

Cirsotrema eocenica Squires & Demetron, sp. nov.

(Figures 12–15)

Cirsotrema sp. Squires, 1984:21, fig. 6p.

Diagnosis: A *Cirsotrema* with approximately 12 axial ribs and seven to eight spiral ribs.

Description: Shell medium-sized, moderately thick, turritiform with strongly convex teleoconch whorls and deep sutures. Axial ribs bladelike with tendency to become lamellose on body whorl, bladelike ribs 0.25 to 0.50 mm thick, lamellose ribs 1.25 to 2 mm thick. Axial ribs extending onto base of body whorl with approximately 12 per whorl and arranged in a usually continuous series and fused across the suture. Axial ribs deflected abaperturally near suture and forming triangular-shaped thickenings. Interspaces between bladelike axial ribs approximately five times as wide as ribs. Interspaces between lamellose axial ribs approximately three times as wide as ribs. Primary spiral ribs well-developed, approximately seven to eight per whorl, but obsolete below suture and replaced on base of body whorl by very fine, secondary spiral threads. Interspaces between spiral ribs twice as wide as spiral ribs and showing approximately five very fine spiral ribs. All spiral ribs (primary and secondary) extending onto backs of axial ribs. Basal spiral keel well-developed and originating from posterior section of aperture. Aperture ovate, peristome continuous and thickened, especially on outer lip area. Fasciole narrow.

Holotype: IGM 6379 (= plastoholotype LACMIP 12252).

Type locality: CSUN loc. 1552, San José de Gracia area, Baja California Sur, Mexico, 112°45'15"W and 25°32'40"W.

Dimensions: Holotype, height 35.1 mm [incomplete], width 17.9 mm.

Discussion: Only the holotype and a small fragment of the new species were found at the type locality in the "Domengine Stage" part of the Bateque Formation. Squires & Demetron, (1992:30, fig. 67) reported a broken specimen of an *Epitonium* sp. from CSUN loc. 1220b in the "Capay Stage" part of the Bateque Formation. The new species superficially resembles this "Capay Stage" species, but the new species differs by having 12 rather than 20 axial ribs and by having the ribs more strongly lamellose.

The new species is also present in the "Domengine State" part of the Llajas Formation, Simi Valley, southern California, where Squires (1984) reported a single specimen as an unidentified species of *Cirsotrema*.

The new species resembles *Cirsotrema contabulata* Deshayes (1864–1866:334, pl. 11, figs. 11–12; Cossmann, 1888:134–135, pl. 5, fig. 19; Cossmann & Pissarro, 1910–1913, pl. 7, fig. 52–22) from the Ypresian Stage (lower Eocene) of the Paris Basin, France. The new species differs in the following features: larger size, narrower teleoconch,

fewer spiral ribs and wider interspaces, obsolescence of spiral ribs near sutures, and axial ribs of variable strength.

The new species is the only named Eocene species of genus *Cirsotrema* from the Pacific coast of North America, and is the earliest *Cirsotrema* from this area. Durham (1937:492) reported a poorly preserved, unnamed species of late? Eocene age from Fresno County, central California. The new species differs by having 12 to 13 rather than nine axial ribs. When compared to the five other North American Pacific coast species of post-Eocene *Cirsotrema* reviewed by Durham (1937), the new species is most similar to *C. howei* Durham (1937:492, pl. 56, fig. 8) from the Pliocene of Coos Bay, Oregon. The new species differs by having 12 to 13 rather than nine axial ribs, seven to eight rather than four primary spiral ribs, and much wider interspaces with more secondary spiral ribbing.

The new species also resembles certain specimens of *Cirsotrema togatum* (Hertlein & Strong, 1951) illustrated by DuShane (1988:56, figs. 10–11) from the Pliocene Esmeraldas beds, Ecuador, and from modern shallow waters (32 to 113 m depths) throughout the Gulf of California to Costa Rica and the Galápagos Islands. The new species has more spiral ribs and a much less tabular shoulder on the whorls.

Wenz (1940) reported the geologic range of genus *Cirsotrema* to be Eocene to Recent. *Cirsotrema* probably originated in the Old World Tethyan paleobiogeographic province and immigrated to the Pacific coast of North America during the early part of the Eocene.

The placement of family Epitoniidae in the hierarchy of gastropod classification is in a stage of revision. Most recent workers would probably agree with Ponder & Warren (1988:303) and cautiously place the family in the ptenoglossa group of caenogastropods.

Etymology: The specific name is for the Eocene.

Occurrence: "Domengine Stage" (upper lower Eocene to lower middle Eocene). Bateque Formation, San José de Gracia area, Baja California Sur, Mexico (herein); Llajas Formation (informal "Stewart bed" near middle of formation), north side of Simi Valley, Ventura County, southern California (Squires, 1984).

Order Heterostropha Fischer, 1885

Family ARCHITECTONICIDAE Gray, 1850

Genus *Architectonica* Röding, 1798

Type species: *Trochus perspectivus* Linné, 1758, by subsequent designation (Gray, 1847), Recent, Indo-Pacific.

Subgenus *Architectonica* s.s.

Architectonica (Architectonica) llajasensis
Sutherland, 1966

(Figure 16)

Architectonica llajasensis Sutherland, 1966:1-4, figs. 1-2.
Squires, 1984:19, fig. 6k.

Type material and type locality: Holotype LACMIP 1140, Llajas Formation, Simi Valley, southern California, LACMIP loc. 461-B.

Geographic distribution: Eastern Laguna San Ignacio area, Baja California Sur, Mexico to northern side of Simi Valley, Ventura County, southern California.

Stratigraphic distribution: "Domengine Stage" (upper lower Eocene to lower middle Eocene). Bateque Formation, eastern Laguna San Ignacio area, Baja California Sur, Mexico (herein); Llajas Formation, north side of Simi Valley, Ventura County, southern California (Sutherland, 1966; Squires, 1984).

Discussion: The single specimen found is from CSUN loc. 1544b. The specimen is not too well-preserved, but it shows the eight closely spaced and beaded spiral ribs that are diagnostic of this species. An additional specimen that might be this species was found at CSUN loc. 1552, but poor preservation prevents positive specific identification. Previously, *A. (A.) llajasensis* was known only from the north side of Simi Valley, Ventura County, southern California.

The genus *Architectonica* has been previously reported from the Bateque Formation by Squires & Demetron (1992), who found *A. (Stellaxis) cognata* (Anderson & Hanna, 1925) in the "Capay Stage" part of the formation. *Architectonica (A.) llajasensis* differs from *A. (S.) cognata* by possessing many closely spaced spiral ribs and beaded spiral ribs.

Class Bivalvia Linné, 1758

Order Pterioida Newell, 1965

Family GRYPHAEIDAE Vyalov, 1936

Genus *Pycnodonte* Fischer de Waldheim, 1835

Type species: *Pycnodonte radiata* Fischer de Waldheim, 1835, by original designation, Upper Cretaceous, Crimea.

Subgenus *Phygraea* Vyalov, 1936

Type species: *Phygraea frauscheri* Vyalov, 1936 [= *Gryphaea pseudovesicularis* Gümbel, 1861], by original designation, upper Paleocene, Austria.

Pycnodonte (Phygraea) cuarentaensis
Squires & Demetron, sp. nov.

(Figures 17-22)

Diagnosis: A medium-sized *Phygraea* with fine radial ribs on left valve and a posterior winglike extension of the shell.

Description: Shell medium-sized, up to 38 mm high and 40 mm long (same specimen), thin, alate, strongly inequivalved. Ligamental pit in both valves small. Left valve very convex, covered with fine radial ribs, umbo subcentral,

in some specimens incurved and used as attachment to substrate. Posterodorsal margin of left valve with prominent winglike extension roughly half the length of the valve and separated from main part of valve by shallow to moderately deep sulcus. Interior of left valve smooth, except for several closely spaced very thin irregular growth lamellae along dorsal area of winglike extension. Right valve concave, rarely somewhat flattened, same shape but slightly smaller than corresponding left valve, exterior usually smooth with some irregular, widely spaced, radial gashes but rarely with very fine radial ribs in umbo area. Margin of right valve deflected upward to accommodate fitting within left valve. Ligamental pit bent backward and exposed along margin of valve. Interior of right valve smooth with or without a few commarginal raised areas corresponding to former position of prominent commissural shelf edge. Minute vermicular anachomata not very extensive and rarely evident. Adductor-muscle scar circular, situated just posterior and dorsal of center of right valve. Deflected-upward margins of right valve smooth with finely granular appearance due to vesicular shell structure.

Holotype: IGM 6381 (= plastoholotype LACMIP 12253).

Type locality: CSUN loc. 1547, northwest of San José de Gracia, Baja California Sur, Mexico. 112°53'13"W and 26°38'50"N.

Paratypes: IGM 6382, 6383 [both from CSUN loc. 1547] (= plastoparatypes LACMIP 12254, 12255).

Dimension: Of holotype, height 31 mm, length 41.7 mm, thickness 17 mm; paratype 6382, height 22.8 mm, length 23.5 mm; paratype 6383, height 30.5 mm, length 39.3 mm.

Discussion: Extremely abundant specimens were found at CSUN loc. 1547 and 1549, where their remains totally dominate the lenticular fossiliferous beds. Preservation is good to excellent. The specimens are mostly disarticulated and are mostly left valves, except at locality 1547 where there are both single left and right valves, as well as some articulated specimens. Some of the specimens served as substrate for juvenile specimens. A few specimens were found at CSUN loc. 1575.

As illustrated in Figure 22, the right valve of the new species is slightly smaller than the corresponding left valve. Hayami & Kase (1992) noted that "size discordance" between valves is a commonly reported feature in species of *Pycnodonte*, and they suggested that the difference may be only superficial because the margin of the right valve was physically weak and was selectively lost before fossilization. Based on their study of the only living species of *Pycnodonte* s.s., they determined that the right valve has a flexible distal area and that the radial gashes on the exterior of the right valve may contribute an increased flexibility to the distal part.

The new species most closely resembles *Ostrea profunda* Deshayes (1824-1837:pl. 48, figs. 4, 5; Cossmann & Pissarro, 1904-1906:pl. 43, fig. 135-5) from the Lutetian

Stage (middle Eocene) of the Paris Basin, France. The new species differs in having radial ribbing on the left valve, a more elongate winglike extension of the posterior part of the shell, and a more distinct sulcus between the winglike extension and the main part of the shell.

Stenzel (1971) reported *Pycnodonte* as ranging from Cretaceous to Miocene and worldwide, but according to Hayami & Kase (1992), the genus ranges from late Early Cretaceous to Recent and is known almost exclusively from low-middle latitudinal regions. A large number of fossil species of *Pycnodonte* (including subgenus *Phygraea*) are known mainly in the Old World Tethyan realms from the late Early Cretaceous to early Miocene (Hayami & Kase, 1992). Additionally, Hayami & Kase (1992) provided an updated review of the systematics of pycnodontid oysters and included a discussion of the subgeneric division of genus *Pycnodonte*.

Pycnodonte (*Phygraea*) *cuarentaensis* sp. nov. is only the second report of the subgenus on the Pacific coast of North America. The other report is *P. (P.) pacifica* (Squires & Demetron (1990:386, fig. 3.1–3.4) from the “Capay Stage” to the middle Eocene part of the “Tejon Stage” strata in the Bateque Formation. The new species differs from *P. (P.) pacifica* in the following features: smaller size, thinner shell, radial ribbing on the left valve, winglike extension of the shell, and margin of commissural shelf not prominent in right valve.

Etymology: The specific name is for the abandoned village site of El Cuarenta that is in the vicinity of the type locality.

Occurrence: “Capay Stage” (middle lower Eocene). Bateque Formation, northwest of San José de Gracia area, Baja California, Baja California Sur, Mexico, CSUN locs. 1547, 1549, and 1575.

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LOCALITIES CITED

CSUN 665. At elevation 2210 ft. along E side of small canyon, 861 m (2825 ft.) N and 709 m (2325 ft.) W of the SE corner of section 30, T6S, R13 E, U.S. Geological

Survey, 7.5-minute, Canyon Spring SW, California, quadrangle, 1963, northern Orocoopia Mountains, Riverside County, southern California. Age: Middle early (“Capay Stage”). Collectors: R. L. Squires and D. M. Advocate, 1982. = *LACMIP 16335*

CSUN 1220b. Along a prominent ridge, N side of a minor canyon on W side of Mesa La Salina, 84 to 130 m above the bottom of the exposures of the Bateque Formation in this area, 112°59'40"W and 26°44'40"N, coordinates 1.60 and 59.40 of Mexican government 1:50,000, San José de Gracia (number G12A64) topographic map, 1982, eastern Laguna San Ignacio area, Baja California Sur, Mexico. Age: Middle early Eocene (“Capay Stage”). Collector: R. L. Squires, 1993.

CSUN 1544a. Along E side of re-entrant on W side of Mesa La Salina, approximately 70 m above the bottom of the exposures of the Bateque Formation in this area, coordinates 4.35 and 55.70 of Mexican government 1:50,000, San José de Gracia (number G12A64) topographic map, 1982, eastern Laguna San Ignacio area, Baja California Sur, Mexico. Age: Early Eocene (“Capay Stage”). Collectors: R. L. Squires & R. A. Demetron, 1993.

CSUN 1544b. Approximately 30 m stratigraphically up-section from CSUN loc. 1544a. Age: Late early Eocene to early middle Eocene. Collectors: R. L. Squires & R. A. Demetron, 1993.

CSUN 1547. Approximately 17 km NW of village of San José de Gracia, at 120-m elevation near middle of east-facing cliff along canyon wall, near N end of Mesa La Azufrera, west side of Arroyo La Tortuga in vicinity of the abandoned village site of El Cuarenta, 112°53'13"N and 26°38'50"N, coordinates 12.45 and 48.80 of Mexican government 1:50,000, San José de Gracia (number G12A64) topographic map, 1982, Baja California Sur, Mexico. Age: Middle early Eocene (“Capay Stage”). Collectors: R. L. Squires & R. A. Demetron, 1992.

CSUN 1549. Approximately 15 km NW of village of San José de Gracia, near base of east-facing cliff and just W of dirt road, northern part of Mesa La Azufrera, W side of Arroyo La Tortuga, coordinates 14.7 and 48.1 of Mexican government 1:50,000, San José de Gracia (number G12A64) topographic map, 1982, Baja California Sur, Mexico. Age: Middle early Eocene (“Capay Stage”). Collectors: R. L. Squires & R. A. Demetron, 1992.

CSUN 1552. Approximately 5.5 km SW of the village of San José de Gracia, on W side of a narrow canyon at S end of Mesa San José, 112°45'15"W and 26°32'40"N, coordinates 26.20 and 36.95 of Mexican government 1:50,000, San José de Gracia (number G12A64) topographic map, 1982, Baja California Sur, Mexico. Age: Late early Eocene to early middle Eocene (“Domengine Stage”). Collectors: R. L. Squires & R. A. Demetron, 1992.

CSUN 1575. Approximately 18 km NW of village of San José de Gracia, along cliff face at S end of Mesa La

- Ladera just N of abandoned village site of El Cuarenta, coordinates 12.65 and 50.35 of Mexican government 1:50,000, San José de Gracia (number G12A64) topographic map, 1982, Baja California Sur, Mexico. Age: Middle early Eocene ("Capay Stage"). Collectors: R. L. Squires and R. A. Demetron, 1993.
- LACMIP 461-B. "On the northern slope of a small canyon intersecting Las Lajas Canyon from the east" (Sutherland, 1966:1), U.S. Geological Survey, 7.5-minute, Santa Susana, California, quadrangle, 1951, north side of Simi Valley, Ventura County, southern California. Age: Late early to early middle Eocene ("Domengine Stage"). Collector: J. A. Sutherland, early 1960s?
- UCMO 7004. At elevation of 1700 ft. on a small cliff on S side of a side canyon to Las Lajas Canyon, 594 m (1950 ft.) N and 556 m (1825 ft.) E of SE corner of section 29, T3N, R17W, U.S. Geological Survey, 7.5-minute, Santa Susana, California, quadrangle, 1951 (photorevised 1969), north side of Simi Valley, Ventura County, southern California. Locality is in the informal "Stewart bed" and is equivalent to CSUN loc. 374 (Squires, 1984:58, 65). Age: Late early to early middle Eocene ("Domengine Stage"). Collector: R. L. Squires, 1981.
- #### LITERATURE CITED
- ANDERSON, F. M. & G. D. HANNA. 1925. Fauna and stratigraphic relations of the Tejon Eocene at the type locality in Kern County, California. *California Academy of Sciences, Occasional Papers* 11:1-249, pls. 1-16.
- ARMENTROUT, J. M., D. A. HULL, J. D. BEAULIEU & W. W. RAU. 1983. Correlation of Cenozoic stratigraphic units of western Oregon and Washington. *Oregon Department of Geology and Mineral Industries, Oil and Gas Investigations* 7:1-90.
- CLARK, B. L. 1942. New middle Eocene gastropods from California. *Journal of Paleontology* 16(1):116-119, pl. 19.
- CLARK, B. L. & J. W. DURHAM. 1946. Eocene faunas from The Department of Bolivar, Colombia. *The Geological Society of American Memoir* 16:1-126, pls. 1-27.
- CLARK, B. L. & H. E. VOKES. 1936. Summary of marine Eocene sequence of western North America. *Bulletin of the Geological Society of America* 47:851-878, pls. 1-2.
- COSSMANN, A. E. M. 1888. Catalogue illustré des coquilles fossiles de l'Éocène des environs de Paris. Fascicule 3. *Annales de la Société Royale Malacologique de Belgique* 23: 3-324, pls. 1-12.
- COSSMANN, M. & G. PISSARRO. 1904-1906. Iconographie complète des coquilles fossiles de l'Éocène des environs de Paris. Vol. 1 (Pélécytopodes). H. Bouillant: Paris. 45 pls.
- COSSMANN, M. & G. PISSARRO. 1910-1913. Iconographie complète des coquilles fossiles de l'Éocène des environs de Paris. Vol. 2 (Gastropodes, etc.). H. Bouillant: Paris. 65 pls.
- COX, L. R. 1960. Gastropoda. General characteristics of Gastropoda. Pp. 84-169. In: R. C. Moore (ed.), *Treatise on Invertebrate Paleontology, Part I. Mollusca 1*. Geological Society of American and University of Kansas Press: Lawrence, Kansas.
- CUVIER, G. L. C. F. D. 1797. *Tableau élémentaire de l'histoire naturelle des animaux [des Mollusques]*. Paris. 710 pp.
- DALL, W. H. 1909. Contributions to the Tertiary Paleontology of the Pacific Coast. I. The Miocene of Astoria and Coos Bay, Oregon. U.S. Geological Survey Professional Paper 59. 278 pp.
- DESHAYES, G.-P. 1824-1837. Description des coquilles fossiles des environs de Paris. Vol. 1 (Conchifères):1-392 (1824-1832). Atlas (Pt. 1):pls. 1-65 (1837). Paris.
- DESHAYES, G.-P. 1864-1866. Description des animaux sans vertèbres découverts dans le bassin de Paris. Vol. 3 (Texte): 1-667. Atlas (Part 2):pls. 1-107. J.-B. Baillièrre et Fils: Paris.
- DICKERSON, R. E. 1916. Stratigraphy and fauna of the Tejon Eocene of California. University of California Publications, *Bulletin of the Department of Geology* 9(17):363-524, pls. 36-46.
- DURHAM, J. W. 1937. Gastropods of the family Epitoniidae from Mesozoic and Cenozoic rocks of the west coast of North America, including one new species by F. E. Turner and one by R. A. Bramkamp. *Journal of Paleontology* 11(6): 479-512, pls. 56-57.
- DUSHANE, H. 1988. Pliocene Epitoniidae of the Esmeraldas beds, northwestern Ecuador (Mollusca: Gastropoda). *Tulane Studies in Geology and Paleontology* 21(1, 2):51-58, figs. 1-12.
- FISCHER, P. 1880-1887. *Manuel de conchyliologie et de paléontologie conchyliologique, ou histoire naturelle des mollusques vivants et fossiles*. F. Savy: Paris. xxiv + 1369 pp.
- FISCHER DE WALDHEIM, G. 1835. Lettre à M. le Baron de Férussac sur quelques genres de coquilles du Muséum Demidoff et en particulier sur quelques fossiles de la Crimée. *Société Impériale des Naturalistes Moscow Bulletin* 8:101-119.
- FLEMING, J. 1822. *The Philosophy of Zoology; or a General View of the Structure, Functions, and Classification of Animals*. 2 Vols. Edinburgh. 1050 pp.
- GIVENS, C. R. 1974. Eocene molluscan biostratigraphy of the Pine Mountain area, Ventura County, California. University of California Publications in Geological Sciences 109: 1-107, pls. 1-11.
- GIVENS, C. R. & M. P. KENNEDY. 1979. Eocene molluscan stages and their correlation, San Diego area, California. Pp. 81-95. In: P. L. Abbott (ed.), *Eocene Depositional Systems, San Diego, California*. Pacific Section, Society of Economic Paleontologists and Mineralogists. Los Angeles, California.
- GMELIN, J. F. 1788-1793. *Caroli a Linné systema naturae per regna tria naturae*. Editio 13, Vol. 1, pt. 6 (Vermes):3021-3910. G. E. Beer: Leipzig.
- GRAY, J. E. 1821. A natural arrangement of Mollusca, according to their internal structure. *London Medical Repository, Monthly Journal and Review* 15:229-239.
- GRAY, J. E. 1808-1856. *Synopsis of the Contents of the British Museum*. British Museum: London. 370 pp.
- GÜMBEL, C. W. 1861. *Geognostische Beschreibung des bayerischen Alpengebirges und seines Vorlandes*. Bavaria, K. Bayerisches Obergamt, Geognostische Abteilung Justus Perle. Gotha. 950 pp.
- GROVES, L. T. 1992. California cowries (Cypraeaacea): past and present, with notes on Recent tropical eastern Pacific species. *The Festivus* 24(9):101-107, figs. 1-3.
- HARRIS, G. F. 1897. *Catalogue of Tertiary Mollusca in the Department of Geology, British Museum (Natural History)*. I. Australian Tertiary Mollusca. London. 407 pp.
- HAYAMI, I. & T. KASE. 1992. A new cryptic species of *Pycnodonte* from Ryukyu Islands: a living fossil oyster. *Transactions of the Paleontological Society of Japan, new series*, 165:1070-1089.
- HERTLEIN, L. G. & A. M. STRONG. 1951. Eastern Pacific

- expeditions of the New York Zoological Society, mollusks from the west coast of Mexico and Central America. Part X. *Zoologica* 36:67-120, pls. 1-11.
- INGRAM, W. M. 1940. A new *Gistoria*. *Journal of the Washington Academy of Sciences* 30(9):376-377, fig. 1.
- JOUSSEAUME, F. P. 1884a. Étude sur la famille des Cypraeidae. *Bulletin de la Société Zoologique de France* 9:81-100.
- JOUSSEAUME, F. P. 1884b. Division des Cypraeidae. *Le Naturaliste* 1884, pp. 414-415.
- KEEN, A. M. 1960. Superfamily Fissurellacea Fleming, 1822. Pp. 226-231, figs. 140-142. *In*: R. C. Moore (ed.), *Treatise on Invertebrate Paleontology, Part I. Mollusca 1*. Geological Society of America and University of Kansas Press: Lawrence, Kansas.
- LAMARCK, J.-B. P. A. DE M. DE. 1822. *Histoire naturelle des animaux sans vertèbres*. Paris, Vol. 6, pt. 2, 232 pp.
- LINK, H. F. 1807. *Beschreibung der Naturalien-Sammlung der Universität zu Rostok*, Vol. 1. Various pages.
- LINNÉ, C. 1758. *Systema naturae per regna tria naturae*. Editio 10, reformata, *Regnum animale*, Vol. 1. *Holmiae*. 1327 pp.
- MONTAGU, G. 1803-1808. *Testacea Britannica, or Natural History of British Shells, Marine, Land and Freshwater*. 2 Vols. London. 606 pp.
- MÖRCH, O. A. L. 1852-1853. *Catalogus conchyliorum quae reliquit D. Alphonso d'Aguirra et Gadea Comes de Yoldi*. Copenhagen, fascicule 1 [Gastropoda, etc.], 170 pp.
- NEWELL, N. D. 1965. Classification of the Bivalvia. *American Museum Novitates* No. 2206. 25 pp.
- PALMER, K. V. W. & D. C. BRANN. 1966. Catalogue of the Paleocene and Eocene Mollusca of the southern and eastern United States. Part II. Gastropoda. *Bulletins of American Paleontology* 48(218):471-1057, pls. 1-5.
- PASSY, A. 1859. Note sur une grande ovule du calcaire grossier. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences* 48(1):948.
- PONDER, W. F. & A. WARÉN. 1988. Appendix. Classification of the Caenogastropoda and Heterostropha—a list of the family-group names and higher taxa. Pp. 288-326. *In*: W. F. Ponder, D. J. Eernisse & J. H. Waterhouse (eds.), *Prosobranch Phylogeny*. *Malacological Review, Supplement 4*.
- RAFINESQUE, C. S. 1815. *Analyse de la nature, ou tableau de l'univers et des corps organisés*. Palermo. 224 pp.
- REEVE, L. A. 1848 [1849]. *Conchologia Iconica: Or, Illustrations of the Shells of Molluscous Animals*. Vol. 5, Monograph of the Genus *Cassis*, pages unnumbered, 12 pls. Reeve, Benham, & Reeve: London.
- RÖDING, P. F. 1798. *Museum Boltenianum sive catalogus cimeliorum e tribus regnis naturae quae olim collegerat. Johan Christi Trappii*: Hamburg, 199 pp.
- SALVINI-PLAWÉN, L. V. 1980. A reconsideration of systematics in the Mollusca (phylogeny and higher classification). *Malacologia* 19(2):249-278.
- SCHILDER, F. A. 1927. Synopsis der Cypraeacea fossiler Lokal-faunen. I. Der Kressenberg. *Senckenbergiana* 9(5):196-222.
- SOHL, N. F. 1992. Upper Cretaceous gastropods (Fissurellidae, Haliotidae, Scissurellidae) from Puerto Rico and Jamaica. *Journal of Paleontology* 66(3):414-434, figs. 1-10.
- SQUIRES, R. L. 1984. Megapaleontology of the Eocene Lajas Formation, Simi Valley, California. *Natural History Museum of Los Angeles County, Contributions in Science* 350. 76 pp.
- SQUIRES, R. L. 1987. Eocene Molluscan Paleontology of the Whitaker Peak Area, Los Angeles and Ventura Counties, California. *Natural History Museum of Los Angeles County, Contributions in Science* 388. 93 pp.
- SQUIRES, R. L. & D. M. ADVOCATE. 1986. New early Eocene mollusks from the Orocochia Mountains, southern California. *Journal of Paleontology* 60(4):851-864, figs. 1-3.
- SQUIRES, R. L. & T. A. DEMÉRÉ. 1991. A middle Eocene marine molluscan assemblage from the usually nonmarine Friars Formation, San Diego County, California. Pp. 181-188. *In*: P. L. Abbott & J. A. May (eds.), *Eocene Geologic History, San Diego Region*. Pacific Section, Society of Economic Paleontologists and Mineralogists, Vol. 68.
- SQUIRES, R. L. & R. A. DEMETRION. 1990. New Eocene bivalves from Baja California Sur, Mexico. *Journal of Paleontology* 64(3):382-391, figs. 1-4.
- SQUIRES, R. L. & R. A. DEMETRION. 1992. Paleontology of the Eocene Bateque Formation, Baja California Sur, Mexico. *Natural History Museum of Los Angeles County, Contributions in Science* 434. 55 pp.
- STENZEL, H. B. 1971. Oysters. Pp. N953-1224, figs. 1-153. *In*: R. C. Moore (ed.), *Treatise on Invertebrate Paleontology, Pt. N. Mollusca 6 (3 of 3)*. Geological Society of America and University of Kansas Press: Lawrence, Kansas.
- SUTHERLAND, J. A. 1966. A new species of *Architectonica* from the Santa Susana Mountains, Ventura County, California. *Natural History Museum of Los Angeles County, Contributions in Science* 117:1-4, figs. 1-2.
- SWAINSON, W. 1820-1833. *Zoological Illustrations, or Original Figures and Descriptions of New, Rare, or Interesting Animals*. London. Series 1 (1820-1823), 3 Vols., 182 pp.; Series 2 (1829-1833), 3 Vols., 136 pp.
- TRECHMANN, C. T. 1924. The Carbonaceous Shale or Richmond Formation of Jamaica. *Geological Magazine* 61:2-19, pls. 1-2.
- VYALOV, O. S. 1936. Sur la classification des huîtres. *Comptes Rendus (Doklady) de l'Académie des Sciences l'URSS, nouvelle série*, 4(13), no. 1(105):17-20.
- WEAVER, C. E. 1942 [1943]. Paleontology of the marine Tertiary formations of Oregon and Washington. *University of Washington, Publications in Geology* 5 (Parts 1-3):1-789, pls. 1-104 [reprinted, 1958].
- WEAVER, C. E. & K. V. W. PALMER. 1922. Fauna from the Eocene of Washington. *University of Washington Publications in Geology* 1(3):1-56, pls. 8-12.
- WENZ, W. 1938. Subfamilia Diodorinae. Pp. 182-185, figs. 304-312. *In*: O. H. Schindewolf (ed.), *Handbuch der Paläozoologie, Band 6, Prosobranchia, Teil 4*. Gebrüder Borntraeger: Berlin [reprinted 1960-1961].
- WENZ, W. 1940. Familia Scalidae. Pp. 787-815, figs. 2287-2384. *In*: O. H. Schindewolf (ed.), *Handbuch der Paläozoologie, Band 6, Prosobranchia, Teil 4*. Gebrüder Borntraeger: Berlin [reprinted 1960-1961].
- WHITFIELD, R. P. 1865. Descriptions of new species of Eocene fossils. *American Journal of Conchology* 1(3):259-268, pl. 27.
- WOODRING, W. P. 1959. Geology and paleontology of Canal Zone and adjoining parts of Panama. Description of Tertiary mollusks (gastropods: Vermetidae to Thaididae). *U.S. Geological Survey Professional Paper* 306-B:147-239, pls. 24-38.