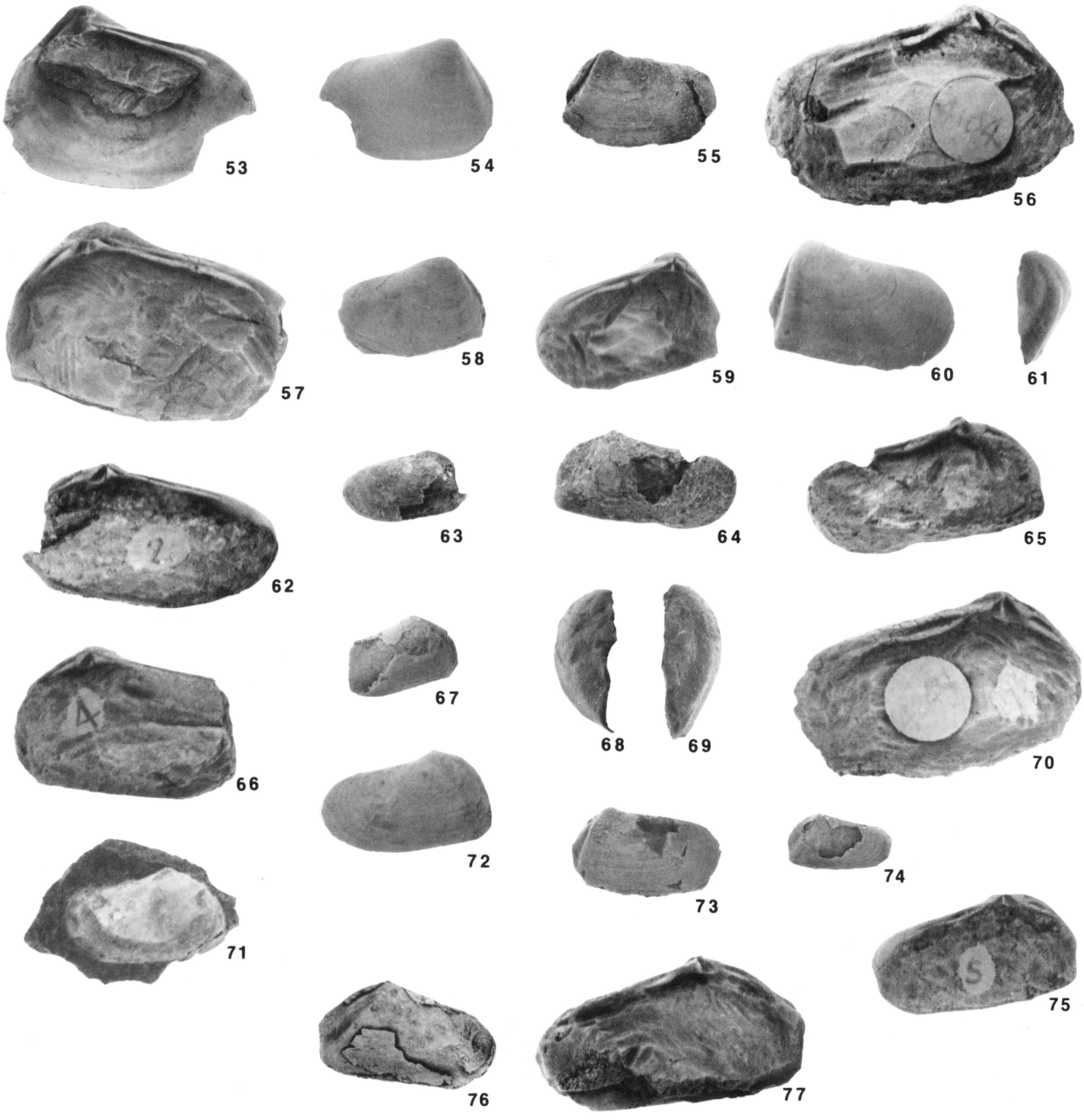
Type locality: LACMIP loc. 8133 (=UCLA loc. 4104, CIT loc. 1034, CIT loc. 1893), Oak Run, Millville Quadrangle, Shasta Co., California.

Distribution: Known only from the type locality.

Age: Coniacian, occurs with *Perissitys cretacea* (Cooper, 1896) and *Christitys delta* Popenoe & Saul, 1987.

Remarks: ***Califadesma aspris*** has the relatively highest, least elongate shell among donaciform bivalves discussed in this paper, and its ventral margin is the most convexly curved. The left valve is not only more inflated than the right valve, but the curved ventral margin of the left valve and its greater height to length ratio suggest that the ventral margin of the right valve fits within that of the left valve. Bilateral asymmetry may afford resistance to strong compressive forces during valve adduction and during attacks by shell-crushing predators (VERMEIJ, 1987:297). The loss of this characteristic between ***C. aspris*** and ***C. elaphium*** suggests that improved burrowing speed gained from a more streamlined, donaciform shape might have resulted in more escapes than did defensive armor, and thus have been of greater adaptive advantage.

Compared to ***Califadesma elaphium*** and ***C. tuscanum***, ***C. aspris*** has the most abrupt posterior angulations; these angulations diverge at the smallest angle, and the posterior margin is most noticeably sinused between the angulations.



Explanation of Figures 53 to 77

Figures 53–61. ***Califadesma aspris*** sp. nov. Figures 53, 54: LACMIP 7844 from LACMIP loc. 8133, holotype, left valve; Figure 53, interior, posterior valve margin broken, ×1.5; Figure 54, exterior, ×1. Figures 55, 56: LACMIP 7845 from UCLA loc. 4101, paratype, right valve; Figure 55, exterior, ×1; Figure 56, interior, ×2. Figures 57, 58: LACMIP 7847 from LACMIP loc. 8133, paratype, left valve; Figure 57, interior, tip of beak broken off, ×2; Figure 58, exterior, ×1. Figures 59–61: LACMIP 7846 from LACMIP loc. 8133, paratype, right valve, ×2; Figure 59, interior; Figure 60, exterior; Figure 61, posterior.

Figures 62–75. ***Califadesma elaphium*** sp. nov. Figures 62, 63: LACMIP 7849 from UCLA loc. 3622, paratype, left valve, posterior end broken off; Figure 62, interior, ×2; Figure 63, exterior, ×1. Figures 64, 65: LACMIP 7848 from UCLA loc. 3622, holotype, right valve; Figure 64, exterior, ×1.5; Figure 65, interior, ×2. Figures 66–68: LACMIP 7851 from UCLA loc. 3622, paratype, left valve, anterior end broken off; Figure 66, interior, ×2; Figure 67, exterior, ×1; Figure 68, posterior, ×2. Figures 69, 70, 73: LACMIP 7854 from UCLA loc. 4247, paratype, right valve; Figure 69, posterior, ×2; Figure 70, interior, ×2; Figure 73, exterior, ×1. Figure 71: LACMIP 7850 from UCLA loc. 3622, paratype, cast of left valve interior showing pallial line, pallial sinus, and adductor muscle scars, ×1.5. Figure 72: LACMIP 7857 from UCLA loc. 3633, paratype, left valve, exterior, ×2. Figures 74, 75: LACMIP 7852 from UCLA loc. 3622, paratype, right valve; Figure 74, exterior, ×1; Figure 75, interior, ×2.

Figures 76, 77. ***Califadesma tuscanum*** sp. nov., LACMIP 7858 from UCLA loc. 4082, holotype, right valve. Figure 76: exterior, ×1. Figure 77: interior, ×1.5.

The specific name is from the Greek *aspris,* a type of oak, and refers to the occurrence of this species on the north side of Oak Run.

Califadesma elafium Saul, sp. nov.

(Figures 15, 62–75)

Diagnosis: Moderately elongate ***Califadesma*** with rounded posterior angulations and the posterior margin barely sinused between the angulations.

Description: Shell small, thick, bluntly wedge-shaped. Beaks low, opisthogyral, very near posterior end. Dorsal margin straight, anterior margin bluntly rounded, ventral margin nearly straight subparallel to dorsal margin, posterior margin broadly rounded, sinused between posterior angulations. Valves compressed anteriorly, truncated and inflated posteriorly; posterior with double angulation, more anterior of angulations sharper and stronger. Lunule long, narrow, and slightly depressed.

Hinge with short but well-developed flange-like nymph for external ligament and posteriorly directed resilifer immediately beneath beaks. Right valve with 3a and 3b thin, lamellar; 3a scarcely detached from hinge margin; AI and AIII elongate; PI elongate; PIII short, low. Left valve with slightly bifid triangular 2b and very thin lamellar 4a adjacent to resilifer; AII very long and lamellar, bimodal; PII short, striated. Pallial line rather distant from valve margin; pallial sinus a wide but shallow indentation extending from posterior muscle scar to point ventrally below beaks. Muscle scars subequal; posterior muscle scar round; anterior muscle scar elongate.

Holotype: LACMIP 7848.

Paratypes: LACMIP 7849–7853 from UCLA loc. 3622, 7857 from UCLA loc. 3633, Chico Creek, Butte Co., California; LACMIP 7854–7856 from UCLA loc. 4247, Oak Run, Shasta Co., California

Dimensions: Of holotype, LACMIP 7848, length 18 mm, height 9.9 mm, inflation of single valve 3 mm, length beak to posterior 6 mm; of paratype LACMIP 7852, length 16 mm, height 8.5 mm, inflation of single valve 3.5 mm, length beak to posterior 5.5 mm; of paratype LACMIP 7854, length 21.7 mm, height 13 mm, inflation of single valve 5.4 mm, length beak to posterior 5.7 mm.

Type locality: UCLA loc. 3622, Chico Creek, Butte Co., California.

Distribution: Musty Buck Member of the Chico Formation on Chico Creek (UCLA locs. 3621–3623, 3625, 3627, 3628, 3633; LACMIP locs. 10849, 10850, abundant at 3622 and 3623), Butte Co.; Redding Formation (UCLA loc. 4247) south side of Oak Run, Shasta Co., California.

Age: Santonian.

Remarks: In external shape this species is very similar to *Notodonax* (***Aliodonax***) ***hsui*** and ***Adelodonax tectus*** with which it occurs on Chico Creek (Figures 14, 15). It differs from both in having the double posterior fold and sulcus, and from ***A. tectus*** in being more inflated and having the ventral and dorsal margins more nearly parallel. ***Califadesma elafium*** is more elongate and less inflated than ***C. aspris***, but less elongate and more inflated than ***C. tuscanum***. In ***C. elafium*** the posterior angulations are more rounded and diverge more widely than those of ***C. aspris***, and cardinal 3a is separated from lateral AII whereas in ***C. aspris*** these teeth are colaminal.

The specific name is from the Greek *elaphos* meaning "deer" or "stag," for its occurrence in the Musty Buck Member of the Chico Formation on Chico Creek.

Califadesma tuscanum Saul, sp. nov.

(Figures 76, 77)

Diagnosis: Elongate ***Califadesma*** of low inflation having the posterior margin straight between the angulations and with beaks at about the posterior third of the shell.

Description: Shell small, thick, bluntly wedge-shaped. Beaks low, opisthogyral, very near posterior end. Dorsal margins straight, sloping; anterior margin bluntly rounded; ventral margin nearly straight, subparallel to dorsal margin; posterior margin nearly straight between angulations, obtusely rounded. Valves compressed anteriorly, truncated and moderately inflated posteriorly; posterior with double, rounded angulations. Lunule long, narrow, and slightly depressed.

Hinge of right valve with short flange-like nymph for external ligament and posteriorly directed resilifer immediately beneath beaks. Cardinal teeth 3a and 3b thin, lamellar; 3a scarcely detached from hinge margin; AI and AIII elongate; PI elongate, PIII low, elongate.

Holotype: LACMIP 7858.

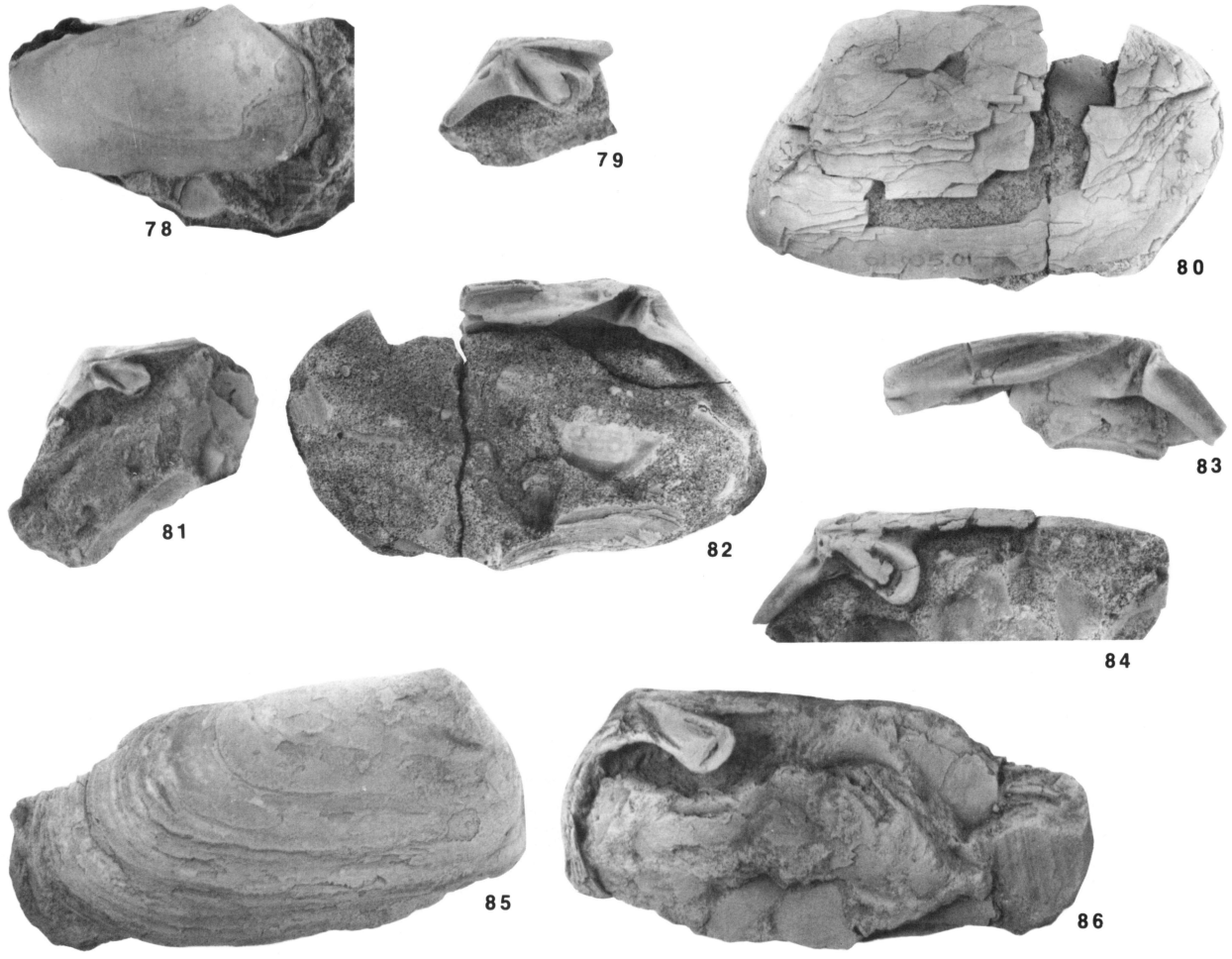
Dimensions: Of holotype, length 27 mm, height 14.6 mm, thickness 5.8 mm, length beak to posterior 9.2 mm.

Type locality: UCLA loc. 4082, Tuscan Springs, Tehama Co., California.

Distribution: Known only from the Chico Formation at Tuscan Springs, on Little Salt Creek, Tehama Co., California.

Age: Campanian.

Remarks: This species is described from a single right valve lacking most of its shell. The specimen preserves the valve shape, the placement of the double posterior angulation, and most of the hinge teeth which have been only partially exposed as more cleaning of the hinge would



Explanation of Figures 78 to 86

Figure 78. *Myadesma pacifica* (Hall & Ambrose, 1916), CAS 61804.01 from Alameda Creek, Alameda Co., California, holotype, left valve, pallial line and sinus, ×1, middle Miocene.

Figures 79–84. *Myadesma dalli* Clark, 1922, Vancouver Island, British Columbia, upper Oligocene (MOORE, 1984, includes the Sooke Formation in the Juanian Stage), ×1. Figure 79: CAS 61805.04, paratype, left valve hinge with lithodesma? in salient resilifer. Figures 80, 82: CAS 61805.01, holotype, right valve; Figure 82, showing foramen in beak and deeply depressed resilifer. Figure 81: CAS 61805.02, paratype, hinge of left valve. Figure 83: CAS 61805.03, paratype, hinge of right valve showing foramen in beak. Figure 84: CAS 231.01, paratype, hinge of left valve with lithodesma? in salient resilifer.

Figures 85, 86. *Myadesma howei* Clark, 1922, UCBMP 30328 from UCB loc. 3622, near Eugene, Oregon (HICKMAN, 1969:73, did not collect this species from the Eugene Formation and considers its occurrence there questionable), lower Oligocene, holotype, left valve, ×1. Figure 85: exterior. Figure 86: hinge.

break the specimen. The pallial line and posterior adductor muscle scar are not apparent on this specimen, but the position of the anterior adductor muscle scar can be determined. The outline of GABB's (1864:pl. 23, fig. 138) *Tellina quadrata,* a species GABB (1864:159) described from a single Tuscan Springs specimen that he considered to be a right valve, resembles that of ***Califadesma tuscanum***. Gabb wrote "muscle scars and pallial sinus almost invisible on cast" and did not draw muscle scars or pallial line on his figure. He considered that the beak was nearer the obliquely subtruncated anterior end and did not mention the presence of a double fold on the posterior slope. STEWART (1930:7) was unable to find Gabb's original material, and Gabb's statements suggest that despite the similar outline and same type locality ***C. tuscanum*** is not *T. quadrata.*

Califadesma tuscanum differs from ***C. elaphium*** in having beaks farther from the posterior end and being less inflated. It differs from ***C. aspris*** in having a nearly straight ventral margin. Of the three species, it has the lowest, most divergent posterior angulations.

Molluscan species extracted from the pebbly sandstone at Tuscan Springs are indicative of diverse shallow-into-deep-water habitats. RUSSELL *et al.* (1986:190) consider these deposits to be a debris flow containing a shallow marine fauna comparable to their *Cymbophora suciensis*

assemblage. Collections include, however, species and genera typical of both deeper and shallower water than that assemblage; and no collection I have used contains *Cymbophora suciensis*. The presence of the littoral ***Califadesma tuscanum*** in these probable outer shelf deposits strongly suggests down slope displacement.

The species is named for its type locality, Tuscan Springs, Tehama Co., California, a spa on Little Salt Creek at the turn of the century (WARING, 1915:289).

ACKNOWLEDGMENTS

W. P. Popenoe and L. R. Saul were planning to jointly describe those species that occurred both in the Redding area, Shasta Co., and at Chico Creek, Butte Co., California, and we both worked on hinges of *Califadesma elaphium*, *Notodonax* (*Aliodonax*) *hsui*, and *Adelodonax tectus*, but Popenoe left no descriptions of these species. I gratefully acknowledge his efforts in cleaning some of the hinges, and his helpful and entertaining discussions regarding these species. Eduardo Olivero kindly and graciously provided photocopies of pertinent pages from FERUGLIO (1936). Alan Beu brought to my attention STINNESBECK's (1986) recent paper on the Quiriquina fauna and considerately sent photocopies of important pages. Specimens from the Cabrillo Formation on Mt. Soledad, San Diego Co., California, were collected and donated by M. P. Kennedy; specimens from the Rosario Formation on Punta Banda, Baja California, Mexico, were collected and donated by J. M. Alderson. Figures 1 and 2 were drafted by Edward Barros, Jr.; the hinges of Figure 3 were drawn by W. S. Griswold. Helpful criticism of this paper has been provided by Eugene Coan, J. R. Harris, G. L. Kennedy, E. C. Wilson, and an anonymous reviewer.

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APPENDIX 1

LOCALITIES CITED

Geographic areas of the cited localities are plotted on Figure 1. Type localities of species described in this paper are fully described. Previously published localities are briefly characterized and the reference given.

213 CAS: 12 mi. W of Sooke, in the seacliff immediately E of the mouth of Coal [Kirby] Creek, Vancouver Island, British Columbia. Sooke Formation. Oligocene.

3314 UCLA: Float in creek bed at UCLA loc. 3313, S side Deer Valley, 2100′S, 28°W of NE cor. sec. 24, T1N, R1E, Antioch South Quad., Contra Costa Co., Calif. 37°55′11″N, 121°48′26.5″W. Coll.: W. P. Popenoe, August 1944. Great Valley Series, Deer Valley Formation of Colburn. Late Maastrichtian.

3621 UCLA: E of Chico Creek Co. road in upper part of meadow to N of old prune orchard, 2050′S, 2350′W of NE cor. sec. 12, T23N, R2E, Paradise Quad., Butte Co., Calif. 38°52′07″N, 121°42′05″W. Coll.: L. R. & R. B. Saul, 1952. Chico Formation, Musty Buck Member. Early Santonian.

3622 UCB: Smith's Quarry, between Millrace and Franklin Blvd., Eugene, 0.7 mi. E of BM 449, sec. 33, T17S, R3W, Oregon. Eugene Formation. Oligocene.

3622 UCLA: First ravine to S of Mickey's Place on "trail" about 0.2 mi. above W side Chico Creek, approx. 800′N, 1400′E of SW cor. sec. 1, T23N, R2E, Paradise Quad., Butte Co., Calif. 39°52′27″N, 121° 42′24″W. Coll.: L. R. & R. B. Saul, 1952. Chico Formation, Musty Buck Member. Early Santonian.

3623 UCLA: Chico Creek, Paradise Quad., Butte Co., Calif. 39°51′51″N, 121°42′29″W. Chico Formation, Musty Buck Member. Early Santonian. (MATSUMOTO, 1960:155)

3624 UCLA: Chico Creek, Paradise Quad., Butte Co., Calif. 39°52′28″N, 121°42′31″W. Chico Formation, Musty Buck Member. Early Santonian. (POPENOE & SAUL, 1987:35)

3625 UCLA: Chico Creek, Paradise Quad., Butte Co., Calif. 39°51′47″N, 121°42′33″W. Coll.: L. R. & R. B. Saul, 1952. Chico Formation, Musty Buck Member. Early Santonian. (POPENOE *et al.*, 1987:99)

3627 UCLA: Chico Creek, Paradise Quad., Butte Co., Calif. 39°51′26″N, 121°42′32″W. Chico Formation, Musty Buck Member. Late Santonian. (MATSUMOTO, 1960: 156)

3628 UCLA: Chico Creek, Paradise Quad., Butte Co., Calif. 39°51′19″N, 121°42′33″W. Coll.: L. R. & R. B. Saul, 1952. Chico Formation, Musty Buck Member. Santonian. (POPENOE *et al.*, 1987:99)

3633 UCLA: Chico Creek, Paradise Quad., Butte Co., Calif. 39°51′14″N, 121°42′24″W. Chico Formation, top of Musty Buck Member. ?Late Santonian, *Baculites capensis* Zone. (MATSUMOTO, 1960:15, 156)

3958 UCLA: S side of Deer Valley, sandstone lens in conglomerate, same ridge as UCLA 3957, but about 700′ farther S along crest of ridge, 2350′N, 750′W of SE cor. sec. 24, T1N, R1E, Antioch South Quad., Contra Costa Co., Calif. 37°55′01.5″N, 121°48′24″W. Coll.: W. P. Popenoe, 1944. Great Valley Series, Deer Valley Formation of Colburn, 1964. ?Late Maastrichtian.

3959 UCLA: Hard sandstone outcrop on crest of same ridge as UCLA loc. 3957, 400′S of UCLA loc. 3957, S side Deer Valley, 2580′S, 690′W of NE cor. sec. 24, T1N, R1E, Antioch South (1953) Quad., Contra Costa Co., Calif. 37°55′04″N, 121°48′23.5″W. Coll.: W. P. Popenoe, 1944. Great Valley Series, Deer Valley Formation of Colburn, 1964. ?Late Maastrichtian.

3960 UCLA: Hard sandstone bed just above conglomerate, S side of Deer Valley on first ridge W of UCLA locs. 3957, 3958, 3959, 2550′S, 35°W of NE cor. sec. 24, T1N, R1E, Antioch South Quad., Contra Costa Co., Calif. Probably same bed as UCLA 3958. 37°55′08″N, 121°48′34″W. Coll.: W. P. Popenoe, 1944. Great Valley Series, Deer Valley Formation of Colburn, 1964. ?Late Maastrichtian.

4082 UCLA: Tuscan Springs, on Little Salt Creek, about 10 mi. NE of Red Bluff, approx. 900′S, 1650′W of NE cor. sec. 32, Tuscan Springs Quad., Tehama Co., Calif. 40°14′29″N, 122°06′35″W. Chico Formation.

Early Campanian. (STEWART, 1927:292; SAUL, 1978: 57)

4104 UCLA: N side of Oak Run, Millville Quad., Shasta Co., Calif. 40°37'53"N, 122°06'W. Redding Formation, Member IV of Popenoe. Coniacian. (POPENOE & SAUL, 1987:36)

4106 UCLA: N of Clover Creek, Millville Quad., Shasta Co., Calif. 40°37'20"N, 122°03'26"W. Redding Formation. Early Santonian. (POPENOE, 1983:760, 765)

4247 UCLA: SE side of Oak Run, about 600'N, 1600'E of SW cor. sec. 15, T32N, R2W, Millville Quad., Shasta Co., Calif. 40°37'30"N, 122°04'52"W. Coll.: W. P. Popenoe, 31 Aug. 1959. Redding Formation, Member V in coarse gritty sandstone about 50' below base of thick conglomerate bed. Early Santonian.

4347 UCLA: Sandstone cropping out below high tide line about 0.5 mi. N of Bolsa Point and just S of Spring Bridge Gulch, Pigeon Point Quad., San Mateo Co., Calif. 37°12'16"N, 122°24'16"W. Coll.: L. R. & R. B. Saul, 1947. Pigeon Point Formation. Campanian.

4671 UCLA: Sandstone cropping out along ridge top 100–200' below base of Paleocene, S side Deer Valley, 2200'S, 600'W of NE cor. sec. 24, T1N, R1E, Antioch South (1953) Quad., Contra Costa Co., Calif. 37°55'06.5"N, 121°48'23.5"W. Coll.: W. P. Popenoe, 1962. Great Valley Series, Deer Valley Formation of Colburn, 1964. Late Maastrichtian.

5659 LACMIP: Little Stave Creek, shells and shark's teeth in light gray-green glauconitic sand and silt, approx. 5' above base of 25' cliff at end of 0.25-mi. long trail which begins at W end of West Point Drive near University of Alabama Historical Marker, Clark Co., Alabama. Coll.: Bruce & Joann Welton, 4 Sept. 1975. Claiborne Group, Gosport Sand. Middle Eocene.

6359 UCLA: W side San Joaquin Valley, just S of Salado Creek, 2000'S, 2650'E of NW cor. sec. 15, T6S, R7E, Orestimba Quad., Stanislaus Co., Calif. 37°24'57"N, 121°11'12"W. Coll.: R. B. Stewart & W. P. Popenoe, 1944. Moreno Formation, Garzas Sand. Maastrichtian.

6360 UCLA: W side San Joaquin Valley, draw S of Black Gulch, 1700'S, 1850'E of NW cor. sec. 34, T5S, R7E, Orestimba Quad., Stanislaus Co., Calif. 37°27'34"N, 121°11'21"W. Coll.: R. B. Stewart & W. P. Popenoe, 1944. Moreno Formation, Garzas Sand. Maastrichtian.

6489 UCLA: 3750'S, 14°E of buildings on Moffett Ranch in Orestimba Creek, in medium grained pepper-and-salt sandstone on crest of long N–S ridge near N end, 2490'S, 1000'E of NW cor. sec. 35, T7S, R7E, Orestimba Quad., Stanislaus Co., Calif. 37°17'N, 121°10'32"W. Coll.: W. P. Popenoe, 29 Aug. 1944. Moreno Formation, Garzas Sand. Maastrichtian.

7137 UCLA: Fossiliferous, hard calcareous concretion from sandstone beds in graben? (*Coralliochama* beds in sea cliff on both sides of graben?) about 200' eastward along shore from sandy ravine with road to beach, N side Punta Banda Peninsula, Baja California Norte, Mexico. Coll.: John Alderson, 18 March 1984. Rosario Formation. Early Maastrichtian.

8133 LACMIP (=CIT loc. 1034, UCLA loc. 4104): Hard, cemented sandstone slabs weathering out of siltstone in pasture a little W of N of Hathaway Ranch house, about 1500'S, 1400'E of NW cor. sec. 16, T32N, R2W, Millville Quad., Shasta Co., Calif. 40°37'53"N, 122°06'W. Coll.: W. P. Popenoe & W. Findlay, 1933. Redding Formation, Member IV of Popenoe. Coniacian.

8148 LACMIP (=CIT loc. 1896): Type Garzas, Garzas Creek, Pacheco Pass Quad. (1947), Stanislaus Co., Calif. Approx. 37°13–15'N, 121°07–09'W. Coll.: W. P. Popenoe, 1944. Moreno Formation, Garzas Sand. Maastrichtian.

10846 LACMIP (=CIT loc. 1014): Right bank of Chico Creek, about 1 mi. upstream from bridge across creek below Mickey's house, NE ¼ sec. 1, T23N, R2E, Paradise Quad., Butte Co., California. Coll.: Popenoe and Scharf, 6 Aug. 1931. Chico Formation, Ponderosa Way Member. ?Coniacian.

10847 LACMIP (=CIT loc. 1016): Chico Creek, Paradise Quad., Butte Co., Calif. 39°52'28"N, 121°42'28"W. Coll.: L. R. & R. B. Saul, 1952. Chico Formation, Musty Buck Member. Early Santonian.

10849 LACMIP (=CIT loc. 1017): W side of Chico Creek, Paradise Quad., Butte Co., Calif. 39°52'47"N, 121°42'23"W. Chico Formation, Musty Buck Member. Santonian (POPENOE *et al.*, 1987:98)

10850 LACMIP (=CIT loc. 1313): E side Chico Creek, Paradise Quad., Butte Co., Calif. Approx. 39°51'38"N, 121°42'18"W. Chico Formation, Musty Buck Member. Santonian (POPENOE *et al.*, 1987:99)

28629 LACMIP: S of Easter Cross on W side of ridge which extends S from Mt. Soledad along W side of Rose Canyon, S of prominent amphitheater facing Rose Canyon, 7050'N of T16S, 1100'E of R3W, La Jolla Quad., San Diego Co., Calif. 32°50'15.1"N, 117°13'59"W. Coll.: M. P. Kennedy, 1967? Cabrillo Formation. Maastrichtian.

61804 CAS: Alameda Creek, 1.5 mi. S of Welch Cr., Pleasanton Quad., Alameda Co., Calif. Monterey Sandstone. Mid Miocene.

61805 CAS: Seacliffs between mouths of Muir and Coal Creeks, W of Otter Point, Sooke, Vancouver Island, British Columbia. Sooke Formation. Oligocene.