

## 5.

Eastern Pacific Expeditions of the New York Zoological Society. XLIII.  
Mollusks from the West Coast of Mexico and Central America. Part X.<sup>1</sup>LEO GEORGE HERTLEIN & A. M. STRONG.  
California Academy of Sciences.

(Plates I-XI).

[This is the forty-third of a series of papers dealing with the collections of the Eastern Pacific Expeditions of the New York Zoological Society made under the direction of William Beebe. The present paper is concerned with specimens taken on the Templeton Crocker Expedition (1936) and the Eastern Pacific Zaca Expedition (1937-1938). For data on localities, dates, dredges, etc., refer to *Zoologica*, Vol. XXII, No. 2, pp. 33-46, and Vol. XXIII, No. 14, pp. 287-298].

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<sup>1</sup> Contribution No. 895, Department of Tropical Research, New York Zoological Society.

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## INTRODUCTION.

This is the tenth and final part of the series of papers published in *Zoologica* dealing with the mollusks collected during the Eastern Pacific Expeditions of the New York Zoological Society, 1936, 1937-1938. Parts I-IX dealt with the Pelecypoda collected on those expeditions. These appeared as follows:

Part	Volume	Part	Number	Pages	Plates	Date
I	25	4	25	369-430	1, 2	December 31, 1940
II	28	3	19	149-168	1	December 6, 1943
III	31	2	5	53-76	1	August 20, 1946
IV	31	3	8	93-120	1	December 5, 1946
V	31	4	10	129-150	1	February 21, 1947
VI	33	4	13	163-198	1, 2	December 31, 1948
VII	34	2	9	63-97	1	August 10, 1949
VIII	34	4	19	239-258	1	December 30, 1949
IX	35	4	19	217-252	1, 2	December 30, 1950

This paper deals with the new species of Scaphopoda, Gastropoda and Amphineura collected during the Eastern Pacific Expeditions of the New York Zoological Society, 1936, 1937-1938. Originally it was planned to publish references to and descriptions or notes dealing with all of the species of gastropods and scaphopods occurring in tropical west American waters. Conditions resulting from unsettled international relations caused changes in this plan as mentioned in Part II of this series of papers. Accordingly, manuscript was prepared dealing with the species obtained during the expeditions of 1936, 1937-1938. The increased cost of publication as well as the desirability of publishing the results of other expeditions and projects of the New York Zoological Society have led to the necessity of closing this series of papers in *Zoologica* with Part X. This paper is limited almost entirely to the descriptions of new species. The description of the single new species of chiton, *Ischnochiton crockeri*, was prepared by the late George Willett. It is planned that additional papers dealing with tropical west American marine mollusks will be published in other periodicals from time to time. Three such papers<sup>2</sup> have recently appeared.

In completing this series of papers the authors wish to express their appreciation to the many persons and institutions who have aided them in this work. The late Templeton Crocker, owner of the Yacht *Zaca* during the expeditions on which the collections here described were assembled, cooperated and maintained a strong interest in the work. Our thanks are here extended to Dr. William Beebe whose unflinching cooperation and interest have inspired the

authors throughout this work. We wish to reiterate our statement in Part I, namely, that his collecting and recording of locality information is a model of its kind. Also we extend our thanks to Mr. William Bridges, Curator of Publications of the New York Zoological Society, who has at all times shown the utmost cooperation and patience

in seeing the publications through the press. Dr. G. Dallas Hanna, Curator of the Department of Paleontology, California Academy of Sciences, and Mr. A. G. Smith, Research Associate of the same institution, have aided us whenever called upon during our work on these papers. Acknowledgment also is due those persons who have aided us by the loan of specimens, identification of species, or in other ways. These include Dr. A. Myra Keen, Stanford University; Dr. Harald A. Rehder, U. S. National Museum; Miss Viola Bristol, San Diego Society of Natural History; Dr. Wm. M. Ingram, Mills College. Occasionally books for reference purposes were made available by authorities of the University of California, the University of California at Los Angeles, The John Crerar Library and the Library of Congress.

The photographs used to illustrate the species represented on the plates of this paper were made by Mr. Frank L. Rogers. The authors wish to express their appreciation to officials of the American Philosophical Society for a grant-in-aid<sup>3</sup> to the senior author which was made available to defray the expense of photography incidental to the present paper. We also wish to express our appreciation to Mrs. Georgia Fitzsimmons for careful secretarial work on the manuscript.

## Class Scaphopoda.

## ORDER SOLENOCONCHA.

## FAMILY DENTALIIDAE.

Genus *Dentalium* Linnaeus.Subgenus *Rhabdus* Pilsbry & Sharp.*Dentalium (Rhabdus) cedrosense*  
Hertlein & Strong, sp. nov.

## Plate XI, Fig. 9.

Shell nearly straight and extremely slender, thin, glossy, white, circular in section; apex very gently curved, truncate, without notch, slit or apical tube; shell sculptured with a few fine longitudinal lines which are visible under moderate magnification and

<sup>2</sup> Hanna, G. D., & Strong, A. M. West American mollusks of the genus *Conus*. *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 26, No. 9, January 28, 1949, pp. 247-322, pls. 5-10, 4 text-figures.

Hertlein, L. G., & Strong, A. M. Description of a new species of Trophon from the Gulf of California. *Bull. South. Calif. Acad. Sci.*, Vol. 46, Pt. 2, May-August, 1947, issued February 5, 1948, pp. 79-80, pl. 18.

Strong, A. M. Additional Pyramidellidae from the Gulf of California. *Bull. South. Calif. Acad. Sci.*, Vol. 48, Part 2, May-August, issued November 4, 1949, pp. 71-93, pls. 11, 12.

<sup>3</sup> For report on Grant No. 1078, see The American Philosophical Society Yearbook 1949, issued 1950, pp. 147-148.

cross lighting; posterior half of shell ornamented with a series of low, close-set concentric, rounded ridges which gradually fade out toward the anterior smoother half. Dimensions of the type: Length, 9 mm.; diameter at aperture, .24 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 126-D-12, Lat. 28° 20' 00" N., Long. 115° 10' 30" W., a mile off the east coast of Cedros Island, Lower California, Mexico, in 45 fathoms (82 meters), crushed shell and mud; collected by the Templeton Crocker Expedition, May 22, 1936.

This species is similar to *Dentalium rectius* Carpenter<sup>4</sup> but that species (as well as all others from the west coast comparable in size and shape), lacks the concentric sculpture which is so obvious on this one.

Two specimens of this species were dredged by the Templeton Crocker Expedition, 1932, in Lat. 23° 03' 00" to 23° 06' 00" N., Long. 109° 36' 00" to 109° 31' 00" W., in 20-220 fathoms.

It seems quite possible that the new species described here may be referable to the subgenus *Episiphon* Pilsbry & Sharp because of the presence of sculpture consisting of strong annular rings on the posterior portion of the shell. According to Pilsbry & Sharp, some of the species of the subgenus *Rhabdus* possess numerous low variceal annular swellings. The apex of shells referred to *Episiphon* usually possess a short projecting tube or a wide shallow U-shaped lateral notch. However, Pilsbry & Sharp mentioned that the apex of shells of this subgenus may be . . . "simple or notched apex, or truncate with a supplemental apical tube." Woodring<sup>5</sup> stated with regard to this subgenus "The apical tube, which may not be a feature of biologic significance, is absent even on many specimens of the type species and is not confined to species included in this subgenus. Most of the living species of *Episiphon* are deep-water dwellers." The absence of a tube or notch on the apex of the present species, as well as the habitat in comparatively shallow water, has led us, at least for the present, to place the present species in the subgenus *Rhabdus*.

#### FAMILY SIPHONODONTALIIDAE.

##### Genus *Cadulus* Philippi.

##### Subgenus *Platyschides* Henderson.

##### *Cadulus (Platyschides) austinclarki* Emerson.

Plate XI, Figs. 1, 6.

##### *Cadulus (Platyschides) austinclarki* Em-

<sup>4</sup> *Dentalium rectius* Carpenter, *Rept. Brit. Assoc. Adv. Sci.* for 1863 (issued August, 1864), pp. 603 [Nom. nud.], 648. Puget Sound and vicinity.—Carpenter, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 17, August 7, 1865, p. 59. "Hab.—In sinu Pugetiano legit Kennerley."—Pilsbry & Sharp, *Man. Conch.*, Vol. 17, 1897, p. 113, pl. 21, fig. 45. Localities cited from Puget Sound to off Cortes Bank, California, in 13 to 984 fathoms.

<sup>5</sup> Woodring, W. P., *Carnegie Inst. Washington, Publ.* 366, May 20, 1925, p. 203.

erson, *Jour. Washington Acad. Sci.*, Vol. 41, No. 1, January 15, 1951, p. 24, figs. 1, 2. "Santa Inez Bay, Baja California (Gulf of California), west around Santa Inez Point, dredged in 6-12 feet of water in fine black sand." Also other localities.

*Type Locality*: Santa Inez Bay, Lower California, Mexico, in the Gulf of California, in 6-12 feet, black sand.

*Range*: Santa Maria Bay, west coast of Lower California to Santa Inez Bay in the Gulf of California and south to Panama City and the Galapagos Islands.

*Collecting Station*: Mexico: Santa Inez Bay, Gulf of California (145-D-1, 3), 4-13 fathoms (7.5-24 meters), sand.

*Description*: Shell gently arcuate, the bend greater posteriorly, rather short and stubby, inflated in the central portion; translucent, glossy, with extremely faint concentric and longitudinal lines; apertural end tapering gently to a diameter not more than a third larger than the apical opening, aperture oblique; apical margin with on some specimens 2, on others 4, notches on the ventral side and spaced about 75° apart. Dimensions of the hypotype: length, 4.05 mm.; diameter at aperture, 0.18 mm.; greatest diameter, 0.27 mm.; at the apex, 0.135 mm.

This species is smaller and much more inflated in the center than *Cadulus quadrifissatus* Carpenter in Pilsbry & Sharp<sup>6</sup>. A set of the latter in the California Academy of Sciences has been used for comparison since they probably are a portion of the original lot.

*Cadulus (Platyschides) austinclarki* was compared by its author with similar east American species. It is said to resemble *Cadulus (Platyschides) nitidus* Henderson (*U. S. Nat. Mus., Bull.* 111, 1920, p. 129, pl. 19, fig. 9), from Porto Rico, in apical features but differs in the shorter and less attenuated shell which also is more inflated at the equator. The general outline of the west coast species resembles that of *Cadulus (Platyschides) parvus* Henderson, from Florida and Barbados, but differs in that the shell is shorter and has less prominent apical features. The shell of *Cadulus (Platyschides) austinclarki* is less attenuated and less convex than that of *Cadulus (Polyschides) quitus* Pilsbry & Olsson<sup>7</sup> which was originally described from the Pliocene of Ecuador.

*Distribution*: A few specimens of this species were taken in Santa Inez Bay in the Gulf of California. It also has been reported as occurring at various localities from southern Lower California to Panama and the Galapagos Islands, in 1 to 4½ fathoms.

<sup>6</sup> [*Cadulus*], *quadrifissatus* (Carpenter), Pilsbry & Sharp, *Man. Conch.*, Vol. 17, May 3, 1898, p. 150, pl. 29, figs. 10, 11, 12, 13. "San Diego, California, 10 fms. (Henry Hempill, in Acad. coll.); San Pedro (Smithsonian Institution)."

<sup>7</sup> *Cadulus (Polyschides) quitus* Pilsbry & Olsson, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 93, September 9, 1941, p. 48, pl. 10, figs. 9, 10. "Canoa formation, Punta Blanca." Ecuador. Pliocene.

## Class Gastropoda.

## ORDER OPISTHOBRANCHIATA.

## FAMILY ATYIDAE.

Genus *Atys* Montfort.Subgenus *Aliculastrum* Pilsbry.*Atys (Aliculastrum) liriopse*

Hertlein &amp; Strong, sp. nov.

Plate VIII, Fig. 2.

Shell slenderly elongate-ovoid, shining, translucent, white; entire surface ornamented with fine, closely spaced spiral threads which are cut by equally fine but more widely spaced incised axial lines, toward the base the axial lines become fainter and the spiral cords broader; apex obliquely truncated, deeply, narrowly pitted, with both the axial and spiral sculpture entering the pit; aperture as long as the shell; outer lip rising from the edge of the pit with a rounded notch or sulcus partly reflected over it, above which the lip extends for a short distance before rounding sharply to form a narrow aperture along the body of the shell; columella curved, forming a broadening of the aperture, the edge broadly reflected over the umbilical region without a visible fold, the lower end extended downward to join the outer lip in a canal-like projection. Dimensions: length, 9.8 mm.; maximum diameter, 3.6 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station ?-D-27, probably from Station 136-D-27, Arena Bank, Gulf of California, Lat 23° 28' 00" N., Long. 109° 24' 00" W., dredged in 50 fathoms (91 meters), sand, calcareous algae, rock.

The outer lip in the unique type is imperfect but the general characters of the shell seem to be quite different from any species described from the west coast. It differs from *Atys chimera* Baker & Hanna<sup>8</sup> in the more uniform, closely spaced, raised sculpture, lack of columellar fold, and in a canal-like basal projection of the aperture. In shape the new species is more like *Cylichna fantasma* Baker & Hanna<sup>9</sup> which species, however, lacks the apical notch or sulcus.

## ORDER CTENOBRANCHIATA.

## Superfamily Toxoglossa.

## FAMILY TURRITIDAE.

Genus *Carinodrillia* Dall.*Carinodrillia pilsbryi* Lowe.

Plate I, Fig. 10.

*Clathrodrillia pilsbryi* Lowe, *Trans. San Diego Soc. Nat. Hist.*, Vol. 8, No. 6, March

<sup>8</sup> *Atys chimera* Baker & Hanna, *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 16, No. 5, April 22, 1927, p. 126, pl. 4, fig. 4. "... dredged in shallow water in Puerto Escondido, Lower California." Also off La Paz and in Coyote Bay, Concepcion Bay, east coast of Lower California.

<sup>9</sup> *Cylichnella fantasma* Baker & Hanna, *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 16, No. 5, April 22, 1927, p. 128, pl. 4, fig. 6. "... taken in Isthmus Bay, Espiritu Santo Island, Gulf of California." Also taken in San Gabriel Bay, Espiritu Santo Island and in San Luis Gonzaga Bay, Lower California.

21, 1935, p. 23, pl. 4, fig. 2. "Punta Peñasco, Sonora, dredged 10 fathoms (1934)."

*Type Locality*: Punta Peñasco, Sonora, Mexico, in the Gulf of California, dredged in 10 fathoms.

*Range*: Punta Peñasco, Sonora, Mexico, to Gorda Banks, in the Gulf of California.

*Collecting Stations*: Mexico: Santa Inez Bay, Gulf of California (143-D-1), 29 fathoms, mud, crushed shell, weed; off Arena Point, Lower California (136-D-14), 45 fathoms, mud; Gorda Banks, Gulf of California (150-D-8), 40-50 fathoms, muddy sand.

*Description*: Shell slender, acute, nucleus and first 3 postnuclear whorls whitish, the remainder brown; nuclear whorls 3, smooth, shining; postnuclear whorls 12, sutures closely appressed, with the narrow, spirally striated, anal fasciole immediately adjacent; axial sculpture of (on the last whorl 7) strong, swollen, nearly vertical ribs which do not cross the anal fasciole and fade out on the base; spiral sculpture of sharp threads, strongest on the tops of the axial ribs but not nodulous, of these 3 or 4 appear on the spire between the anal fasciole and suture with about 15 similar cords on the base and canal; aperture narrow, outer lip thin, serrated at the edge by the spiral threads, last axial rib not varicose; anal sulcus small, deep, rounded, with a small callus pile on the body; inner lip callous, with a sharp, raised edge along the canal, leaving a decided umbilical chink; canal fairly short, slightly recurved. The specimen illustrated measures: length, 34 mm.; maximum diameter, 11.5 mm.

This species resembles *Clathrodrillia callianira* Dall<sup>10</sup> but has fewer and more prominent axial ribs and lacks the cord-like sub-sutural band. It also seems to be larger for the same number of whorls, *C. callianira* being described as length 16 mm. with 8½ postnuclear whorls but shown with 10 postnuclear whorls in the original figure. Lowe's species is very similar to *Carinodrillia adonis* Pilsbry & Lowe<sup>11</sup> but possesses more numerous spiral ribs.

*Distribution*: A few specimens of this species were dredged at 3 localities in the Gulf of California in 29 to 50 fathoms.

Genus *Clathurella* Carpenter.*Clathurella erminiana*

Hertlein &amp; Strong, sp. nov.

Plate I, Fig. 8.

Shell small, slender, brownish; nuclear whorls 2½, smooth, swollen; postnuclear whorls 7, sutures appressed; first 3 whorls with 8 sharp nodes near the lower edge, on the fourth whorl these begin to become axially elongated with first 1 and then 2 spirally elongated ridges crossing the tops but absent

<sup>10</sup> *Clathrodrillia callianira* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, August 8, 1919, p. 16, pl. 5, fig. 2. "Range.—Station 2823, off Lower California in 27 fathoms, sand, U. S. Bureau of Fisheries."

<sup>11</sup> *Carinodrillia adonis* Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 45, pl. 2, fig. 2. "Manzanillo, Mexico, dredged in about 20 fathoms."

in the interspaces; on the last whorl there are 10 axial ribs extending from the anal fasciole to the canal, crossed by 5 spiral cords, strong on the tops of the ribs, faint in the interspaces, these are followed by 12 closely spaced spiral threads on the lower part of the base and on the canal; anal fasciole rather broad, marked by numerous, curved lines of growth; aperture narrow, outer lip thin at the edge, greatly thickened a short distance back by a strong varix, separated from the canal by a shallow internal depression, interior not dentate; anal sulcus small, deep, with a raised edge and small subsutural callosity; inner lip smooth, the edge not raised; canal rather short, hardly recurved. The type measures: length, 12.5 mm.; maximum diameter, 5.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 147-D-2, Lat. 26° 57' 30" N., Long. 111° 48' 30" W., off Concepcion Point, Santa Inez Bay, Gulf of California, in 60 fathoms (110 meters), mud, crushed shell. A second specimen was dredged at the same locality.

This species is quite similar to *Glyphostoma sirena* Dall<sup>12</sup> from the Galapagos Islands, but differs principally in the less distinct axial ribs, fewer spiral cords and in the color.

#### Genus *Fusiturricula* Woodring.

##### *Fusiturricula armilda* Dall.

Plate VIII, Fig. 4.

*Turris* (*Surcula*) *armilda* Dall, *Bull. Mus. Comp. Zool.*, Vol. 43, No. 6, October, 1908, p. 262. "U.S.S. 'Albatross', station 3017, Gulf of California, off Cape Lobos, in 58 fathoms, mud, bottom temperature 51.8° F."

*Type Locality*: Off Cape Lobos, Gulf of California, in 58 fathoms, mud.

*Range*: Santa Maria Bay, Lower California, to Santa Inez Bay, Gulf of California, and south to the Gulf of Chiriqui, Panama.

*Collecting Stations*: Mexico: Arena Bank, Gulf of California (136-D-4, 6, 9, 14, 17, 23, 24), 35-55 fathoms, mud, sand, weed, *Arca* conglomerates; Santa Inez Bay, Gulf of California (146-D-1), 35 fathoms, mud, crushed shell; Gorda Banks, Gulf of California (150-D-23), 45 fathoms, sand, calcareous algae; Costa Rica: off Ballena Bay, Gulf of Nicoya (213-D-11, 17), 35 fathoms, mud; Panama: Gulf of Chiriqui (221-D-1, 5), 35-40 fathoms, sandy mud.

*Description*: Shell fusiform, thin, spire acute, whorls angulated; sculpture consisting of about 12 short, oblique, protractive axial ribs, about 12 on the last whorl on which 2 or 3 are much larger than the others; axials crossed by spiral threads of which 2 on the periphery are slightly larger

than the others; canal long, narrow, slightly recurved; pale brown, interior pinkish.

A specimen from Arena Bank, Gulf of California, measures: height, 40.3 mm.; maximum diameter, 14 mm.

The shell of this species differs from that of *Fusiturricula fusinella* Dall in that the axial ribs are oblique rather than straight and in that on large specimens about every fourth rib is enlarged.

*Distribution*: A number of specimens of this species were dredged by the expedition in the region between Santa Inez Bay, Gulf of California, and the Gulf of Chiriqui, Panama.

##### *Fusiturricula howelli*

Hertlein & Strong, sp. nov.

Plate VIII, Fig. 8.

Shell slender, acute, bleached a dull white; nucleus defective; normal whorls 8, strongly shouldered; axial sculpture of 9 nearly vertical, strong ribs which undulate the sutures, feeble above the shoulder angle and extending over the base to the canal; spiral sculpture of raised cords, 3 above the shoulder angle and 4 much stronger below, riding over the ribs on the tops of which they are somewhat swollen, base and canal with about 30 closely spaced cords which have a tendency to alternate in strength; aperture with the outer lip not varicose but turned in by the last rib, notch triangular, close to the suture, inner lip with a thin wash of callus; canal open, long, straight and slender. The type measures: length, 31 mm.; length of aperture and canal, 16 mm.; maximum diameter, 11 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 214-D-1, 4, 14 miles S. X E. of Judas Point, Costa Rica, Lat. 9° 19' 32" to 9° 17' 40" N., Long. 84° 29' 30" to 84° 27' 30" W., dredged in 42-61 fathoms (76.5-112 meters), mud, shell, rocks.

This species bears some resemblance to the species described by Dall as *Turris* (*Surcula*) *fusinella*<sup>13</sup>, but differs in that the axial ribs are continuous rather than represented by spirally elongated nodes arranged in axial lines.

There is doubt as to whether the species here described as new should be placed in the genus *Fusiturricula* in which the axial ribs are said to be similar to those described on *T. fusinella*. However, it appears best to leave it in *Fusiturricula* until more is known of the variation of the characters of the type species of the various genera of this family.

This species is named for Mr. John Thomas Howell, Curator of the Department of Botany, California Academy of Sciences.

<sup>12</sup> *Glyphostoma sirena* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, August 3, 1919, p. 53, pl. 17, fig. 3. "Range.—Station 2813, in the Galapagos Islands, in 40 fathoms, coral sand, surface temperature 81° F. U. S. Bureau of Fisheries."

<sup>13</sup> *Turris* (*Surcula*) *fusinella* Dall, *Bull. Mus. Comp. Zool.*, Vol. 43, No. 6, October, 1908, p. 261, pl. 14, fig. 7. "U. S. S. 'Albatross' station 3391, in the Gulf of Panama, in 153 fathoms, mud, bottom temperature 55.8° F." Also off Cape Lobos, Gulf of California, west coast of Mexico, in 58 fathoms.

Genus *Crassispira* Swainson.*Crassispira turricula ballenaensis*

Hertlein &amp; Strong, subsp. nov.

Plate XI, Figs. 4, 11.

The shell of this subspecies differs from that of typical *Crassispira turricula* Sowerby in that the whorls are more rounded, the last whorl is shorter in proportion to the height and the axial ribbing is finer. The color is dark brown. Dimensions of holotype: length, 33.2 mm.; maximum diameter, 11 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 206-D-1, 3, Lat. 10° 37' 03" to 10° 36' 22" N., Long. 85° 41' 12" to 85° 41' 08" W., off Port Cu-lebra, Costa Rica, in 14 fathoms (25.5 meters), sandy mud. 1 specimen was dredged at Station 213-D-11, 17, Lat. 9° 44' 52" N., Long. 84° 51' 25" W., to Lat. 9° 42' 00" N., Long. 84° 56' 00" W., off Ballena Bay, Gulf of Nicoya, Costa Rica, in 35 fathoms (63.7 meters), mud. 5 specimens were dredged at Station 183-D-3, Lat. 19° 14' 30" N., Long. 104° 51' 30" W., Tenacatita Bay, Mexico, in 40 fathoms (73 meters), sandy mud. 3 specimens were dredged in Acapulco Bay, Mexico, by the Templeton Crocker Expedition of the California Academy of Sciences in 1932.

*Pleurotoma turricula* Sowerby<sup>14</sup> was described in 1834. On the same page immediately following this description Sowerby also described *Pleurotoma corrugata*<sup>15</sup>. Reeve in 1843 illustrated *Pleurotoma turricula*, placed *P. corrugata* in the synonymy and stated that there was not the slightest difference between the specimens upon which Sowerby based the two specific names. Reeve also indicated that Sowerby's *P. corrugata* was distinct from a species from West Africa which also was described as *Pleurotoma corrugata* by Kiener. This African species was not described until 1839-1840 and therefore does not take priority over Sowerby's earlier use of the same combination of names. In a later portion of his monograph of *Pleurotoma* Reeve illustrated (his species 162) under the name of *Pleurotoma turricula* the species originally described from England by Montagu in 1803 as *Murex turricula*. In the errata to his monograph Reeve renamed the west American shell, Sowerby's *Pleurotoma turricula* (Reeve's species 49), *Pleurotoma sowerbyi*. *Murex turricula* Montagu

<sup>14</sup> *Pleurotoma turricula* Sowerby, *Proc. Zool. Soc. London* for 1833, p. 137 (issued April 16, 1834). "Hab. ad Sanctam Elenam Columbiae Occidentalis." "From sandy mud at a depth of six fathoms."—Reeve, *Conch. Icon.*, Vol. 1, *Pleurotoma*, 1843, sp. 49, pl. 6, fig. 49. In errata it is stated "Species 49. For *P. turricula*, Sowerby—read *P. sowerbyi*, Reeve; and for *P. turricula*, refer to species 162."—Tryon, *Man. Conch.*, Vol. 6, 1884, p. 180, pl. 10, fig. 67 (as *Drillia sowerbyi*). Not *Murex turricula* Montagu, *Test. Brit.*, Pt. 1, 1803, p. 262, Suppl. Tab. 9, fig. 1.

<sup>15</sup> *Pleurotoma corrugata* Sowerby, *Proc. Zool. Soc. London* for 1833, p. 137 (issued April 16, 1834). "Hab. ad Sinum Montijae et ad Portam Porteram." "Found in muddy sand at ten fathoms depth." Not *Pleurotoma corrugata* Kiener, *Spéc. Gén. et Icon. Coq. Viv.*, Fam. Canalifères, Pt. 1, *Pleurotoma*, 1839-1840, p. 26, pl. 9, fig. 2. "Habite les côtes de Gorée et de Guinée."

was designated as the type of a genus *Propebela* Iredale, 1918, but Winckworth, 1932, placed the species in the genus *Lora* Gistel, 1848. Sowerby's *Pleurotoma turricula* has line priority over his *P. corrugata*. It appears then that *turricula* is the valid specific name for the west American shell of which we here describe a new subspecies as *Crassispira turricula ballenaensis*.

The species from Panama cited by C. B. Adams, 1852, under the name of *Pleurotoma corrugata* Sowerby was later described as a new species, *Crassispira adamsiana*, by Pilsbry & Lowe.<sup>16</sup>

*Crassispira chacei*

Hertlein &amp; Strong, sp. nov.

Plate I, Fig. 12.

Shell stout, brownish; nucleus and first 3 or 4 postnuclear whorls lost, remaining whorls 8; anal fasciole strongly impressed, sculptured with fine curved lines of growth and microscopic spiral striations, close to the suture but is separated from it by a narrow raised band on which there are 1 or 2 fine spiral threads; axial sculpture of (on the last whorl 14) slightly protractive ribs, which are highest at the margin of the anal fasciole, flattening out toward the suture and fading out on the lower part of the base; spiral sculpture of subequal, raised threads which ride over the axial ribs, of these there are 7 on the penultimate whorl between the lower edge of the anal fasciole and the following suture and about 20 on the base and canal; aperture narrow, outer lip thin at the edge, with an indistinct stromboid notch, the last axial rib varicose and some distance back; anal sinus small, deep, rounded, with a raised pile of callus on the body; inner lip callous, with a raised edge along the canal; canal very short, slightly recurved. The type measures: length, 29.5 mm.; maximum diameter, 10.7 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 150-D-23, Lat. 23° 01' 00" N., Long. 109° 27' 30" W., Gorda Banks, Gulf of California, dredged in 45 fathoms (82 meters), sand, calcareous algae. 1 specimen was taken nearby at Station 150-D-9, 50-60 fathoms (91-109 meters), muddy sand. 1 specimen was dredged at Station 142-D-3, Lat. 27° 04' 00" N., Long. 111° 54' 00" W., Santa Inez Bay, Lower California, Gulf of California, in 40 fathoms (73 meters), sand, weed.

This species resembles *Crassispira turricula* Sowerby (*Crassispira sowerbyi* Reeve<sup>17</sup>) in many ways, but the canal is much shorter and the axial ribs do not cross the anal fasciole to form nodules on the sub-sutural band as on Sowerby's species. All the specimens secured are more or less

<sup>16</sup> *Crassispira adamsiana* Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 48, pl. 2, fig. 11. Type from "Reef off 'French Plaza', Panama City." Also collected at San Juan del Sur, Nicaragua.

<sup>17</sup> See Reeve, L., *Conch. Icon.*, Vol. 1, *Pleurotoma*, 1843, pl. 6, fig. 49.

bleached. Living shells are probably uniformly dark brown or blackish.

This species is named for Emery Chace of Lomita, California, an indefatigable collector of west American shells.

***Crassispira brujae***

Hertlein & Strong, sp. nov.

Plate I, Fig. 18.

Shell slender, whitish under a persistent black periostracum; nuclear whorls 2, very small, smooth; postnuclear whorls 12; axial sculpture of (on the penultimate whorl 12) narrow ribs, strongest just below the anal fasciole, extending to the following suture, fading out on the base, absent on the narrow anal fasciole but appearing as faint nodes on the low, narrow, subsutural cord; entire surface with microscopic spiral striations; base and canal with about a dozen fine spiral threads, those on the canal slightly the stronger and faintly nodulous; aperture narrow, outer lip thin at the edge, the last 2 axial ribs enlarged, forming a slight hump; anal sulcus deep, rounded, with a projecting subsutural callosity; inner lip callous, with a raised edge; canal short, slightly recurved. The type measures: length, 29 mm.; maximum diameter, 9.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 136-D-13, Lat. 23° 29' 00" N., Long. 109° 24' 00" W., Arena Bank, Gulf of California, in 45 fathoms (82 meters), mud, *Arca* conglomerates.

The sculpture of the unique type is somewhat similar to that of *Crassispira erigone* Dall<sup>18</sup> described from Panama Bay, but is much finer. The shell also is much more slender than Dall's species. It also is more slender and the nodes on the subsutural cord are much finer than on *C. erebus* Pilsbry & Lowe.<sup>19</sup>

The specific name of this species is derived from that of the ship *Bruja* on which Lieut. R. W. H. Hardy explored the upper portion of the Gulf of California, 1825-1828.

***Crassispira ericana***

Hertlein & Strong, sp. nov.

Plate I, Fig. 11.

Shell small, rather thick, with a persistent black periostracum; nuclear and first 2 or 3 postnuclear whorls lost, remaining whorls 8, sutures appressed, undulated by the axial ribs; axial sculpture of (on the last whorl 12) ribs, broadest near the anal fasciole, extending to the following suture and fading out on the base, absent on the anal fasciole and subsutural band; subsutural band moderately wide, axially striated, bounded at the lower edge by a strong cord; anal fasciole

broad, sculptured by 4 spiral threads crossed by strong lines of growth; other spiral sculpture of fine raised threads in the interspaces between the axial ribs similar to those on the anal fasciole, 6 appearing on the penultimate whorl and about 24 on the base and canal; aperture narrow, purplish; outer lip slightly thickened, not varicose, anal sulcus small, very deep, the outer edge strongly constricted by a strong subsutural callosity; inner lip callous, the edge scarcely raised; canal short, slightly recurved. The type measures: length, 11.5 mm.; maximum diameter, 4.3 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., Santa Inez Bay, Lower California, Gulf of California, in 4-13 fathoms (7.5-24 meters), sand.

In many ways this shell fits the description of the unfigured *?Drillia hanleyi* Carpenter,<sup>20</sup> but the axial ribs would seem to be fewer in number and more nearly vertical. The presence of a strong subsutural cord on the present shell serves to separate it from *C. tepocana* Dall.<sup>21</sup>

This species is named in honor of Eric Knight Jordan in recognition of his contributions to the knowledge of West American marine mollusks.

***Crassispira xanti***

Hertlein & Strong, sp. nov.

Plate I, Fig. 3.

Shell small, stout, with a pointed spire and a persistent black periostracum; nuclear whorls 2, smooth, whitish; postnuclear whorls 9, with the subsutural band and anal fasciole occupying more than half the space between the sutures; axial sculpture of (on the last whorl 12) strong ribs, extending from the anal fasciole to the following suture and over the base to the siphonal fasciole, absent on the anal fasciole and subsutural band; subsutural band broad, bordered at the lower edge by a smooth keel, between which and the suture there are 4 subequal spiral threads crossed by strong lines of growth; anal fasciole with 3 similar but more distinct spiral threads, below which there are 3 sharply incised spiral lines in the interspaces between the axial ribs; periphery with a broad space on which the spiral sculpture is indistinct, followed by an incised spiral line and about 13 subequal spiral threads on the base; aperture purplish at the edge, white within, narrow; outer lip with a shallow but distinct stromboid notch, somewhat thickened by the last rib which is slightly swollen; anal sulcus shallow, rounded (probably not mature) with a small subsutural

<sup>20</sup> *?Drillia hanleyi* Carpenter, Cat. Mazatlan Shells, November, 1856, p. 398. "Hab.—Mazatlan; 1 fresh sp., L'pool Col."

<sup>21</sup> *Crassispira tepocana* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, August 8, 1919, p. 25, pl. 6, fig. 5. "Range.—Station 3018, off Cape Tepoca, Lower California, in 36 fathoms, sand, bottom temperature 63.3° F; U. S. Bureau of Fisheries."

<sup>18</sup> *Crassispira erigone* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, August 8, 1919, p. 21, pl. 7, fig. 8. "Range.—Station 2798, in Panama Bay, in 18 fathoms; U. S. Bureau of Fisheries."

<sup>19</sup> *Crassispira erebus* Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 49, pl. 2, fig. 10. "Corinto, Nicaragua, in about 20 fathoms (Lowe)."



callosity; inner lip callous, purplish, with the edge little raised; siphonal fasciole distinct, sculptured with fine lines of growth and followed by 6 spiral cords; canal short, slightly recurved. The type measures: length, 15.5 mm.; maximum diameter, 5.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 135, dredged in San Lucas Bay at the southern end of Lower California, Mexico. 1 specimen was dredged at Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., Port Guatulco, Mexico, in 7 fathoms (12.6 meters), gr. sand, crushed shell. 1 specimen was dredged at Station 200-D-16, Lat. 12° 27' 41" N., Long. 87° 12' 08" W., near Corinto, Nicaragua, in 4-7 fathoms (7-13 meters), mangrove leaves. 1 small specimen was taken at Port Parker, Costa Rica, and 2 specimens at Piedra Blanca, Costa Rica.

The shell of the present species resembles the preceding species in general appearance but is broader and differs in the ornamentation of the subsutural area. This species appears in some instances to have been recorded as *Crassispira nigerrima* Sowerby.<sup>22</sup> It differs from that species in the narrower axial ribs and very broad subsutural area which bears a much stronger carina which occurs much farther anterior to the suture. For comparative study, we have used 2 specimens of *C. nigerrima* in the collections of the California Academy of Sciences which were collected at Santa Elena Bay, Ecuador, by Woodbridge Williams, which agree exceedingly well with Reeve's illustration of that species.

This species is named for John Xantus who collected many specimens of marine mollusks at Cape San Lucas, Lower California.

#### *Crassispira tangolaensis*

Hertlein & Strong, sp. nov.

Plate I, Fig. 13.

Shell small, biconic, uniformly dark, the extreme tip broken, remaining whorls 8, strongly sculptured; axial sculpture of 12 strong, somewhat retractive ribs, fading out on the base, very faint over the narrow, depressed fasciole but rising to rounded tubercles at the suture; spiral sculpture of very fine, closely spaced threads over the entire surface, on the base every third or fourth thread the strongest; aperture narrow, outer lip thickened, with a small, rounded anal sulcus near the suture; inner lip

simple, canal very short, hardly differentiated. The type measures: length, 14 mm.; maximum diameter, 5.4 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 196-D-6, 7, Lat. 15° 45' 34" N., Long. 96° 06' 02" to 96° 06' 03" W., Tangola-Tangola Bay, Mexico, dredged in 6-7 fathoms (11-12.8 meters), sand, crushed shell bottom.

The axial ribbing on the shell of this species bears some similarity to that of *Pleurotoma rustica* Sowerby<sup>23</sup> but it differs in that the whorls of that species are said to be keeled near the suture whereas on the present shell a row of tubercles is present near the suture.

#### Genus *Elaeocyma* Dall.

##### *Elaeocyma craneana*

Hertlein & Strong, sp. nov.

Plate I, Fig. 2.

Shell slender, acute, dull white; nucleus of 2 bright, shining whorls, the first smooth, inflated, the second with a peripheral keel; normal whorls 10; axial sculpture of 12 strong ribs, extending from the anal fasciole to the canal but absent for a short distance back of the outer lip, and strong lines of growth prominent and curved on the fasciole; spiral sculpture indistinct on the spire, gradually increasing in strength toward the periphery, base and canal with 12 narrow spiral cords; aperture rather wide, outer lip smooth, sharp, inner lip curved, with a raised callus, and ending in a callus pile separating the deep, rounded sinus from the body of the shell; canal open, distinct, set off by a raised thread marking the siphonal fasciole. The type measures: length, 21 mm.; maximum diameter, 8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Bahia Honda, Panama.

This species is of much the same form as *Elaeocyma pallida* Sowerby<sup>24</sup> from the same general locality but is larger with fewer and stronger axial ribs and only indistinct spiral sculpture. The species described as *Pleurotoma (Drillia) cretata* by E. A. Smith<sup>25</sup> appears to be another member of this group.

This species is named for Miss Jocelyn Crane, Technical Associate, Department of Tropical Research, New York Zoological Society, who accompanied the Eastern Pacific *Zaca* expedition, 1937-1938, during the course of which the type of the present species was collected.

<sup>22</sup> *Pleurotoma nigerrima* Sowerby, *Proc. Zool. Soc. London* for 1833, p. 137 (issued April 16, 1834). "Hab. ad Panamam." "Dredged in sandy mud in six and ten fathoms."—Reeve, *Conch. Icon.*, Vol. 1, *Pleurotoma*, 1843, sp. 102, pl. 12, fig. 102. "Hab. Panama and Bay of Caracas (dredged from sandy mud at the depth of ten fathoms); Cuming."

The species named *Pleurotoma cornuta* Sowerby (*Proc. Zool. Soc. London* for 1833, p. 136 (issued April 16, 1834). "Hab. ad Sinum Caracac Columbiae Occidentalis.") "Found in sandy mud at a depth of ten fathoms.") has not been illustrated but has generally been considered to be identical with *P. nigerrima*. It has page priority over the latter but the species is so well known under the name of *P. nigerrima* that we favor acceptance of this name.

<sup>23</sup> *Pleurotoma rustica* Sowerby, *Proc. Zool. Soc. London* for 1833, p. 138 (issued April 16, 1834). "Hab. sub lapidibus ad Xipixapi Columbiae Occidentalis."—Reeve, *Conch. Icon.*, Vol. 1, *Pleurotoma*, 1843, sp. 91, pl. 11, fig. 91.

<sup>24</sup> *Pleurotoma pallida* Sowerby, *Proc. Zool. Soc. London* for 1833, p. 137 (issued April 16, 1834). "Hab. ad Portam Portreram Americae Centralis." "Found in thirteen fathoms, on a sandy muddy floor."—Reeve, *Conch. Icon.*, Vol. 1, *Pleurotoma*, 1843, sp. 134, pl. 16, fig. 134.—Tryon, *Man. Conch.*, Vol. 6, 1884, p. 196, pl. 14, fig. 8 (as *Drillia pallida*).

<sup>25</sup> *Pleurotoma (Drillia) cretata* E. A. Smith, *Ann. & Mag. Nat. Hist.*, Ser. 6, Vol. 2, No. 10, October, 1888, p. 305. "Hab. Panama (A. H. Cooke)."

*Elaeocyma salvadorica*

Hertlein &amp; Strong, sp. nov.

Plate XI, Fig. 5.

Shell large for the genus, acute, white; nuclear whorls defective, remaining whorls 11; axial sculpture of 16 protractive ribs which extend from suture to suture and over the base to the canal, strongly curved where they cross the depressed anal fasciole and indistinct on the last third of the body whorl between a light stained hump and the edge of the outer lip; spiral sculpture of closely spaced, flattened cords separated by sharp, incised lines which cut across the ribs, rendering them slightly nodulous, 3 appearing on the fasciole and 6 between it and the periphery, base and canal with 12 similar cords; aperture short, outer lip thin, sharp, inner lip with a raised callus ending in a callus pile separating the very narrow, deep anal sinus from the body of the shell; canal short, deep, slightly recurved with a shelly siphonal sinus. The type measures: length, 29 mm.; maximum diameter, 11 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 198-D-1, off La Libertad, El Salvador, Lat. 13° 27' 20" N., Long. 89° 19' 20" W., dredged in 13 fathoms (24 meters), mud.

This species is very similar in many ways to *Elaeocyma pallida* Sowerby<sup>26</sup> but is larger with fewer and less well developed ribs. It is larger and is sculptured with more numerous axial ribs than *E. craneana*.

Genus *Kylix* Dall.*Kylix turveri* Hertlein & Strong, sp. nov.

Plate I, Fig. 1.

Shell small, with a pointed spire, pinkish-white, shining; nuclear whorls 2, swollen, with a peripheral keel; postnuclear whorls 9; axial sculpture of (on the penultimate whorl 20) strong ribs, with narrower interspaces, lower and curved over the constricted anal fasciole, rising to points at the suture, extending over the base to the siphonal fasciole, obsolete on the last quarter turn; spire with 3 or 4 sharply incised spiral lines between the anal fasciole and the following suture which cut the axial ribs into somewhat rounded segments; base similarly sculptured with 10 incised lines between the periphery and the siphonal fasciole and 4 or 5 cords on the canal; aperture narrow, smooth within, with a very slight varicose hump and a distinct stromboid notch; anal sulcus deep, rounded, with a projecting sub-sutural callosity; inner lip callous, with the edge reflected; canal short, somewhat recurved. The type measures: length, 19.3 mm.; maximum diameter, 7.4 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 142-D-2, Santa Inez Bay, east coast of Lower California, Lat. 27° 04' 00" N., Long. 111° 55' 00" W., dredged in 30-35 fathoms (54-64 meters), muddy sand, crushed shell.

<sup>26</sup> For references to this species see footnote No. 24, p. 75.

The unique type of this new species appears to belong in the group with ?*Clathrodrillia* (*Kylix*) *alcemene* Dall<sup>27</sup> and ?*Clathrodrillia* (*Kylix*) *alcyone* Dall<sup>28</sup>, having similar sculpture and color. However, in the present species the anal sulcus is deep, with a projecting callosity, and the number of incised spiral lines is different from those on the two species described by Dall. Dall stated with regard to *alcemene* that the aperture is "probably not quite mature" and of *alcyone* that "It has every appearance of being adult." In the figure of *alcyone* the outer lip does not seem to be fully formed.

This species is named for Mr. Harry R. Turver of South Gate, California.

*Kylix zacae* Hertlein & Strong, sp. nov.

Plate I, Fig. 5.

Shell small, with a pointed spire, brownish-white, shining; nuclear whorls lost, remaining whorls 8; axial sculpture of (on the penultimate whorl 14) broad ribs, curved over the narrow, rather indistinct anal fasciole, somewhat nodulous at the suture, extending over the base to the siphonal fasciole; spire with from 3 to 5 sharply incised spiral lines between the anal fasciole and the following suture which cut the axial ribs into spirally elongated segments, base with 10 similar incised spiral lines between the periphery and the siphonal fasciole, followed by 5 cords on the canal; aperture narrow, smooth within; outer lip thin, externally with fine axial striae for some distance back from the edge; the stromboid notch shallow, indistinct; anal sulcus deep, rounded, with a projecting subsutural callosity; inner lip callous, the edge slightly raised; canal short, somewhat recurved. The type measures: length, 14.5 mm.; maximum diameter, 5.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.) from Station 145-D-1, 3, off San Domingo Point, Santa Inez Bay, east coast of Lower California, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., dredged in 4-13 fathoms (7.5-24 meters), sand. A second specimen, dredged at the same locality, has 2 swollen nuclear whorls, the second with a strong peripheral keel.

The shell of this species is quite similar to that of the preceding species, *K. turveri*, but is smaller and with fewer and broader axial ribs.

Genus *Cymatosyrinx* Dall.*Cymatosyrinx arenensis*

Hertlein &amp; Strong, sp. nov.

Plate I, Fig. 17.

Shell slender, strong, polished, white, light brown on the fasciole and on the lower part

<sup>27</sup> ?*Clathrodrillia* (*Kylix*) *alcemene* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, August 8, 1919, p. 19, [not figured]. "Range.—Dredged at Agua Verde Bay, Gulf of California, by Dr. Paul Bartsch."

<sup>28</sup> ?*Clathrodrillia* (*Kylix*) *alcyone* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, August 8, 1919, p. 20, pl. 2, fig. 3. "Range.—Station 3016, on the west coast of Mexico off Cape Lobos, in 76 fathoms, mud, bottom temperature 59° F. U. S. Bureau of Fisheries."

of the base; nuclear whorls decollated; post-nuclear whorls 13, with a broad anal fasciole and appressed suture; axial sculpture of strong, rounded ribs, 12 on the body whorl, reaching from suture to suture and over the base to the siphonal fasciole, sharply pinched in on the middle of the anal fasciole; spiral sculpture of fine threads, 5 or 6 between the anal fasciole and the following suture, and about 10 on the base; aperture short, internally white with a brown band; outer lip thin at the edge, thickened just back of it by the last axial rib, notch deep, rounded, close to the suture, with a raised edge and a small callus pile on the body of the shell; columella with a strong, white callus; siphonal notch distinct with a broad, smooth fasciole; canal short, slightly recurved. The type measures: length, 45 mm.; maximum diameter, 14.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 136-D-22, Lat. 23° 28' 30" N., Long. 109° 25' 00" W., Arena Bank, Gulf of California, in 45 fathoms (82 meters), mud. A second specimen was dredged at the same locality. 3 specimens were dredged in this general locality at Station 136-D-4, Lat. 23° 32' 00" N., Long. 109° 27' 00" W., in 55 fathoms (100 meters), mud; 1 specimen at Station 136-D-14, Lat. 23° 29' 30" N., Long. 109° 25' 00" W., in 45 fathoms (82 meters), mud; 1 specimen at Station 136-D-21, Lat. 23° 29' 00" N., Long. 109° 25' 00" W., in 45 fathoms (82 meters), mud; 1 specimen at Station 136-D-32, Lat. 23° 24' 30" N., Long. 109° 24' 00" W., in 42 fathoms (76 meters), sand; 3 specimens were dredged at Station 150-D-23, Lat. 23° 01' 00" N., Long. 109° 27' 30" W., Gorda Banks, in 45 fathoms (82 meters), sand, calcareous algae.

This species belongs in a group of species including *Cymatosyrinx empyrosia* Dall.<sup>29</sup> It differs from Dall's species and others in the group in the much larger size and the better development of axial ribs.

#### *Cymatosyrinx allyniana*

Hertlein & Strong, sp. nov.

Plate I, Fig. 7

Shell small, acute, uniformly grayish-white; the extreme tip broken, remaining whorls 9; axial sculpture of (on the last whorl 14) strong ribs, straight over the body of the whorls, continuous over the base to the canal, on the deeply impressed anal fasciole they become very fine and strongly curved but rise to points at the appressed suture; other axial sculpture of curved lines of growth on the fasciole; spiral sculpture of about 8 fine, close, raised threads on the whorls below the fasciole on the spire and about 12 additional similar threads on the base, followed by 6 slightly larger cords on the canal; aperture short, with a deep,

rounded, anal fasciole and a strong subsutural callosity; outer lip thin at the edge, smooth within, thickened by the first rib which is slightly varicose; inner lip with a pure white callus which is extended along the canal with a raised, somewhat reflected edge; canal short, deep, slightly recurved. The type measures: length, 20.7 mm.; maximum diameter, 8.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 136-D-4, Lat. 23° 32' 00" N., Long. 109° 27' 00" W., Arena Bank, Gulf of California, in 55 fathoms (100 meters), mud. Additional specimens were dredged in the same general locality as follows: 1 specimen from Station 136-D-18, Lat. 23° 30' 00" N., Long. 109° 25' 00" W., in 40 fathoms (73 meters), mud; 1 specimen from Station 136-D-24, Lat. 23° 29' 00" N., Long. 109° 23' 30" W., in 50 fathoms (91 meters), mud. *Arca conglomerates*; 1 specimen from Station 136, the exact haul number unknown.

In many features this species resembles *Elaeocyma aerope* Dall<sup>30</sup> and *E. acapulcana* Lowe<sup>31</sup> but differs markedly from both of them in the more slender shell, more deeply impressed anal fasciole, more numerous raised ribs and in the strongly raised spiral threads.

This species is named for Mr. Allyn G. Smith, Research Associate, Department of Paleontology, California Academy of Sciences.

#### *Cymatosyrinx strohbeeni*

Hertlein & Strong, sp. nov.

Plate I, Fig. 14.

Shell small, slender, shining, flesh-colored, with a row of light brown patches between the axial ribs on the anal fasciole and a fainter row of similar spots near the middle of the whorls; nuclear whorls 2½, smooth, pale brown, translucent; postnuclear whorls 9; axial sculpture of (on the last whorl 12) protractive, curved ribs, continuous from suture to suture and over the base to the canal, but constricted and cut by a fine incised spiral line to form the anal fasciole, leaving a row of rounded nodes against the appressed suture; spiral sculpture of 4 incised spiral lines in the interspaces between the axial ribs on the spire, base with 6 similar incised spiral lines of which the lower 3 cut across the continuation of the axial ribs and are followed by 3 closely set cords on the canal; aperture narrow, anal sulcus deep, narrow, with a broad subsutural callus; outer lip thin at the edge, thickened by the first rib; pillar with a raised white callus; canal very short, deep, slightly recurved. The type measures: length, 11.5 mm.; maximum diameter, 3.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo.

<sup>29</sup> *Drillia empyrosia* Dall, *Nautilus*, Vol. 12, No. 11, March, 1899, p. 127. "Found in deep water off San Pedro, Cala., by Mr. and Mrs. T. S. Oldroyd."—Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, 1919, p. 12, pl. 4, fig. 1 (as "*Elaeocyma empyrosia*").

<sup>30</sup> *Elaeocyma aerope* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, August 8, 1919, p. 13, pl. 1, fig. 3. "Range—Agua Verde Bay, Lower California, Dr. Paul Bartsch."

<sup>31</sup> *Elaeocyma acapulcana* Lowe, *Trans. San Diego Soc. Nat. Hist.*, Vol. 8, No. 6, March 21, 1935, p. 23, pl. 4, fig. 1. "Acapulco, dredged 20 fathoms (1930)."

Type Coll.), dredged off Cape San Lucas, Lower California. Seven additional specimens were dredged at the same locality.

This species belongs in the group of species combined by Grant & Gale<sup>32</sup> under the name of *Clavus (Cymatosyrinx) hemphilli* Stearns.<sup>33</sup> Of this group it is nearest to *Elaeocyma arbela* Dall<sup>34</sup> from Scammon Lagoon, differing in the more slender form and lighter color as well as in the details of the sculpture.

This species is named for Mr. John Strohen of Santa Cruz, California.

***Cymatosyrinx asaedi***

Hertlein & Strong, sp. nov.

Plate I, Fig. 4.

Shell of medium size, with a sharp pointed spire, uniformly whitish (probably bleached); nuclear whorls partly broken, one smooth whorl remaining; postnuclear whorls 11, sutures closely appressed; axial sculpture of (on the penultimate whorl 13) short, slightly protractive ribs, strongest just below the anal fasciole, fading out on the base, obsolete on the last quarter turn; entire surface with microscopic incised spiral lines and lines of growth; anal fasciole broad, without a subsutural band or rib, showing the continuations of the axial ribs very faintly; aperture narrow, with a deep, rounded anal sinus and a strong, rounded subsutural callosity; outer lip thin at the edge, thickened a short distance back by a slight swelling, smooth within; inner lip eroded, canal short, defective. The type measures: length, 27 mm.; maximum diameter, 9.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 136-D-2, Lat. 23° 30' 30" N., Long. 109° 26' 00" W., Arena Bank, Gulf of California, in 45 fathoms (82 meters), mud, *Arca* conglomerates.

The unique type is about the size and shape of *C. rosea* Sowerby<sup>35</sup> but the latter has a narrower fasciole, fewer and more rounded ribs and lacks the microscopic sculpture.

The shell of this species bears a general resemblance to that of the species described as *Clavatula quisqualis* Hinds<sup>36</sup> but differs

in the greater size, presence of microscopic spiral lines and in other details.

This species is named for Mr. Toshio Asaeda, photographer and preparateur, who accompanied the expedition during which the type specimen of the present species was collected.

**Genus *Kurtzina* Bartsch.**

***Kurtzina cyrene* Dall.**

Plate VIII, Fig. 9.

*Mangilia (Kurtziella) cyrene* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, August 8, 1919, p. 62, Pl. 21, fig. 5. "Range.—Station 2823, off La Paz, Lower California, in about 26 fathoms, broken shell. U. S. Bureau of Fisheries."

*Type Locality*: Off La Paz, Lower California, in about 26 fathoms, broken shell.

*Range*: Santa Inez Bay, Gulf of California, to San Juan del Sur, Nicaragua.

*Collecting Station*: Mexico: Santa Inez Bay, Gulf of California (145-D-1, 3), 4-13 fathoms, sand.

*Description*: Shell small, whorls obtusely angulated; axial sculpture consists of about 8-10 ribs (on the last whorl); spiral sculpture consists of about 12 threads (on the last whorl), the peripheral thread the strongest; incremental lines of growth are closely spaced giving a characteristic frosted appearance to the surface. Length, 8.5 mm.; diameter, 3.4 mm.

*Distribution*: A few specimens of this species were dredged in Santa Inez Bay, Gulf of California, in 4-13 fathoms. This is an extension north of the known range of this species.

**Genus *Crockerella***

Hertlein & Strong, gen. nov.

Shell small; nucleus smooth; outer lip varicose, smooth within; canal short but distinct, the anal sinus rounded, near the suture, and with little or no anal fasciole.

*Type*: *Clathurella crystallina* Gabb, *Proc. Calif. Acad. Nat. Sci.*, Vol. 3, January, 1865, p. 184. "Hab. Catalina Island, 40 fms. Dr. Cooper."—Dall, *U. S. Nat. Mus.*, *Bull.* 112, 1921, p. 79, pl. 6, fig. 4 (as *Philbertia crystallina*). "Off Catalina Island, in 50 fathoms."

The species assigned to this genus differ from those generally assigned to *Philbertia* Monterosato and *Cytharella* Monterosato in that the anal fasciole is indistinct or lacking.

***Crockerella pederseni***

Hertlein & Strong, sp. nov.

Plate I, Fig. 15.

Shell very small, fusiform, white, with sharply cut sculpture giving it a frosted appearance; nuclear whorls 2, the first very small, smooth, the second much larger, an-

record stated, "But, in the British Museum, two, perhaps types but not so marked, are labelled, 'W. coast of Central America, Sir E. Belcher Coll.' These two habitats are incompatible." *Drillia lucida* Nevill, 1875, was considered to be an oriental representative of *C. quisqualis*.

<sup>32</sup> Grant, IV, U. S., & Gale, H. R., *Mem. San Diego Soc. Nat. Hist.*, Vol. 1, 1931, p. 577-578.

<sup>33</sup> *Pleurotoma (Drillia) hemphilli* Stearns, *Conch. Memor.*, No. 7, August 28, 1871, (second page). "Habitat—Los Santos Bay, Lower California."—Stearns, *Proc. Calif. Acad. Sci.*, Vol. 5, May, 1873, p. 80, pl. 1, fig. 3. Original locality cited.

<sup>34</sup> *Elaeocyma arbela* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2288, August 8, 1919, p. 10, pl. 4, fig. 3. "Range.—Scammon Lagoon, Lower California, collected by Henry Hemphill."

<sup>35</sup> *Pleurotoma rosea* Sowerby, *Proc. Zool. Soc. London* for 1833, p. 134 (issued April 16, 1834). "Hab. ad Salango et ad Montem Christi." "Found in sandy mud in from twelve to sixteen fathoms."—Reeve, *Conch. Icon.*, Vol. 1, *Pleurotoma*, 1843, sp. 43, pl. 6, fig. 43.—Tryon, *Man. Conch.*, Vol. 6, 1884, p. 190, pl. 10, fig. 62 (as *Drillia rosea*).

<sup>36</sup> *Clavatula quisqualis* Hinds, *Zool. Voy. Sulphur*, Moll., Pt. 1, July, 1844, p. 19, pl. 6, fig. 5. "Inhab. Gulf of Papagayo, Central America. From eight to fourteen fathoms, mud."—Reeve, *Conch. Icon.*, Vol. 1, *Pleurotoma*, 1845, sp. 230, pl. 26, fig. 230.

Brazier, 1877, cited this species as occurring at Darnley Island, Torres Straits. Hedley (1913), referring to this

gulated in the middle, sculptured with a fine spiral cord on the angle and numerous fine axial riblets; postnuclear whorls 6; sutures distinctly undulated by the axial ribs, anal fasciole only feebly indicated; axial sculpture of 10 strong ribs, continuous up the spire and over the base to the canal; spiral sculpture of a strong cord on the angle of the whorls with 7 or 8 smaller threads between it and the preceding suture, below the angle there are 3 or 4 fine threads and then a cord only a little less strong than the one at the angle, with 3 finer threads between it and the following suture, on the last whorl below the angle there are 5 cords with 3 or 4 finer threads between each of them and then 10 more equal cords extending to the end of the canal, all spiral cords and threads riding over the axial ribs without nodulation; aperture narrow, outer lip thickened by the varicose swelling of the last rib, smooth within except for a slight swelling at the lower edge of the anal sulcus; anal sulcus shallow, rounded, close to the suture; inner lip not callous; canal hardly differentiated. The type measures: length, 4.8 mm., length of aperture and canal, 2.0 mm.; maximum diameter, 1.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., Santa Inez Bay, Gulf of California, in 4-13 fathoms (7.5-24 meters), sand.

The species described by Carpenter as "*Mangelia*" *subdiaphana*<sup>37</sup> from Cape San Lucas, Lower California, the type specimen of which was figured by Dall,<sup>38</sup> possesses a similar but less angulated shell. The description indicates a number of differences in the sculpture and in the color in comparison to those of the present species.

This species is named for Captain Alfred Pedersen of the yacht *Zaca*.

***Crockerella hilli* Hertlein & Strong, sp. nov.**

Plate I, Fig. 16.

Shell very small, fusiform, white, with indications of a brown band in the suture, canal brown; nuclear whorls 2, the first minute, smooth, the second much larger, angulated in the middle, sculptured with fine axial riblets; postnuclear whorls 5, the upper whorls strongly angulated in the middle, the last less so, sutures appressed, undulated by the axial sculpture; axial sculpture of (on the last whorl 7) strong ribs with much wider interspaces, extending from suture to suture and over the base to the canal; spiral sculpture of a low, flattened cord on the angle of the whorl which rides over the axial ribs, and 2 similar cords between it and the following suture; base with 4 similar cords, followed by 7 rounded cords on the canal; aperture narrow, outer lip varicose, re-

flected, the face with microscopic axial and spiral threads; anal sulcus large, rather deep, close to the suture; inner lip without callus; canal very short. The type measures: length, 3.8 mm.; maximum diameter, 1.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., Santa Inez Bay, Gulf of California, dredged in 4-13 fathoms (7.5-24 meters), sand. 9 additional specimens were dredged at the same locality.

This species is quite similar to the preceding one, *Crockerella pedersenii*, differing principally in the more sharply angulated whorls and in the absence of the fine, secondary sculpture.

This species is named for Dr. Howard Hill, Curator of Mollusks in the Los Angeles County Museum, Los Angeles, California.

Genus ***Cythereella*** Monterosato.

***Cythereella burchi* Hertlein & Strong, sp. nov.**

Plate I, Fig. 6.

Shell small, fusiform, uniformly light brown; nuclear whorls 3, translucent, dark brown, the first 2 smooth, the last with close-set, axial riblets; postnuclear whorls 7; axial sculpture of low, rounded ribs, continuous from the narrow, slightly depressed anal fasciole to the following suture and over the base to the canal, 16 appearing on the penultimate whorl; spiral sculpture of fine, subequal cords, 7 appearing on the anal fasciole, followed by 8 on the spire and about 50 on the last whorl, with occasional finer threads in the interspaces, these cords ride evenly over the axial ribs and are cut in turn by fine lines of growth, giving a finely cancellated surface to the entire shell; aperture narrow, about half as long as the shell; outer lip thickened by a strong varix, smooth within; anal sulcus deep, rounded, close to the suture; inner lip not callous, canal hardly differentiated. The type measures: length, 16.5 mm.; length of aperture and canal, 10.1 mm., maximum diameter, 6.3 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 136-D-22, Arena Bank, Gulf of California, Lat. 23° 28' 30" N., Long. 109° 25' 00" W., dredged in 45 fathoms (82 meters), mud.

The unique type of this new species is quite similar in shape to *Cythereella carissima* Pilsbry & Lowe<sup>39</sup> but is much larger, lacks the spots of color and has somewhat coarser spiral sculpture.

This species is named for Mr. John Q. Burch of Los Angeles, California.

Superfamily Rhachiglossa.

FAMILY FASCIOLARIIDAE.

Genus ***Latirus*** Montfort.

***Latirus hemphilli* Hertlein & Strong, sp. nov.**

Plate II, Fig. 4.

Shell fusiform, moderately slender, spire

<sup>37</sup> *Manacilia subdiaphana* Carpenter, *Ann. & Mag. Nat. Hist.*, Ser. 3, Vol. 14, July, 1864, p. 45. Reprint in *Smithson. Miscell. Coll.*, No. 252, 1872, p. 218. "Cape St. Lucas."

<sup>38</sup> *Cythereella subdiaphana* Carpenter, *Dall, Proc. U. S. Nat. Mus.*, Vol. 56, 1919, p. 75, pl. 24, fig. 4.

<sup>39</sup> *Cythereella carissima* Pilsbry & Lowe, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 84, May 21, 1932, p. 53, pl. 4, figs. 1, 1a. "Manzanillo, dredged in about 20 fathoms (H. N. Lowe)."

high, thick, whorls broadly rounded; sculpture consists of rather broad axial folds or ridges which are crossed by spiral threads varying in size, on the earlier whorls 2 or 3 threads stand out stronger than the others; aperture elongately ovate, anterior canal moderately long, a siphonal fasciole present, the columella bears 3 oblique plaits; color yellowish covered with a dark brown periostracum, interior white. Dimensions of the holotype: length, 68.5 mm.; maximum diameter, 23.8 mm.; height of spire, 39 mm.

Holotype and paratypes (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Port Parker, Costa Rica, 10 specimens, rather small, were dredged near the same locality (203-D-1-3), in 12-15 fathoms (22-27 meters). 2 specimens were dredged at Port Culebra, Costa Rica (206-D-1-3), in 14 fathoms (25.5 meters), sandy mud.

*Range:* Off Santa Margarita Island, Magdalena Bay, Lower California, to Taboga Island, Panama.

The shell of this species is somewhat variable. Some specimens, especially young forms, are shorter and broader than adult shells, some of which are quite elongate. The axial ridges are often weaker on the body whorl of adult shells.

The shell of this new species differs from that of the following species, *Latirus mediamericanus*, in that the whorls as well as the axial ridges are more rounded, and the spiral threads are very much stronger especially on the body whorl.

This species probably has been cited from tropical west American waters under the name of *Latirus spadiceus* Reeve. C. B. Adams, 1852, cited Reeve's species from Taboga Island, Panama; Melvill, 1891, cited it from Acapulco and Panama but also from "Fernando Noronha (Ridley)", off Brazil, and Pillsbury & Lowe, 1932, cited it from Acapulco and San Juan del Sur. *Turbinella spadicea* Reeve<sup>40</sup> was originally described without information as to the locality from which it came. Some of our specimens bear a resemblance to Reeve's illustration of that species but none of them are as broad in proportion to the height, the whorls are less strongly rounded and the canal is longer. The whorls of Reeve's species appear to be more tumid than those of our shells but less so than *Latirus tumens* Carpenter<sup>41</sup> which approaches the Indo-Pacific *L. nodatus* Martyn. Reeve, Melvill, and Hidalgo<sup>42</sup> cited the latter species from Panama. Pease<sup>43</sup> long ago stated that it does not occur in west American waters. We have not seen any specimens

from Panama or other west American localities which we could refer to *L. tumens* on the basis of Melvill's figure.

The present species, *Latirus hemphilli*, bears considerable resemblance to the species described as *Turbinella acuminata* Wood,<sup>44</sup> a Philippine species, but is more slender in outline, the concentric ribbing appears to be less evenly arranged and it possesses a well developed siphonal fasciole. Kiener later proposed the same name for the Philippine shell and referred to Wood's original figure. The illustrations of Wood's species given by Wood, Kiener and Reeve indicate that it lacks a siphonal fasciole, or nearly so.

*Turbinella candelabrum* Reeve, which was described as coming from Santa Elena, Ecuador, was later cited by Hidalgo, 1904-1905, as occurring in the Philippine Islands.

This species is named for Henry Hemphill, early collector of mollusks on the Pacific coast. Much of his fine collection is now in the Department of Paleontology of the California Academy of Sciences.

#### *Latirus mediamericanus*

Hertlein & Strong, sp. nov.

Plate XI, Figs. 3, 10.

*Turbinellus acuminatus* Kiener, Reeve, Conch. Syst., Vol. 2, 1842, p. 180, pl. 229, fig. 2. [No locality cited].

Not *Turbinella acuminata* Wood, 1828, nor *Turbinella acuminata* Kiener, 1840.

*Turbinella castanea* Reeve, Conch. Icon., Vol. 4, *Turbinella*, July, 1847, species 26, pl. 5, fig. 26. "Hab. Panama (in the crevices of rocks); Cuming."

Not *Turbinella castanea* Gray, Zool. Beechey's Voy., 1839, p. 114. "Inhab. Pacific Ocean."

*Latirus castaneus* Reeve, Tryon, Man. Conch., Vol. 3, 1881, p. 91, pl. 68, fig. 138 (copy of Reeve's figure). Panama.

*Type Locality:* Gorgona Island, Colombia.

*Range:* Manzanillo, Mexico, to Gorgona Island, Colombia.

*Collecting Stations:* Costa Rica: Port Parker; Piedra Blanca Bay; Panama: Pearl Islands; Colombia: Gorgona Island.

*Description:* Typical forms of this attractive west American *Latirus* may be easily recognized by the comparatively smooth, often somewhat flattened whorls, bearing rude, oblique axial plications. The anterior canal is sculptured with about 8 spiral ribs. The earlier whorls bear spiral threads and sometimes the whole shell bears weak or sub-obsolete spirals. The color is chestnut brown.

The name *Turbinella castanea* was first proposed by Gray in 1839 for a shell which Melvill later referred to the synonymy of *Leucozonia cingulifera* Lamarck. The original description indicates that it is quite

<sup>40</sup> *Turbinella spadicea* Reeve, Conch. Icon., Vol. 4, *Turbinella*, August, 1847, species 44, pl. 9, fig. 44. "Hab.?"

<sup>41</sup> *Latirus tumens* Carpenter, Proc. Zool. Soc. London, November 11, 1856, p. 166. "Hab. In Sinu Panamensi; legit T. Bridges. Sp. un. in Mus. Cuming."—Melvill, Mem. & Proc. Manchester Lit. & Philos. Soc., Ser. 4, Vol. 4, No. 5, 1891, pp. 391, 405, pl. 2, fig. 14 (as *Latirus tumens*) "Amer. centr."—Tomlin, Jour. Conch., Vol. 18, No. 6, 1927, p. 159. Gorgona Island, Colombia, on shore.

<sup>42</sup> Hidalgo, J. G., Mem. R. Acad. Cienc. Fis. y Nat. Madrid, Vol. 19, 1900, p. 341.

<sup>43</sup> Pease, W. H., Amer. Jour. Conch., Vol. 5, Pt. 2, October 7, 1869, p. 83.

<sup>44</sup> *Turbinella acuminata* Wood, Index Test., Suppl., 1828, p. 57, pl. 5, fig. 12, As *Murex acuminatus* on p. 15. Habitat unknown.—Kiener, Spéc. Gén. et Icon. Coq. Viv., Canalières, *Turbinella*, 1840, p. 28, pl. 15, fig. 2. "Habite l'Océan Indien."—Reeve, Conch. Icon., Vol. 4, *Turbinella*, 1847, species 47 pl. 9, fig. 47. "Hab. Philippine Islands; Cuming."

different from Reeve's shell of the same name. It therefore becomes necessary to propose a new name for Reeve's *Turbinella castanea* and the name *Latirus mediamericus* is here proposed. It is based on a holotype from Gorgona Island, Colombia. It measures: height, 52.8 mm.; maximum diameter, 18 mm. A paratype came from Pearl Island, Panama Bay. It measures: length (apex incomplete), 58.3 mm.; maximum diameter, 22 mm. Specimens are often covered with calcareous algae.

**Distribution:** Several specimens of this species were taken in the region between Port Parker, Costa Rica, and Gorgona Island, Colombia. It also has been recorded as occurring in the Pleistocene of Panama and in the Quaternary of Manta, Ecuador.

#### FAMILY BUCCINIDAE.

Genus *Pseudoneptunea* Kobelt.

#### *Pseudoneptunea panamica*

Hertlein & Strong, sp. nov.

Plate II, Figs. 6, 10.

Shell ovately elongate, rather broad, spire moderately elevated, moderately thick, about 7 to 8 whorls which are subangulate at the shoulder; sculpture consisting of longitudinal ridges, about 10 on the penultimate and 9 on the last whorl, these are crossed by spiral lirae of uneven strength but about 10 are noticeable on the lower portion of the last whorl and canal, between these major threads usually 2, occasionally 3, striae are present, where the major threads cross the axial ridges a row of rather sharp spirally elongated tubercles is formed at the angulation, on the penultimate whorl there is another row below the shoulder and on the last whorl there are 2 rows below the shoulder; aperture rather widely subovate, the parietal wall and columella are covered with a thin callus, columella with a slight siphonal fasciole and a slight fold near the base which is slantingly truncated, end of canal slightly recurved, outer lip lirate internally, apparently about 10-12 lirae on the type which is somewhat eroded. Color (paratypes) whitish-brown, the tubercles darker brown and a vague band of that color present on the base of the last whorl. Dimensions of holotype: length, 39 mm.; maximum diameter, 25 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 224, Lat. 7° 23' 30" N., Long. 82° 03' 00" W., on Hannibal Bank, Panama, in 35-40 fathoms (64-73 meters), bottom of rocks, dead coral, mud, sand, shells, algae. Two specimens, paratypes, were dredged at Station 142-D-3, Lat. 27° 04' 00" N., Long. 111° 54' 00" W., Santa Inez Bay, Gulf of California, in 40 fathoms (73 meters), sand, weed bottom.

This new species differs from any described shell from west American waters which has come to our attention. It somewhat resembles the east American species de-

scribed as *Fusus multangulus* Philippi<sup>45</sup>. The shell of the present species is more sharply tuberculate and the spiral threads are much more uneven in strength than those on the species described by Philippi. Both *Fusus multangulus* and the species here described as new appear to be referable to the genus *Pseudoneptunea* Kobelt<sup>46</sup>, the type of which was designated by Cossmann<sup>47</sup> as "*Siphon. varicosa*, Kien."<sup>48</sup>

The shell of *Pseudoneptunea panamica* is thinner, the body whorl is more inflated, and lacks the varix on the outer lip, the spiral ribbing is much finer and the axial ribs much more strongly tuberculated than those of *Cantharus vibex* Broderip.

#### FAMILY NASSARIIDAE.

Genus *Nassarius* Dumeril.

#### *Nassarius insculptus gordanus*

Hertlein & Strong, subsp. nov.

Plate VIII, Fig. 6.

Typical *Nassarius insculptus* Carpenter<sup>49</sup> has the axial sculpture confined to the first few whorls and the spiral sculpture is strongest on the base. In the subspecies *N. insculptus eupleura* Dall<sup>50</sup> the axial ribs are "prolonged over the periphery of the whorl to the base." The present form also has the axial sculpture quite distinct on the last whorl but the spiral grooves are quite strong over the entire surface, particularly so on the sloping shoulders of the whorls. The shell is darker brown and ranges much farther south than the others which have not been reported south of Cedros Island. The type measures: length, 22 mm.; diameter, 11.5 mm.

Holotype and paratype (Calif. Acad. Sci. Dept. Paleo. Type Coll.) from Station 150-D-6, dredged on Gorda Banks, Gulf of California, in 60 fathoms (109 meters), muddy sand, rocks, Lat. 23° 02' 00" N., Long. 109° 31' 00" W. In the same general area 2 specimens were dredged at Station 150-D-2, in 75 fathoms (137 meters), sand, Lat. 23° 01' 00" N., Long. 109° 28' 00" W., and 1 specimen was dredged at Station 150-D-16, in 67-75

<sup>45</sup> *Fusus multangulus* Philippi, *Zeit. f. Malakozool.*, Jahrg. 5, February, 1848, p. 25. "Patria: Yucatan, communicavit cl. Largilliert."—Perry, *Bull. Amer. Paleo.*, Vol. 26, No. 95, 1940, p. 144, pl. 31, fig. 219 (as *Muriceida multangula*. Under subgenus *Pseudoneptunea*).

<sup>46</sup> *Pseudoneptunea* Kobelt, *Jahrb. deutsch. Malakozool. Gesell.*, Bd. 9, 1882, p. 17.

<sup>47</sup> Cossmann, M., *Ess. de Paléo.*, Vol. 4, 1901, p. 111.

<sup>48</sup> *Fusus varicosus* Kiener, *Spéc. Gén. et Icon. Coq. Viv.*, Canalicifères, Pt. 1, *Fusus*, 1840, p. 41, pl. 10, fig. 2. "Habite les côtes de l'Océanie, celles de l'île Timor." Wenz recorded doubtful occurrence of this species in Peru (*Handbuch der Paläozool.*, Lief. 7, Bd. 6, *Gastropoda*, Teil 5, 1941, p. 1170, fig. 3324. "Rezent ? bei Peru."). Oostingh discussed this species and stated that the locality Peru, cited by Deshayes, is probably incorrect (*Mededeel. Landbouwhoogeschool*, Deel 26, Verhandl. 3, 1923, p. 116).

<sup>49</sup> *Nassa insculpta* Carpenter, *Rept. Brit. Assoc. Adv. Sci.* for 1863, issued August, 1864, p. 613. "Cat. Is., living in 40 fm., rare", p. 662, Santa Barbara Islands. Reprint in *Smithson. Miscell. Coll.*, No. 252, 1872, pp. 93, 148. Illustrated by I. S. Oldroyd, *Stanford Univ. Publ. Univ. Ser. Geol. Sci.*, Vol. 2, Pt. 1, 1927, p. 267, pl. 26, fig. 12.

<sup>50</sup> *Alectrion insculptus*, new variety *eupleura* Dall, *Proc. U. S. Nat. Mus.*, Vol. 51, No. 2166, January 15, 1917, p. 576. "It has been collected from San Simeon, California, to Cerros Island."

fathoms (122-136 meters), Lat. 23° 02' 00" N., Long. 109° 30' 30" W.

FAMILY COLUMBELLIDAE.

Genus *Anachis* H. & A. Adams.

*Anachis coronata hannana*

Hertlein & Strong, subsp. nov.

Plate II, Fig. 3.

Shell small, slender, consisting of 10 slightly rounded whorls including the undifferentiated nucleus, the first 7½ whorls smooth, polished, light brown, with faint lighter dots; the last 2½ whorls developing low, nearly vertical, axial ribs, slightly nodulous at the shoulder of the whorls, while the light dots gradually increase in size until on the last whorl they form narrow, zigzag, white and brown lines of about equal width; of the axial ribs there are about 10 on the last whorl, fading out on the base where they are replaced by about a dozen fine spiral threads extending to the end of the canal; aperture narrow; outer lip thickened, with a sharp edge, internally with 8 spirally elongated denticles, of which the upper is the largest and is separated from the suture by a shallow notch; inner lip with a sharply raised edge; canal short, recurved. Dimensions of holotype: length, 13.6 mm.; maximum diameter, 6.3 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Cape San Lucas, Lower California, Mexico.

The shell of this new subspecies described here is similar to that of *Anachis coronata* Sowerby<sup>51</sup> but differs in the following particulars: the more slender outline, finer and more numerous axial ribs which develop correspondingly weaker coronations at the shoulder of the ultimate and penultimate whorls and in the pronounced color pattern which consists of divaricate stripes of white on a dark brown ground.

Two lots typical of the form here described are present in the Henry Hemphill collection in the California Academy of Sciences, one from Scammon Lagoon and one from Magdalena Bay, Lower California. Judging from the collections which we have studied it appears that this beautifully colored form is characteristic of the northern portion of the range of *Anachis coronata* and it is therefore accorded subspecific rank.

The unique type somewhat resembles a small specimen of *Anachis fluctuata* Sowerby<sup>52</sup> in the peculiarly polished surface and zigzag lines of color but it is more slender and the axial ribs on the body whorl are straight instead of curved.

<sup>51</sup> *Columbella coronata* Sowerby, *Proc. Zool. Soc. London*, August 14, 1832, p. 114. "Hab. in Sinu Panamae sub lapidibus."—Sowerby, *Thes. Conch.*, Vol. 1, 1844, p. 135 bis, pl. 39, fig. 134.—Tryon, *Man. Conch.*, Vol. 5, 1883, p. 153, pl. 54, figs. 36, 37.—Baker, Hanna & Strong, *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 23, No. 16, 1938, p. 249, pl. 24, fig. 5 (as *Anachis coronata*).

<sup>52</sup> *Columbella fluctuata* Sowerby, *Proc. Zool. Soc. London*, August 14, 1832, p. 115. "Hab. sub lapidibus ad oras Americae Centralis. (Gulf of Nocoioyo)."—Sowerby, *Thes. Conch.*, Vol. 1, 1844, p. 133 bis, pl. 38, fig. 150. Type locality cited.

This subspecies is named for Dr. G. Dallas Hanna, Curator of the Department of Paleontology, California Academy of Sciences.

*Anachis ritteri* Hertlein & Strong, sp. nov.

Plate II, Fig. 11.

Shell small, solid, ovate, the extreme tip eroded, without distinct nuclear whorls; normal whorls 6, the first 4 nearby smooth, the fifth with faint axial swellings which on the last whorl expand into strong axial ribs extending from the suture to the periphery on the front of the whorl but are faint for some distance back of the lip, other sculpture of rounded spiral cords strongest near the suture, on the base, and canal where they become more closely spaced; outer lip thickened with 3 strong denticles on the posterior portion; columella with 3 equally strong denticles on the anterior portion. Dimensions of holotype: length, 7.4 mm.; diameter, 3.8 mm.

Holotype and paratypes (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, off Port Guatulco, Mexico, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell. About 40 additional specimens were taken with the type. Other specimens were dredged off Tangola-Tangola Bay, Mexico, at Station 196-D-6, 7, Lat. 15° 45' 34" N., Long. 96° 06' 02" W., and Lat. 15° 45' 34" N., Long. 96° 06' 03" W., in 6-7 fathoms (11-12.8 meters), sand, crushed shell; Station 196-D-14, 15, Lat. 15° 45' 34" N., Long. 96° 06' 03" W., in 5 fathoms (9.1 meters), crushed shell.

The color markings on the type are quite striking. Immediately below the suture there is a narrow light band, below this and over the body of the whorl is a darker band, while the base and canal are light again. In addition there are fine penciled spiral lines of dark reddish-brown, 6 appearing on the body whorl. In the paratypes there is much variation in the strength of these colored lines, being entirely absent in some cases. There is much variation in the ribbing, some specimens are nearly smooth, others strongly ribbed. A specimen with poorly developed ribs and strongly developed spiral lines approaches *Anachis incerta* Stearns<sup>53</sup>, a somewhat smaller species from the Galapagos Islands.

The shells of the species here described as new bear some resemblance to *Anachis varians* Sowerby<sup>54</sup> originally described as having come from the Galapagos Islands. The present shells are more slender and less shouldered and lack dark coloration at the base of the canal which Tryon stated

<sup>53</sup> *Nitidella incerta* Stearns, *Nautilus*, Vol. 6, No. 8, December, 1892, p. 88. "Galapagos Islands (special island not stated), Dr. Simeon Habel."—Stearns, *Proc. U. S. Nat. Mus.*, Vol. 16, No. 942, 1893, p. 390, pl. 51, fig. 6. "Indefatigable Island." Also island not stated, Habel collection.

<sup>54</sup> *Columbella varians* Sowerby, *Proc. Zool. Soc. London*, August 14, 1832, p. 118. "Hab. ad insulas Gallapagos. (Hood's Island)." Also "Mr. Sowerby has a great number brought by the Endeavor, Capt. Cook, many years since, but without locality."—Sowerby, *Thes. Conch.*, Vol. 1, 1844, p. 117 bis, pl. 37, figs. 47-50.



is a characteristic feature of *C. varians*. This coloration is well shown on Sowerby's figures 49 and 50. Specimens agreeing almost exactly with Sowerby's illustrations occur in the Hawaiian Islands. Iredale<sup>55</sup> pointed out the ambiguity of Sowerby's statement that specimens came from Hood's Island, Galapagos group, and that others without information as to the locality from which they came were said to have been collected on Captain Cook's voyage on the *Endeavor*. Iredale cited (p. 261) Sowerby's species under the name of *Euplica varians* from Middleton Reef off eastern Australia. He stated that it is the species generally referred to *Columbella varians* on Lord Hood Island. Baker, Hanna & Strong, 1938, mentioned that although Sowerby's species was described from the Galapagos Islands it might be confined to more western portions of the Pacific Ocean.

This species is named for Dr. Friedrich Ritter, once a resident of Charles Island, Galapagos Islands.

***Anachis teevani* Hertlein & Strong, sp. nov.**

Plate II, Fig. 5.

Shell small, rather slender, extreme tip broken, whorls 7, slightly rounded, moderately slopingly shouldered at the summit, sculptured with faint axial ribs and equally faint spiral threads strongest on the shoulder and on the base and canal where about 20 can be counted; aperture narrow, outer lip with 5 small denticles, columella with 4 denticles. The ground color is yellowish-white with irregular and irregularly placed patches of reddish-brown, 2 of which show through on the inside of the outer lip. Dimensions of holotype: length, 8 mm.; diameter, 3.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 189-D-4, 17 miles SE. × E. of Acapulco, Mexico, Lat. 16° 38' 30" N., Long. 99° 40' 00" W., dredged in 28 fathoms (51 meters), mud.

If it were not for the faint sculpture and the strong denticles this shell would be much like *Mitrella tuberosa* Carpenter<sup>56</sup> of the California coast.

This species is named for Mr. John Teevan, General Associate, Department of Tropical Research, New York Zoological Society, who accompanied the expedition during which the type of the present species was collected.

***Anachis rehderi* Hertlein & Strong, sp. nov.**

Plate II, Fig. 14.

Shell small, rather slender; nucleus of 3 smooth, glassy whorls; normal whorls 6,

<sup>55</sup> Iredale, T., *Australian Zool.*, Vol. 8, Pt. 4, March 12, 1937, p. 255.

<sup>56</sup> *Amycla tuberosa* Carpenter, *Rept. Brit. Assoc. Adv. Sci.* for 1863, issued August, 1864, pp. 539, 628, 662. Fossil at Santa Barbara, California; Vancouver Island and Straits of Juan de Fuca, and vicinity; region of Monterey; region between San Pedro and San Diego, California, and the Santa Barbara Islands.

For additional references to this species see Grant & Gale, *Mem. San Diego Soc. Nat. Hist.*, Vol. 1, 1931, p. 697, pl. 26, fig. 45.

flat-sided, sculptured with strong, slightly sinuous axial ribs, about 20 appearing on all whorls, extending from the suture to below the periphery, at the suture these ribs are expanded to form a row of raised nodules coronating the whorls; spiral sculpture absent on the spire but strong on the base and canal, 10 cords showing between the periphery and the end of the canal; aperture narrow, outer lip thin but probably not mature and without denticles or embayment at the suture, inner lip and columella smooth, with a raised edge. The type is a "dead shell," bleached a dull white but showing very faint indication of colored spiral bands. Dimensions of holotype: length, 8.5 mm.; diameter, 3.3 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, off Port Parker, Costa Rica, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., dredged in 12 fathoms (22 meters), shelly mud. Several additional specimens were taken at the type locality. On some specimens more than 10 spiral cords are present between the periphery and the end of the canal. 1 specimen was dredged at Station 192-D-1, 4 miles SSW. of Maldonado Point, Mexico, Lat. 16° 16' 30" N., Long. 98° 37' 00" W., 26 fathoms (47 meters), mud.

This new species bears some resemblance to *Anachis gracilis* C. B. Adams<sup>57</sup> but the presence of a subsutural cord and different color pattern easily serve to separate it from that species.

This species is named for Dr. Harald A. Rehder, Curator of Mollusks, U. S. National Museum.

Genus *Aesopus* Gould.

***Aesopus osborni* Hertlein & Strong, sp. nov.**

Plate XI, Fig. 2.

Shell minute, subcylindric, with a blunt, somewhat eroded apex; whorls 6, slightly convex, sutures distinct; sculpture of 22 low, rounded, nearly vertical, axial ribs with slightly wider interspaces; pale brownish with faint white dots on the tops of the ribs arranged in diagonal rows; aperture short, outer lip somewhat thickened, smooth within, columella short, smooth; canal short, straight, wide. The type measures: length, 3.0 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand and crushed shell.

As usual in this genus there is much difference in color among a number of specimens. Some are nearly white and do not show the diagonal rows of dots. Others are dark brown and show the dots very distinctly, the dark areas without magnification appearing as nodules on the ribs.

This species is named for Mr. Fairfield

<sup>57</sup> *Columbella gracilis* C. B. Adams, *Ann. Lyceum Nat. Hist. New York*, Vol. 5, June, 1852, pp. 313, 531 (separate, pp. 89, 307). "Habitat.—Panama."

Osborn, President of the New York Zoological Society.

Genus *Strombina* Mörch.

*Strombina marksi*

Hertlein & Strong, sp. nov.

Plate II, Fig. 7.

Shell small, slender, with a pointed spire, light brown with a few, small, irregular, white spots; nuclear whorls 2, smooth, well rounded, slightly larger than the following whorl; postnuclear whorls 9, slightly shouldered, flattened, the first 5 smooth; beginning with the sixth axial ribs begin to appear, becoming strong on the last two whorls, ribs rounded, strongest on the upper part of the whorls, fading out at the periphery, 9 appearing on the last whorl; spiral sculpture of about a dozen strong threads on the base and canal and a few microscopic striations on the shoulder of the whorls; aperture narrow; outer lip thick with a strong varix externally, internally smooth, shining, with a narrow depression just below the suture; inner lip raised, spreading into a thin callus over the body whorl; canal short, strongly recurved. The type measures: length, 23.8 mm.; maximum diameter, 9.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 136-D-4, Lat. 23° 32' 00" N., Long. 109° 27' 00" W., dredged in 55 fathoms (100 meters), on Arena Bank, Gulf of California, mud. One additional specimen was dredged at the same locality. Additional specimens were dredged in the Arena Bank area as follows: three specimens at Station 136-D-14, Lat. 23° 29' 30" N., Long. 109° 25' 00" W., dredged in 45 fathoms (82 meters), mud; two specimens at Station 136-D-15, Lat. 23° 28' 30" N., Long. 109° 25' 00" W., dredged in 40 fathoms (73 meters), mud, crushed shell; two specimens from Station 136-D-16, Lat. 23° 29' 30" N., Long. 109° 25' 30" W., dredged in 45 fathoms (82 meters), muddy sand, weed; one specimen at Station 136-D-17, Lat. 23° 30' 30" N., Long. 109° 26' 00" W., dredged in 45 fathoms (82 meters), mud.

The shell of this species bears some resemblance to that of *Strombina recurva* Sowerby<sup>58</sup> but the axial ribs do not rise to points at the periphery of the rounded whorls, the spiral sculpture on the spire is much fainter, the canal is less recurved and the color is lighter. Compared to *Strombina bonita* Strong & Hertlein<sup>59</sup>, the present shell has much shorter and less strongly developed axial ribbing. Compared to *Strombina carmencita* Lowe<sup>60</sup>, the shell of the present spe-

cies is much more slender and bears much fewer and weaker spirals.

*Strombina gradata* Guppy, described from the Bowden Miocene of Jamaica, bears a general similarity to *S. marksi*.

This species is named for Dr. Jay G. Marks, Paleontologist with the Creole Petroleum Corporation, Caracas, Venezuela, in recognition of his contribution to the knowledge of the family Cancellaridae.

*Strombinoturris* Hertlein & Strong, gen. nov.

Shell slender, turritid, with a thickened, varicose outer lip and a long, recurved canal, much the size and shape of the more slender species placed in the genus *Strombina*, but with the shallow depression on the inner portion of the outer lip near the suture shown on those species developed into a deep rounded notch. This notch is thickened and very similar to the anal sulcus in some species of *Clathrodrillia* but it is not armored. Type, *Strombinoturris crockeri* Hertlein & Strong, sp. nov.

*Strombinoturris crockeri*

Hertlein & Strong, sp. nov.

Plate I, Fig. 9.

Shell slender, turritid, dull brownish; nuclear whorls 2, smooth, shining, white; post-nuclear whorls 10, slopingly shouldered sutures appressed; axial sculpture on the spire consists of elongated nodules extending from the shoulder to the following suture, 13 appearing on the penultimate whorl, on the last whorl these form sharp nodules at the shoulder and narrower ribs extending to the canal; spiral sculpture of sharp threads, strong on the ribs, fainter in the interspaces, of which 2 appear on the first whorl, increasing to 5 on the penultimate, on the last whorl there are 26 between the shoulder and the end of the canal forming beaded nodules at their intersections with the axial ribs; aperture narrow; outer lip thickened externally by a strong varix, the edge slightly serrated by the spiral sculpture, with a deep, rounded, thick-edged notch just below the suture, the trace of which forms a narrow band in the suture roughened by the curved lines of growth; inner lip and body callus white, glazed, showing the continuation of the spiral threads and with a small callus pile opposite the notch; canal long, open, strongly recurved. The type measures: length, 43.2 mm.; diameter, 14.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 136-D-24, Arena Bank, Gulf of California, Lat. 23° 29' 00" N., Long. 109° 23' 30" W., dredged in 50 fathoms (91 meters), mud, *Arca* conglomerate. One additional specimen was taken at the type locality. About 15 additional specimens were dredged as follows: Mexico: Arena Bank, Gulf of California (136-D-4, 5, 9, 14, 16, 18, 24, 32), 33-55 fathoms (60-100 meters), mud, muddy sand, weed, *Arca* conglomerate; Santa Inz Bay, east coast of Lower California (142-D-3, 4), 40-50 fathoms (73-91

<sup>58</sup> *Columbella recurva* Sowerby, *Proc. Zool. Soc. London*, August 14, 1832, p. 115. "Hab. ad oras Americae Meridionalis. (Isle of Plata.)" "Found among coral sand at a depth of seventeen fathoms."—Sowerby, *Thes. Conch.*, Vol. 1, 1844, p. 139 bis, pl. 40 (*Columbella*, pl. 5), fig. 152.

<sup>59</sup> *Strombina bonita* Strong & Hertlein, *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 22, No. 6, December 31, 1937, p. 169, pl. 35, fig. 9. "dredged in 20 to 25 fathoms off Cape San Lucas, Lower California, Mexico."

<sup>60</sup> *Strombina carmencita* Lowe, *Trans. San Diego Soc. Nat. Hist.*, Vol. 8, No. 6, March 21, 1935, p. 21, pl. 3, fig. 1. "Carmen Island, Gulf of California, dredged 20 fathoms (1932)."

meters), sand, weed; Gorda Banks off southern end of Lower California (150-D-8), 40-45 fathoms (73-82 meters), muddy sand; Costa Rica: off Port Culebra (206-D-3), 14 fathoms (25.5 meters), sandy mud; 14 miles S. × E. of Judas Point (214-D-1, 4), 42-61 fathoms (76.5-112 meters), mud, rocks.

This species appears to be identical with the one collected by Hinds in the Bay of Panama and illustrated by Reeve under the name of *Pleurotoma stromboides* Sowerby<sup>61</sup>. However, Reeve's illustration apparently represents a different species than that originally illustrated by Sowerby<sup>62</sup> under the name of *Pleurotoma stromboides* without information as to the locality from which it came. This latter form appears to be the same or nearly the same shell named *Pleurotoma strombiformis* G. B. Sowerby<sup>63</sup> in 1839.

The Recent West American species is here assigned a new name, *Strombinoturris crockeri*, in honor of the late Templeton Crocker, owner of the yacht *Zaca* upon which the expedition was made during which the type of this new species was collected.

The combination of characters of the shell of this species are peculiar in that they are in part those of *Strombina* and in part those of *Clathrodrillia*. Probably a study of the anatomy of the animal will be required to determine the relationship. We place it provisionally in the Columbelloidea.

#### FAMILY MURICIDAE.

##### Genus *Pterynotus* Conrad.

##### Subgenus *Pteropurpura* Jousseaume.

##### *Pterynotus (Pteropurpura) swansonii*

Hertlein & Strong, sp. nov.

Plate II, Figs. 8, 12.

Shell trialate, yellowish-white; nuclear whorls more than 2, apparently smooth; postnuclear whorls 7, roundly shouldered; axial sculpture of 3 flattened, digitated varices between which are low, rounded knobs; spiral sculpture of a low rounded rib on the shoulder which is produced on the varices to long recurved digitations, slightly grooved on the face; on the base 2 similar, smaller spiral ribs are produced as shorter, recurved points; other spiral sculpture of fine striations most prominent on the back of the varices, the front of the varices showing fine fimbriations; aperture ovate with a projecting margin, slightly raised at the junction with the 3 spiral cords but without dentation; canal closed for about two-thirds of its length, curved to the right; operculum thin, brown. The type measures: length, 59 mm.; maximum diameter, including the varices, 49 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo.

Type Coll.), from Station 136-D-22, dredged on Arena Bank, Gulf of California, Lat. 23° 28' 30" N., Long. 109° 25' 00" W., in 45 fathoms (82 meters) mud. A second specimen was dredged at Station 142-D-3, in Santa Inez Bay, Gulf of California, Lat. 27° 04' 00" N., Long. 111° 54' 00" W., in 40 fathoms (73 meters), sand, weed. A juvenile specimen was dredged at Station 146-D-1, also in Santa Inez Bay, Lat. 26° 54' 20" N., Long. 111° 48' 45" W., in 35 fathoms (64 meters), mud, crushed shell.

The shell of this species is quite similar to that of *Pterynotus petri* Dall<sup>64</sup> from the coast of southern California. It differs in the fewer digitations which extend outward from the shoulder of the whorls rather than upward, also the surface is much smoother.

This species is named for Mr. George Swanson, artist on the expedition, 1936, during which the type specimen was collected.

Genus *Muricopsis* Bucquoy & Dautzenberg.  
*Muricopsis zefeki* Hertlein & Strong, sp. nov.

Plate II, Fig. 9.

*Murex aculeatus* Wood, Index Test., Suppl., 1828, pp. 15, 44, pl. 5, fig. 19. [No locality cited].

Not *Murex aculeatus* Lamarck, 1822.

*Murex dubius* Sowerby, Conch. Illustr., *Murex*, 1841, Cat., p. 8, pl. 61, fig. 23. "Panama. Mr. Cuming." New name for *Murex aculeatus* Wood, 1828, not *Murex aculeatus* Lamarck, 1822.—Reeve, Conch. Icon., Vol. 3, *Murex*, 1845, species 116, pl. 26, fig. 116. "Hab. Panama; Cuming."—Sowerby, Thes. Conch., Vol. 4, *Murex*, 1879, p. 43, pl. 403 (*Murex*, pl. 24), fig. 250. Panama.—Tryon, Man. Conch., Vol. 2, 1880, p. 109, pl. 29, fig. 266. Panama.

Not *Murex dubius* Dillwyn, Descript. Cat. Rec. Shells, Vol. 2, 1817, p. 716. "Inhabits—."

Type Locality: Panama City, Panama.

Range: Manzanillo, Mexico (Dall), to the Bay of Panama.

Collecting Stations: Mexico: Port Guatulco (195-D-15), 1.5 fathoms, coral; Costa Rica: Port Parker (203-D-4-15), 1-9 fathoms, sandy mud, cr. shell, shelly sand, algae, shelly mud, rocks, coral, gravel, mangrove leaves, also on beach; Potrero Grande Bay; Piedra Blanca Bay.

Description: Shell elongately ovate, spire rather acuminate, whorls angulated on upper portion, about 6-7 varices present, these where crossed by about 5-6 spiral threads, give rise to sharp spines, between these threads are fine spiral striae, the whole finely squamose; aperture elongately ovate, anterior canal short, slightly recurved, columella obliquely truncated at the base by the canal, often slightly nodose or subpiculate, outer lip strongly dentate within, the pos-

<sup>61</sup> *Pleurotoma stromboides* Sowerby, Reeve, Conch. Icon., Vol. 1, *Pleurotoma*, April, 1843, sp. 71, pl. 9, fig. 71. "Hab. Bay of Panama (found in mud at the depth of seven fathoms); Hinds."—Tryon, Man. Conch., Vol. 6, 1884, p. 176, pl. 10, fig. 58 (as *Drillia stromboides*).

<sup>62</sup> *Pleurotoma stromboides* Sowerby, Gen. Rec. and Foss. Shells, Vol. 2, [?] 1832, pl. 228, fig. 4.

<sup>63</sup> *Pleurotoma strombiformis* G. B. Sowerby, Jun., Conch. Man., 1839, p. 85, fig. 381.

<sup>64</sup> *Murex petri* Dall, *Nautilus*, Vol. 14, No. 4, August, 1900, p. 37. "San Pedro, in rather deep water."—Dall, Proc. U. S. Nat. Mus., Vol. 24, No. 1264, 1902, p. 532, pl. 34, fig. 7 (as *Murex (Pteropurpura) petri*). "San Pedro, California, in about 50 fathoms; Oldroyd." See also A. G. Smith in *Min. Conch. Club South. California*, No. 51, August, 1945, pp. 33-34.

terior denticles usually the largest; exterior whitish and brown, the spines and varices darkest, aperture bluish-white, columella sometimes with a brownish tinge on the anterior portion.

The largest specimen in the present collection from Port Parker, Costa Rica, measures: height, 22 mm.; maximum diameter, including spines, 13.3 mm.

The name *Murex dubius* which was applied to this species by Sowerby is not valid because that combination of names had already been applied to a different species by Dillwyn in 1817. We base the new name, *Muricopsis zeteki*, upon a specimen collected by Dr. James Zetek at Panama City, Panama, length, 27.3 mm.; maximum diameter including spines, 18.5 mm. This species is the one illustrated by Reeve (plate 26, fig. 116) from Panama. None of our specimens are as strongly spinose as shown for this species in the illustrations of Sowerby and Reeve. However, in other features they agree well. The subnodose or subpublicate character of the lower portion of the columella as well as the strongly dentate inner portion of the outer lip are quite unlike many shells referred to *Murex*. However, Tryon pointed out that the operculum is *Muricoid*. In some features the shell resembles some species of *Engina*.

*Muricopsis zeteki* differs from *M. squamulata* Carpenter<sup>65</sup> in the lower spire, more nodose or subpublicate lower portion of the columella, strongly dentate inner portion of the outer lip and in the darker color.

*Muricopsis paucillus* A. Adams<sup>66</sup> appears to be a similar species. According to Tryon's illustration and description of Adams' species it appears to possess a slightly more slender shell with shorter spines and the color was said to be purplish, the revolving ribs usually white.

*Distribution*: Three specimens, rather small, were dredged by the expedition at Port Guatulco, Mexico, in 1.5 fathoms. It also has been recorded as occurring in the Pleistocene of the Galapagos Islands.

#### Genus *Trophon* Montfort.

##### Subgenus *Zacatrophon*

Hertlein & Strong, subgen. nov.

Type: *Trophon (Boreotrophon) beebei* Hertlein & Strong, *Bull. South. Calif. Acad. Sci.*, Vol. 46, Pt. 2, May-August, 1947 (issued February 5, 1948), p. 80, pl. 18, figs. 1, 2 (on p. 79). Gorda Banks in the southern portion of the Gulf of California, dredged in 60 fathoms.

This subgenus is characterized by the loosely coiled, tabulate whorls which are comparatively smooth externally; sculptured

with faint spiral striae, strongest on the base, with somewhat stronger axial growth striae and with a row of sharp, erect, guttered spines on the angulation at the shoulder. Sometimes the spines are slightly extended anteriorly into short lamellae; aperture smooth interiorly; canal moderately long, broad, open; operculum muricoid.

##### Subgenus *Acanthotrophon*

Hertlein & Strong, subgen. nov.

Type: *Trophon (Acanthotrophon) sorenseni*

Hertlein & Strong, sp. nov.

The shells of this subgenus are rather thin, biconic in outline; spiral sculpture consisting of 2 or 3 rather weak, usually spinose cords below the shoulder on the body whorl and another one a little more prominent on the canal about halfway between the upper cords and the end of the canal; axial sculpture of weak axially elongated nodes which are developed into a row of sharp, erect, guttered spines on the angulation of the body whorl. The earlier whorls bear a row of nodes rather than spines. A slight siphonal fasciole is present; aperture smooth interiorly.

This subgenus is somewhat similar in general features to *Enixotrophon* Iredale<sup>67</sup> with the type *Trophon carduelis* Watson, an Australian species. *Actinotrophon* Dall<sup>68</sup> appears to belong to quite a different group than *Acanthotrophon*.

##### *Trophon (Acanthotrophon) sorenseni*

Hertlein & Strong, sp. nov.

Plate II, Fig. 1.

Shell thin, dingy white; only the last whorl of the nucleus remaining, apparently smooth; postnuclear whorls 6, angulated, sculptured with axially elongated nodes on the upper whorls which on the last whorl are produced into 10 narrow, radial, guttered spines; spiral sculpture consists of 2 faint cords immediately below the shoulder and a third, slightly more prominent, about half way between the upper cords and the end of the canal; aperture ovate; canal narrow, open, distinctly recurved; outer lip thin; inner lip appressed to the base, the enamel terminating some distance from the end of the canal, leaving an umbilical chink. The type measures: length, 31 mm.; length of aperture and canal, 19 mm.; maximum diameter (not including spines), 14 mm.

Holotype (Calif. Acad. Sci. Dept. Paleol. Type Coll.), from Station 150-D-24, Lat. 23° 01' 00" N., Long. 109° 29' 00" W., dredged on Gorda Banks, southern portion of the Gulf

<sup>65</sup> *Muricidea dubia* var. *squamulata* Carpenter, *Proc. Zool. Soc. London*, March 14, 1865, p. 281. Reprint in *Smithson. Miscell. Coll.*, No. 252, 1872, p. 274. "Hab. Cape St. Lucas (Xantus)."—M. Smith, *Illustr. Cat. Rec. Spec. Rock Shells (Trop. Labor., Lantana, Florida)*, 1939, p. 11, pl. 12, fig. 6 (as *Muricidea dubius squamulata* Carpenter and *Muricidea squamulifera* Pfeiffer).

<sup>66</sup> *Murex paucillus* A. Adams, *Proc. Zool. Soc. London* for 1853, p. 71 (issued July 25, 1854). "Hab. Gulf of California."—Tryon, *Man. Conch.*, Vol. 2, 1880, p. 109, pl. 29, fig. 264. "Mazatlan." Mexico.

<sup>67</sup> *Enixotrophon* Iredale, *Rec. Australian Mus.*, Vol. 17, No. 4, September 4, 1929, pp. 185, 189. "type *Trophon carduelis* Watson." (See *Rept. Sci. Res. Voy. Challenger. Zool.*, Vol. 15, 1886, *Gastropoda*, p. 167, pl. 10, fig. 7. Dredged off Sydney, Australia, in 410 fathoms).

<sup>68</sup> *Actinotrophon* Dall, *Proc. U. S. Nat. Mus.*, Vol. 24, No. 1264, March 31, 1902, p. 541. Sole species *Boreotrophon actinophorus* Dall (*Bull. Mus. Comp. Zool.*, Vol. 18, June, 1889, p. 206, pl. 15, fig. 2. Caribbean region, off Santa Cruz in 248 fathoms; off Martinique in 170 fathoms; near Barbados in 140 fathoms.)

of California, in 60 fathoms (109 meters), sand, calcareous algae.

The interior of the unique type has the appearance of a fresh shell but the exterior appears weathered and worn. Spines may have been present originally on the upper whorls.

This new species bears some resemblance to "*Murex*" *carduus* Broderip<sup>69</sup> originally described from Pacasmayo, Peru, but it has but a slight umbilical groove, the canal is more elongate, much more pointed, and it lacks the numerous spiral rows of spines on the body whorl and canal which are so prominent on Broderip's species. The shell is similar in shape to *Trophon avalonensis* Dall<sup>70</sup>, described from off Avalon, Catalina Island, California, but is larger, lacks the varicose lamellae present on that species and the spines are longer and narrower.

This species is named for Mr. Andrew Sorensen of Pacific Grove, California, who has assiduously collected marine mollusks in the Gulf of California.

#### Genus *Calotrophon*

Hertlein & Strong, gen. nov.

Type: *Calotrophon bristolae*

Hertlein & Strong, sp. nov.

Shell subfusiform, whorls subangulated, sculptured with rounded axial ribs which begin at the angulation and extend to the following suture on the spire, to the base on the body whorl; spiral sculpture of rather coarse cords, the first one, beginning at the angulation, forms low vaulted scales where it crosses the axial ribs, the remainder are squamosely scaly; outer lip with spirally elongated denticles; canal short, open, somewhat recurved at the end, a well developed siphonal fasciole present.

The very strong axial ribs with vaulted scales at the angulation, strong spiral cords and dentate interior of the outer lip are features separating this genus from *Boreotrophon*.

The scaly sculpture of the spiral ribs of this genus is somewhat reminiscent of *Xenotrophon* Iredale<sup>71</sup> with the type *X. euschema*, an Australian species.

*Benthoxystus* Iredale<sup>72</sup> with the type *Trophon columnarius* Hedley & May, has

sculpture somewhat lattice-like in pattern vaguely resembling that of *Trophon boivini* Kiener, 1843 (*Murex horridus* Broderip, 1833, not of Brocchi, 1814). *Trophon columnarius* has, however, a very high spire and differs in other details from the west American shell.

#### *Calotrophon bristolae*

Hertlein & Strong, sp. nov.

Plate II, Fig. 2.

Shell fusiform, white, fairly thick; nuclear whorls decollated; postnuclear whorls 7, slopingly shouldered; axial sculpture consisting of nearly vertical, rounded ribs, extending from the shoulder to the following suture on the spire and becoming slightly less strong over the base, 10 present on the last whorl; spiral sculpture consists of a cord on the shoulder which rises to small, vaulted scales where it rides over the ribs, followed by 2 similar, smoother cords between the shoulder and the suture on the spire and 6 more on the base and canal; all spiral cords show a tendency to form vaulted scales, both on crossing the ribs and in the interspaces, particularly in the area immediately back of the edge of the outer lip; aperture ovate, thin at the edge, thickened within where it bears 5 spirally elongate denticles; canal short, open, slightly recurved; inner lip appressed to the base except at the lower end where it bounds a distinct siphonal fasciole. The type measures: length, 39 mm.; length of aperture and canal, 22 mm.; maximum diameter, 20 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo, Type Coll.), from Station 150-D-24, Lat. 23° 01' 00" N., Long. 109° 29' 00" W., dredged on Gorda Banks in the southern portion of the Gulf of California in 60 fathoms (109 meters), sand, calcareous algae. 1 additional specimen was taken at the type locality. Several specimens were dredged in the vicinity of the type locality as follows: 1 at Station 150-D-6, in 60 fathoms (109 meters), muddy sand, rocks; 2 at Station 150-D-13, in 70-80 fathoms (128-146 meters), sand, calcareous algae; 6 at Station labeled 150-D-27 but that haul number is erroneous because no haul with that number was recorded from Station 150.

The general features of this species are somewhat similar to those of *Trophon boivini* Kiener<sup>73</sup> (*Murex horridus* Broderip<sup>74</sup>, 1833, not *Murex horridus* Brocchi, 1814), which was originally described from Ecuador and Panama. The present shell differs in that the spiral cords are much more closely

<sup>69</sup> *Murex carduus* Broderip, *Proc. Zool. Soc. London* for 1832, p. 175 (issued January 14, 1833). "Hab. in oceano juxta Pacasmayo Peruviae." "From a coral reef twelve miles from the land, at the depth of twenty-five fathoms."—Reeve, *Conch. Icon.*, Vol. 3, *Murex*, 1845, sp. 125, pl. 28, fig. 125.

<sup>70</sup> *Boreotrophon avalonensis* Dall, *Proc. U. S. Nat. Mus.*, Vol. 24, No. 1264, March 31, 1902, p. 546. "Dredged off Avalon, in the Santa Barbara channel, California, by the U. S. Fish Commission steamer *Albatross*, at station 3664, in 80 fathoms, sand, bottom temperature 50° F.; U. S. N. M., 109109."—Dall, *U. S. Nat. Mus.*, *Bull.* 112, 1921, p. 110, pl. 8, fig. 8 (as *Neptunea avalonensis*).

<sup>71</sup> *Xenotrophon* Iredale, *Rec. Australian Mus.*, Vol. 17, No. 4, September 4, 1929, pp. 184, 189. "Type *Xenotrophon euschema* Iredale," p. 184, pl. 40, fig. 3. "Type trawled off Montague Island, New South Wales, 50-60 fathoms."

<sup>72</sup> *Benthoxystus* Iredale, *Rec. Australian Mus.*, Vol. 17, No. 4, September 4, 1929, pp. 185, 189. "type *Trophon columnarius* Hedley & May. (See *Rec. Australian Mus.*, Vol. 7, No. 2, September 11, 1908, p. 121, pl. 24, fig. 22. Dredged 7 miles East of Cape Pillar, Tasmania, in 100 fathoms.

<sup>73</sup> *Murex boivini* Kiener, *Spéc. Gén. et Icon. Coq. Viv.*, *Fam. Canalifères, Murex*, 1843, p. 81, pl. 43, fig. 2. "Habite."

<sup>74</sup> *Murex horridus* Broderip, *Proc. Zool. Soc. London* for 1832, p. 176 (issued January 14, 1833). "Hab. ad Sanctam Elenam et ad Panamam." "Found in sandy mud at the depth of from eight to twelve fathoms."—Reeve, *Conch. Icon.*, Vol. 3, *Murex*, 1845, species 128, pl. 28, fig. 128. Original locality cited.

The combination of names *Murex horridus* used by Broderip in 1833 had already been used by Brocchi in 1814. The specific name *boivini* of Kiener thus becomes applicable to the species described by Broderip.

spaced, not forming a latticed pattern, and the interspaces are not striated as in Broderip's species. The spiral cords on this new species are often somewhat irregularly spaced and occasionally a small spiral thread occurs between the major cords, especially on the upper portion of the whorl just below the shoulder.

This species is named for Miss Viola Bristol, Curator of Mollusks, San Diego Society of Natural History.

Superfamily Ptenoglossa.

FAMILY EPITONIDAE.

Genus *Epitonium* Bolten.

Subgenus *Asperiscala* De Boury.

*Epitonium (Asperiscala) vivesi*

Hertlein & Strong, sp. nov.

Plate III, Fig. 11.

Shell small, thin, pure white; nuclear whorls 3, well rounded, smooth; postnuclear whorls 8, well rounded with deep sutures, regularly increasing in size; axial sculpture of 7 strong, varicose ribs, continuous up the spire about which they make nearly a full turn, strongly reflected, exposing the edges of the cell-structure as axial striations, forming long, curved, coronating points at the shoulder, beyond which they dip concavely into the sutures; spiral sculpture of numerous fine, distant striations which are distinct on the upper whorls but gradually fade out until on the last whorl they are scarcely discernible; ribs continuous over the base without cord or disk, fusing with the raised inner lip; aperture nearly circular, the outer and basal lips thickened by the last varicose rib. The type measures: length, 7.0 mm.; maximum diameter, 3.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 145-D-1-3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., off San Domingo Point, Santa Inez Bay, Gulf of California, dredged in 4-13 fathoms (7.5-24 meters), sand. 5 additional but younger specimens were dredged at the same locality.

The strongly coronating points and fewer varicose ribs of this species make it quite distinct from any west coast species described in the subgenus *Asperiscala*. *Epitonium (Nitidiscala) apiculatum* Dall<sup>75</sup> is about the same size and shape for the same number of whorls and has about the same number of varicose ribs, but it lacks the spiral sculpture and the ribs are more erect with less coronation.

This species is named for Mr. Gastón J. Vives, native of La Paz, Lower California, who developed a method for cultivating the West American pearl oyster, *Pinctada mazatlanica*.

<sup>75</sup> *Epitonium apiculatum* Dall, *Proc. U. S. Nat. Mus.*, Vol. 53, No. 2217, August 10, 1917, p. 480. "Range, Lower California to Panama Bay, in 30 fathoms."—Baker, Hanna & Strong, *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 19, No. 5, 1930, p. 51, pl. 3, figs. 4, 5, 6 (as *Epitonium (Nitidiscala) apiculatum*).

*Epitonium (Asperiscala) manzanillense*

Hertlein & Strong, sp. nov.

Plate III, Fig. 13.

Shell small, pure white, broadly conic; nuclear whorls 4, smooth, elevated, horn-colored, separated from the first postnuclear whorl by a sharp line; postnuclear whorls 5, well rounded, separated by a deep suture, rapidly increasing in size; axial sculpture of 16, thin, erect, sharp edged varices, without spine or angulation, curving into the suture where they meet and fuse, continuous over the spire which they about half encircle, on the imperforate base continuing without change to the edge of the columellar lip; spiral sculpture of raised threads in the interspaces between the varices, about 12 appearing on the last whorl; aperture nearly circular with a broad outer lip slightly expanded anteriorly. The type measures: length, 3.7 mm.; diameter, 1.4 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 184-D-2, Lat. 19° 04' 00" N., Long. 104° 22' 00" W., near Manzanillo, Mexico, dredged in 30 fathoms (55 meters), gravelly sand.

In shape and sculpture this shell resembles *Epitonium (Asperiscala) bellastratum* Carpenter from the California coast but is smaller for the same number of whorls and lacks the coronation of the varices and umbilicus of that species. The unique specimen is probably not mature.

*Epitonium (Asperiscala) walkerianum*

Hertlein & Strong, sp. nov.

Plate III, Fig. 12.

Shell small, pure white, elongate-conic; nuclear whorls 4, smooth, white, forming an elevated spiral point to the shell without noticeable break in the outline; postnuclear whorls 5, rounded, separated by a distinct but rather shallow, rounded suture; axial sculpture of 20 low, rounded ribs, without spine or angulation, curving into the sutures where they meet and fuse, continuous over the spire which they nearly encircle, on the imperforate base continuing without change to the edge of the columellar lip; spiral sculpture of sharp, incised lines in the interspaces between the axial ribs, about 12 appearing on the last whorl; aperture nearly circular, with the outer lip but little thickened and narrower than the columellar lip. The type measures: length, 3.7 mm.; diameter, 1.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves. Additional specimens were collected in beach drift at Corinto.

*Epitonium (Asperiscala) onchodes* Dall<sup>76</sup>, from Panama Bay in 62 fathoms, seems from the description to be a somewhat similar

<sup>76</sup> *Epitonium (Asperiscala) onchodes* Dall, *Proc. U. S. Nat. Mus.*, Vol. 53, No. 2217, August 10, 1917, p. 476. "Range, Panama Bay in 62 fathoms, sand."

shell but the sutures are said to be deep and the base minutely perforate.

This species is named for William Walker, one time president of Nicaragua.

Subgenus *Cirsotrema* Mörch.

*Epitonium (Cirsotrema) togatum*

Hertlein & Strong, sp. nov.

Plate III, Figs. 1, 5.

Shell of medium size, with a slender, turritid spire, dingy white; nuclear and probably the first 1 or 2 postnuclear whorls lost; remaining whorls 10, narrowly tabulated, with deep sutures, regularly increasing in size, the upper whorls with the sculpture much worn; axial sculpture of (on the last whorl 20) retractive, strongly reflected ribs, continuous from suture to suture, of which every fourth, fifth or sixth is swollen to form a strong varix; spiral sculpture of 7 cords in the interspaces between the axial ribs and numerous fine striae; the reflected faces of the varices with close, wavy, axial striae, that of the intermediate axial ribs below the slightly coronated shoulder with 3 or more sharp, wavy, axial laminae, the points of which correspond to the spiral cords, and in some cases span the interspaces between the axial ribs; base with a strong spiral cord forming a narrow basal disk, the axial ribs expanded on the cord but become narrow where they fuse with the inner lip; aperture circular, the outer and basal lip thickened by the last varix. The type measures: length, 37.5 mm.; maximum diameter, including the varices, 13.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleont. Type Coll.), from Station 150-D-19, Lat. 23° 01' 00" N., Long. 109° 27' 30" W., Gorda Banks, Gulf of California, dredged in 50 fathoms (91 meters), sand. A second specimen was secured at the same locality.

Two specimens, apparently the same species although varying somewhat from the type specimen, were taken, one at Station 184-D-2, Lat. 19° 04' 00" N., Long. 104° 22' 00" W., near Manzanillo, Mexico, dredged in 30 fathoms (55 meters), gravelly sand, and one at Station 214-D-1-4, Lat. 9° 19' 32" N., Long. 84° 29' 30" W., to Lat. 9° 17' 40" N., Long. 84° 27' 30" W., 14 miles S. × E. of Judas Point, Costa Rica, dredged in 42-61 fathoms (76.5-112 meters), mud, shell, rocks.

The shell of this species appears to be quite distinct from any other known from the west coast. It is quite similar to the shell illustrated by Dall<sup>77</sup> under the name of *Scala (Cirsotrema) cochlea* Sowerby from the northern part of the Gulf of Mexico, but is more slender, with more numerous axial ribs. The figure of "*Scalaria*" *cochlea* Sowerby<sup>78</sup>, a species said to have come from Loanda, West Africa, is more slender than our shell,

<sup>77</sup> *Scala (Cirsotrema) cochlea* Sowerby, Dall, *Proc. U. S. Nat. Mus.*, Vol. 24, No. 1264, 1902, p. 506, pl. 30, fig. 7. Gulf of Mexico. Also cited from the West Indies and off Cape Hatteras, North Carolina, and near Cedar Keys, Florida.

<sup>78</sup> *Scalaria cochlea* Sowerby, *Thes. Conch.*, Vol. 1, *Scalaria*, p. 103 bis, pl. 35, fig. 142, April 11, 1844. "From Loanda, West coast of Africa."

with more rounded whorls. Two west American species referred to *Cirsotrema* do not appear to belong to that subgenus. *Scala (Cirsotrema) montereyensis* Dall<sup>79</sup> is the young of a typical *Opalia* and the unfigured *Cirsotrema funiculata* Carpenter<sup>80</sup> also appears to be an *Opalia* according to the description.

Subgenus *Nitidiscala* De Boury.

*Epitonium (Nitidiscala) oerstedianum*

Hertlein & Strong, sp. nov.

Plate III, Fig. 10.

Shell small, short, white, with the whorls rapidly increasing in size; nuclear whorls 4, smooth, well rounded, with a narrow brown line in the sutures; postnuclear whorls 6, swollen, with very deep sutures; axial sculpture of 7 high, somewhat reflected, varicose ribs, with finely striated anterior faces, continuous up the spire, about which they make nearly two-thirds of a turn; at the shoulder of the whorls the ribs are expanded to form broad, coronating points, beyond which they dip concavely toward the suture, which they span to fuse with the corresponding rib on the preceding whorl, leaving deep pits in the suture; ribs continuous over the base and fusing with the expanded inner lip; spiral sculpture absent; aperture nearly circular, a broad margin formed by the last rib, produced at the shoulder and at the junction of the basal and inner lips. The type measures: length, 6.5 mm.; maximum diameter, 4.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleont. Type Coll.), from Station 145-D-1-3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., off San Domingo Point, Santa Inez Bay, Gulf of California, dredged in 4-13 fathoms (7.5-24 meters), sand.

In many ways the unique type agrees with the description of the unfigured *Epitonium bialatum* Dall<sup>81</sup> but is less than half the length for the same number of whorls and has an entirely different nucleus.

This species is named for Dr. Anders Sandoe Oersted, Danish botanist, whose collection of mollusks from the west coast of Central America in 1847 was described by Dr. O. A. L. Mörch.

*Epitonium (Nitidiscala) durhamianum*

Hertlein & Strong, sp. nov.

Plate III, Fig. 9.

Shell small, elongate-conic, white; nuclear whorls 4, pale horn color, smooth, forming an elevated spiral point to the spire without noticeable break to the outline; postnuclear whorls 7, the upper third of each whorl

<sup>79</sup> *Scala (Cirsotrema) montereyensis* Dall, *Nautilus*, Vol. 20, No. 11, March, 1907, p. 128. "Dredged in 25 fathoms mud, off Del Monte, in Monterey Bay, Cala." Keen has pointed out that this species should take the name *Epitonium regiomontanum* Dall in De Boury (See *Min. Conch. Club. South. Calif.*, No. 52, September, 1945, p. 31).

<sup>80</sup> "*Cirsotrema funiculata*, ? n. s.," Carpenter, *Cat. Mazatlan Shells*, January, 1857, p. 447. "Hab.-Mazatlan; 2 sp. only." Also cited from Panama.

<sup>81</sup> *Epitonium bialatum* Dall, *Proc. U. S. Nat. Mus.*, Vol. 53, No. 2217, August 10, 1917, p. 485. "Range, Gulf of California, near La Paz, in 10 fathoms, and West Mexico."

broadly, slopingly shouldered, the lower third well rounded, separated by a moderately deep suture; axial sculpture of 16 low, narrow, slightly reflected ribs, without spine or angulation, curving into the sutures where they meet and fuse, continuous over the spire which they nearly encircle, on the imperforate base continuing without change to the columellar lip; spiral sculpture absent; aperture oval, outer and columellar lips only moderately thickened. The type measures: length, 5.7 mm.; diameter, 1.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), bottom of mangrove leaves. Additional specimens were collected in beach drift at Corinto.

The sloping shoulder on the whorls of this species would seem to be a distinct character separating it from all species described from the west coast of approximately this size and with approximately this number of varices.

This species is named for Dr. J. Wyatt Durham, Associate Professor of Paleontology, University of California, Berkeley, California.

Subgenus *Punctiscala* De Boury.

*Epitonium (Punctiscala?) colimanum*

Hertlein & Strong, sp. nov.

Plate III, Fig. 14.

Shell small, elongate-conic, white; nuclear whorls with the tip broken, the two remaining whorls well rounded, rapidly enlarging, the first smooth, the second axially threaded; postnuclear whorls 6, well rounded, separated by a deep suture; axial sculpture of 10 strong, somewhat retractive, rounded ribs which hardly touch in the sutures where they alternate in most cases, interspaces rounded, wider than the ribs; base forming a distinct disk at the upper edge of which both ribs and interspaces terminate; entire surface with fine, wavy, spiral striations which continue over the tops of the ribs and show on the basal disk where they extend to the umbilical region; aperture round, outer lip thickened by the last rib, forming a flattened face with a slightly raised inner edge, columellar lip similarly raised but not as wide as the outer lip. The type measures: length, 7.6 mm.; diameter, 2.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 184-D-2, Lat. 19° 04' 00" N., Long. 104° 22' 00" W., near Manzanillo, Mexico, dredged in 30 fathoms (55 meters), gravelly sand.

The shell of this species differs from that of *Epitonium carpenteri* Tapparone-Canefri<sup>82</sup>, from the Gulf of California, in that it possesses 10 rather than 8 axial ribs.

Subgenus *Sthenorytis* Conrad.

*Epitonium (Sthenorytis) paradisi*

Hertlein & Strong, sp. nov.

Plate III, Fig. 7.

Shell turbinate, pure white; nuclear whorls and first 2 postnuclear whorls lost; remaining whorls 6, rapidly enlarging, well rounded, sutures deep; axial sculpture of varicose ribs, erect on the upper whorls, somewhat reflected on the lower whorls, expanded to form coronating points on the shoulder, depressed in the suture and confluent near the aperture, with axial striations on the faces; of these ribs there are 6 on the upper whorls and 10 on the last whorl, in general continuous up the spire about which they make nearly a full turn, the increasing number of ribs occurring as occasional splits in the sutures; aperture round, with a broad face except for a short distance along the body of the whorl; at the lower end of the columella the lip is somewhat depressed and expanded but not forming a basal disk. The type measures: length, 35 mm.; maximum diameter, including varicose ribs, 26.5 mm., not including ribs, 18 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 150-D-13, Lat. 23° 01' 00" N., Long. 109° 27' 30" W., Gorda Banks, Gulf of California, dredged in 70-80 fathoms (128-146 meters), sand, calcareous algae. A second specimen was dredged at the same locality. One specimen, somewhat eroded, was taken at Station 136-D-13, Lat. 23° 29' 00" N., Long. 109° 24' 00" W., Arena Bank, dredged in 45 fathoms (82 meters), mud, *Arca* conglomerates.

In many ways this species resembles *Epitonium (Sthenorytis) turbinum* Dall<sup>83</sup>, known only by the basal whorl of a specimen dredged off the Galapagos Islands. The more erect form, less oblique aperture and different shape of the varicose axial ribs indicate that the present specimens represent a distinct species. *Epitonium (Sthenorytis) pernobilis* Fischer & Bernardi<sup>84</sup>, an Atlantic species, is very similar to *E. paradisi*.

Superfamily Gymnoglossa.

FAMILY EULIMIDAE.

Genus *Balcis* Leach.

Subgenus *Balcis* s.s.

*Balcis (Balcis) corintonis*

Hertlein & Strong, sp. nov.

Plate VI, Fig. 1.

Shell minute, elongate-conic, slender, straight, translucent, white; whorls 8, slightly rounded, in places showing strong lines of growth, in other places wide smooth areas resembling varices but not raised; sutures

<sup>83</sup> *Epitonium (Sthenorhytis) turbinum* Dall, *Bull. Mus. Comp. Zool.*, Vol. 43, No. 6, October, 1908, p. 317, pl. 9, figs. 5, 6, 8. From "four miles S. 41° E. from the east point of Hood Island, Galapagos Islands, in 300 fathoms, broken shell, bottom temperature 48.6° F".

<sup>84</sup> See Clench, W. J., and Turner, R. D., *Johnsonia*, Vol. 2, No. 29, September 30, 1950, p. 224, pl. 97, figs. 1-7. Range, North Carolina south through the Lesser Antilles.

<sup>82</sup> *Scalaria carpenteri* Tapparone-Canefri, *Journ. de Conchyl.*, Vol. 24, No. 2, 1876, p. 154. New name for *Scalaria varicostata* Carpenter (Cat. Mazatlan Shells, January, 1857, p. 447. "Hab.-Mazatlan; 1 sp. off Chama."). Not *Scalaria varicostata* Wood, 1828.



quite distinct; periphery rounded, base somewhat produced; aperture large, oval, outer lip produced in the middle, inner lip short, reflected and closely appressed to the base, parietal wall with a slight callus. The type measures: length, 1.9 mm.; diameter, 0.7 mm. The specimen is probably not fully mature.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, in 12-13 fathoms (22-24 meters), mangrove leaves. About a half dozen additional specimens, some of them somewhat worn, were dredged at the type locality.

The shell of this new species is exceedingly slender in comparison to that of somewhat similar species such as *Balcis solitaria* C. B. Adams<sup>85</sup>.

#### Subgenus *Vitreolina* Monterosato.

##### *Balcis (Vitreolina) drangai*

Hertlein & Strong, sp. nov.

Plate VI, Fig. 2.

Shell small, elongate-conic, white, doubly flexed, almost the entire shell curved strongly to the right, the tip bent forward; whorls 11, the first 3 slightly rounded, the rest flattened; sutures rather distinct but with the preceding whorls shining through in some lights, giving the appearance of a false suture; periphery rounded, base moderately produced, slightly rounded; aperture small, ovate, outer lip fairly thick, produced in the middle, inner lip short, reflected and appressed to the base, parietal wall with a moderate callus. The type measures: length, 3.3 mm.; diameter, 1.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, in 7 fathoms (12.6 meters), gr. sand, crushed shell. Four additional specimens, slightly worn, were dredged at the type locality.

The shell of this species is considerably wider in proportion to the height in comparison with that of *Balcis taravali* Bartsch<sup>86</sup> which is exceedingly slender.

This species is named for Mr. Ted Dranga of Miami, Florida, a well known collector of marine mollusks.

#### FAMILY PYRAMIDELLIDAE.

##### Genus *Turbonilla* Risso.

##### Subgenus *Bartschella* Iredale.

##### *Turbonilla (Bartschella) vestae*

Hertlein & Strong, sp. nov.

Plate VI, Fig. 4.

Shell elongate-ovate, white; nucleus large, having a depressed helicoid spire, with the

axis forming an oblique angle with that of the following whorls, in the first of which it is about one-half immersed; normal whorls 7, strongly, slopingly shouldered, flattened below the shoulder angle; axial ribs straight, slightly retractive, 18 appearing on the first whorl, increasing to 24 on the last whorl; interspaces wider than the ribs, crossed by 5 spiral series of pits, the raised areas between which appear as wider, flat-topped cords, of which the one at the shoulder angle is somewhat sharper than the others and forms small tubercles at the intersection with the axial ribs; periphery rounded, marked by a cord similar to those on the spire; base rounded, with 6 spiral cords of which the upper two are interrupted by the enfeebled extensions of the axial ribs; aperture ovate, outer lip thin, columella curved, not raised. The type measures: length, 3.1 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

This species bears a resemblance to *Turbonilla (Bartschella) hipolitensis* Dall & Bartsch<sup>87</sup> but it differs from that species in possessing tuberculate spiral cords at the shoulder of the whorls.

The specific name of this species is derived from that of the brig *Vesta* on which William Walker and his 58 "immortals" sailed to Realejo, Nicaragua, in 1855.

#### Subgenus *Careliopsis* Mörch.

##### *Turbonilla (Careliopsis) beltiana*

Hertlein & Strong, sp. nov.

Plate VI, Fig. 3.

Shell elongate-conic, slender, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is slightly immersed; normal whorls 7, slightly rounded, somewhat contracted just below the suture, the first nearly smooth, the rest with microscopic spiral threads of which 8 appear on the first whorl, increasing to 14 on the last whorl; axial sculpture of very fine lines which render the spiral threads slightly granular and the interspaces with faintly indicated pits; periphery rounded, without definite markings; base rather long, rounded, with 8 spiral threads similar to those on the spire; aperture ovate, outer lip thin, columella short, curved. The type measures: length, 3.2 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from beach drift at Corinto, Nicaragua.

The shell of this species differs from that of *Turbonilla (Careliopsis) stenogyra* Dall & Bartsch<sup>88</sup> in that the spiral sculpture con-

<sup>85</sup> *Eulima solitaria* C. B. Adams, *Ann. Lyceum Nat. Hist. New York*, Vol. 5, July, 1852, pp. 423, 542 (separate pp. 199, 318). "Taboga" Island, Panama. "On Holothuridae."—Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 53, No. 2207, 1917, p. 308, pl. 35, fig. 4 (as *Melanella (Melanella) solitaria*).

<sup>86</sup> *Melanella (Balcis) taravali* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 53, No. 2207, August 13, 1917, p. 328, pl. 42, fig. 2. "Point Abrejos, Lower California."

<sup>87</sup> *Turbonilla (Dunkeria) hipolitensis* Dall & Bartsch, *U. S. Nat. Mus.*, Bull. 68, December 13, 1909, p. 123, pl. 12, figs. 8, 8a. "From San Hipolito Point, Lower California."

<sup>88</sup> *Turbonilla (Careliopsis) stenogyra* Dall & Bartsch, *U. S. Nat. Mus.*, Bull. 68, December 13, 1909, p. 130, pl. 12, figs. 1, 1a. "San Hipolito Point, Lower California."

sists of finely granular threads rather than of a series of impressed pits.

This species is named for Thomas Belt, author of *The Naturalist in Nicaragua*.

Subgenus *Chemnitzia* d'Orbigny.

*Turbonilla (Chemnitzia) nicarasana*

Hertlein & Strong, sp. nov.

Plate VI, Fig. 8.

Shell elongate-conic, white; nucleus having an elevated spire with the axis at right angles to that of the following whorls, the tip extending slightly beyond the edge of the first whorl, in which it is about one-third immersed; normal whorls 11, moderately rounded; axial ribs rounded, slightly curved, strongly protractive; interspaces smooth, about twice as wide as the ribs, terminating a little above the periphery, leaving a narrow smooth band in the suture; periphery subangulated, base short, rounded; aperture subquadrate, outer lip thin, columella nearly straight, somewhat reflected over the umbilical area. The type measures: length, 5.2 mm.; diameter, 1.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

The shell of this species differs from that of *Turbonilla (Chemnitzia) sinaloana* Strong<sup>89</sup> in that the periphery of the body whorl is subangulated rather than well rounded.

The specific name of this species is derived from that of Nicaras, a powerful Cholutec Chief in Nicaragua.

Subgenus *Cingulina* A. Adams.

*Turbonilla (Cingulina) realejoensis*

Hertlein & Strong, sp. nov.

Plate V, Fig. 2.

Shell small, elongate-conic, vitreous, nucleus deeply, obliquely immersed in the first of the following whorls above which only the tilted edge appears; normal whorls 6, with the greatest diameter at about the lower third where they are angulated, almost flat above and below the angle; spiral sculpture of a low cord just below the suture and a second on the angle, bounded by shallow grooves; entire surface with microscopic spiral lines; axial sculpture of faint indications of ribs, most noticeable on the upper whorls, and very fine lines of growth; periphery rounded, without definite marking; base rather long, well rounded, marked with numerous microscopic spiral striations and stronger lines of growth; aperture ovate, outer lip thin, showing the spiral cord within, columella very slender. The type measures: length, 2.7 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Corinto, Nicaragua, collected in beach drift.

The shell of this species differs from that of *Turbonilla (Cingulina) academica* Strong & Hertlein<sup>90</sup> in that the penultimate whorl is sculptured with 2 rather than 3 spiral cords.

Subgenus *Mormula* A. Adams.

*Turbonilla (Mormula) guatulcoensis*

Hertlein & Strong, sp. nov.

Plate VI, Fig. 9.

Shell elongate-conic, light brown; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-half immersed; normal whorls 8, narrowly shouldered, well rounded, with here and there slight varicose swellings; axial ribs low, irregular, sinuous, somewhat retractive, 24 appearing on the first whorl, increasing to about 40 on the last whorl; interspaces varying in width, crossed by numerous fine, incised spiral lines; periphery without definite markings, base produced, the axial ribs fading out in the umbilical region, with spiral sculpture similar to that on the spire except that on the lower half the incised spiral lines continue over the enfeebled axial ribs; outer lip decidedly thickened, aperture oval, columella short, strongly curved, body with a distinct callus. The type measures: length, 5.9 mm.; diameter, 1.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Gualtulo, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

The shell of this species differs from that of *Turbonilla (Mormula) coyotensis* Baker, Hanna & Strong<sup>91</sup> in that the base is produced rather than short.

Subgenus *Ptycheulimella* Sacco.

*Turbonilla (Ptycheulimella) portoparkerensis*

Hertlein & Strong, sp. nov.

Plate VI, Fig. 10.

Shell elongate-conic, very slender, pale brown; nucleus and several of the upper whorls decollated; axial ribs faint, irregular and irregularly spaced, entire surface with incised spiral lines, about 20 on each whorl; periphery subangulated, base short, with incised spiral lines similar to those on the spire; aperture subquadrate, outer lip thin, columella short, straight, somewhat reflected. The remaining whorls of the type measure: length, 7.3 mm.; diameter, 1.4 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat 10° 55' 45" N., Long. 85° 49' 05" W., near Port

<sup>89</sup> *Turbonilla (Cingulina) academica* Strong & Hertlein, Allan Hancock Pac. Exped., Vol. 2, No. 12, August 21, 1939, p. 205, pl. 19, fig. 14. "dredged in from 3 to 9 fms. in Bahía Honda, Panama."

<sup>91</sup> *Turbonilla (Mormula) coyotensis* Baker, Hanna & Strong *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 17, No. 7, June 29, 1928, p. 223, pl. 11, fig. 17. "Coyote Bay, Concepcion Bay, Lower California, in about two fathoms."

<sup>89</sup> *Turbonilla (Chemnitzia) sinaloana* Strong, *Bull. South. Calif. Acad. Sci.*, Vol. 48, Pt. 2, May-August (issued November 4), 1949, p. 73, pl. 12, fig. 2. "Mazatlan, Mexico."

Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud.

The shell of this species differs from that of *Turbonilla (Ptycheulimella) magdalinensis* Bartsch<sup>92</sup> in that the spiral sculpture consists of incised lines rather than of exceedingly fine striations.

Subgenus *Pyrgisculus* Monterosato.

*Turbonilla (Pyrgisculus) utuana*

Hertlein & Strong, sp. nov.

Plate V, Figs. 6, 8.

Shell elongate-ovate, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 7, upper whorls slopingly shouldered, flat-sided, later whorls slightly shouldered, slightly rounded; axial ribs strong, straight, vertical, 14 appearing on the first whorl, increasing to 20 on the last whorl; interspaces about twice as wide as the ribs, crossed by 4 spiral series of rectangular pits, the spaces between which appear as flat-topped cords of unequal width, the lower 2 of these cords cut by 2 or 3 fine incised spiral lines; periphery rounded, marked by a narrow spirally cord; base rounded, with a spiral row of pits just below the peripheral cord formed by the enfeebled extensions of the axial ribs, below this there are 3 or 4 spiral cords and in the umbilical region several fine incised spiral lines; aperture ovate, outer lip thin, columella curved, slightly raised. The type measures: length, 3.1 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters), sandy mud, crushed shell.

The shell of this species differs from that of *Turbonilla (Pyrgisculus) eucosmia* Dall & Bartsch<sup>93</sup> in that the ribs are nearly vertical on all the whorls rather than strongly retractive on the last whorl.

This species is named for Pemasu Utu who collected numerous specimens during the expedition on which the type of this species was collected.

Subgenus *Pyrgiscus* Philippi.

*Turbonilla (Pyrgiscus) vivesi*

Hertlein & Strong, sp. nov.

Plate VI, Fig. 15.

Shell elongate-conic, light yellowish-brown with a darker band covering the periphery and base and a narrow, fainter, dark band on the middle of the whorl; nuclear whorls moderately large, depressed, the axis at right angles to that of the postnuclear whorls, in

the first of which it is about one-half immersed; postnuclear whorls 12, the greatest convexity falling a little below the middle; axial sculpture of rounded, nearly vertical ribs with wider interspaces; of these ribs 14 appear on the first whorl, gradually increasing to 22 on the last whorl; spiral sculpture of about 30 fine, closely spaced, incised lines in the interspaces between the axial ribs, of these the upper third are equal and equally spaced but on the middle of the whorls there is a tendency for them to become more irregular, and just above the suture there appears a row of deeper, rectangular pits; periphery with a narrow, smooth band, at the upper edge of which the axial ribs terminate; base short, rounded, with about 20 very fine, wavy spiral striations; aperture rhomboid, somewhat flaring at the anterior end; outer lip thin, showing the external sculpture within; columella straight, revolute. The type measures: length, 6.8 mm.; maximum diameter, 1.6 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., off San Domingo Point, Santa Inez Bay, Lower California, in the Gulf of California, dredged in 4-13 fathoms (7.5-24 meters), sand. 7 additional specimens were dredged at the same locality.

The shell of this species differs from that of *Turbonilla (Pyrgiscus) superba* Dall & Bartsch<sup>94</sup> in that it lacks the medial row of pits which are very distinct on that species.

This species is named for Gastón J. Vives of La Paz, Lower California, in recognition of his work on the culture of pearl oysters in the Gulf of California.

*Turbonilla (Pyrgiscus) domingana*

Hertlein & Strong, sp. nov.

Plate VI, Fig. 6.

Shell slender, regularly elongate-conic, translucent, white; nuclear whorls 2, depressed, with their axis at right angles to that of the postnuclear whorls in the first of which they are about one-third immersed; postnuclear whorls 10, the upper ones roundly shouldered, the last 2 flattened; axial sculpture of low, nearly vertical ribs, with wider interspaces, 14 appearing on the upper whorls and 16 on the last whorl; spiral sculpture of 9 incised lines in the interspaces between the axial ribs, the upper 4 widely spaced and occupying a little more than half the area between the sutures, the following 5 closely spaced with the last just above the suture, a little stronger than the others; periphery rounded, with a narrow smooth space bounded at the lower edge with an incised line at which the axial ribs terminate; base moderately long, with a second narrow, smooth space just below the peripheral one, followed by 5 closely spaced, incised spiral

<sup>92</sup> *Turbonilla (Ptycheulimella) magdalinensis* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 70, No. 2660, Art. 11, April 8, 1927, p. 4, pl. 1, fig. 7. "Magdalena Bay, Lower California." Cited on p. 34 as *Turbonilla (Ptycheulimella) magdalenensis*.

<sup>93</sup> *Turbonilla (Pyrgisculus) eucosmia* Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, December 13, 1909, p. 128, pl. 12, figs. 13, 13a. "dredged at U. S. Bureau of Fisheries Station 2822, in 21 fathoms, off La Paz, Lower California."

<sup>94</sup> *Turbonilla (Pyrgiscus) superba* Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, December 13, 1909, p. 80, pl. 7, figs. 10, 10a. "dredged at U. S. Bureau of Fisheries station 2822, in 21 fathoms, gray sand and broken shells, off La Paz, Lower California."

lines; aperture ovate, slightly expanded at the anterior end; outer lip thin, showing the external sculpture within; columella nearly straight, reflected, revolute; body with a slightly raised callus. The type measures: length, 6.3 mm.; maximum diameter, 1.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., off San Domingo Point, Santa Inez Bay, Lower California, in the Gulf of California, dredged in 4-13 fathoms (7.5-24 meters), sand.

The unique type can probably be best compared with *Turbonilla (Pyrgiscus) corsoensis* Bartsch<sup>95</sup> which has similar axial ribs and the same number of spiral lines. However, the present species possesses a more slender shell, with the later whorls less shouldered, and the arrangement of the spiral lines entirely different.

***Turbonilla (Pyrgiscus) yolettæ***

Hertlein & Strong, sp. nov.

Plate VI, Fig. 13.

Shell small, elongate-conic, very slender, white; nuclear whorls 2½, large, depressed, the axis at right angles to that of the post-nuclear whorls, in the first of which they are about one-fourth immersed; postnuclear whorls 9, the first 3 well rounded, the remainder less so, sutures distinct; axial sculpture of low, rounded, slightly waved, nearly vertical ribs, with somewhat wider, shallow interspaces, of these ribs 16 appear on the second whorl, gradually increasing to 22 on the last whorl; spiral sculpture of 10 incised lines in the interspaces between the axial ribs; of these the first 3 are very fine and closely spaced while the remainder are more distinct and rather irregular and irregularly spaced; periphery rounded, marked by a fine incised spiral line; base short, rounded, with a narrow smooth space just below the peripheral line marked by 6 very fine incised spiral lines and feeble continuations of the axial ribs; aperture ovate, defective in the type; columella short, strongly revolute, with a strong fold at its insertion; body with a distinct callus. The type measures: length, 4.1 mm.; maximum diameter, 1.1 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., off San Domingo Point, Santa Inez Bay, Lower California, dredged in 4-13 fathoms (7.5-24 meters), sand. A second specimen was dredged at the same locality.

This shell is much the size and shape of *Turbonilla (Pyrgiscus) histias* Dall & Bartsch<sup>96</sup> but has more feeble axial ribs and a different arrangement of the spiral cords.

Fresh specimens would probably show more or less of a color pattern.

***Turbonilla (Pyrgiscus) amiriana***

Hertlein & Strong, sp. nov.

Plate VI, Fig. 7.

Shell broadly conic, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls in the first of which it is about one-third immersed; normal whorls 8, broadly, slopingly shouldered; axial sculpture of low, rounded, somewhat sinuous ribs of which 18 appear on the first whorl, increasing to 24 on the last whorl; interspaces a little wider than the ribs, crossed by 5 spiral series of pits, of which the lower is just above the suture and the upper marks the beginning of the shoulder on which there are much finer incised spiral lines; periphery subangulated, marked by a wide spiral band without spiral sculpture but undulated by the ends of the axial ribs; base short, sculptured with about 10 irregularly spaced, incised spiral lines; aperture subquadrate, outer lip defective, columella twisted. The type measures: length, 5.8 mm.; diameter, 2.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud.

The shell of this species differs from such species as *Turbonilla (Pyrgiscus) hypocurta* Dall & Bartsch<sup>97</sup> in the more broadly conic form.

***Turbonilla (Pyrgiscus) colimana***

Hertlein & Strong, sp. nov.

Plate VI, Fig. 5.

Shell elongate-conic, rather stout, very pale brown; nuclear whorls having a depressed helicoid spire, with the axis at right angles to that of the following whorls in the first of which it is about one-third immersed; normal whorls 7, slightly rounded with a well rounded shoulder and somewhat contracted at the suture; axial ribs strong, rounded, nearly vertical, slightly swollen at the shoulder angle, 14 appearing on the first whorl and increasing to 18 on the last whorl; interspaces about twice as wide as the ribs, crossed by 5 equal and equally spaced spiral series of deeply incised lines below the shoulder and 2 or 3 finer lines on the shoulder; periphery rounded, marked by a smooth band a little wider than the spaces between the incised spiral lines, on which the axial ribs terminate; base short, rounded, with 5 incised spiral lines similar to those on the spire but continuous; aperture subquadrate,

<sup>95</sup> *Turbonilla (Pyrgiscus) corsoensis* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 52, No. 2193, May 29, 1917, p. 657, pl. 45, fig. 8. "dredged in shallow water in Santa Maria Bay, Lower California."

<sup>96</sup> *Turbonilla (Pyrgiscus) histias* Dall & Bartsch, *U. S. Nat. Mus.*, *Bull.* 68, December 13, 1909, p. 105, pl. 10, figs. 8, 8a. "Off La Paz, in 21 fathoms, on sand bottom off Lower California."

<sup>97</sup> *Chemnitzia hypocurta* Dall & Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 30, No. 1452, May 9, 1906, p. 347. New name for *Chemnitzia caelata* Carpenter (*Ann. & Mag. Nat. Hist.*, Ser. 3, Vol. 15, May, 1865, p. 400. "probably from Panama"). Not *Turbonilla caelata* Gould, 1861. Carpenter's species was also renamed *Turbonilla (Pyrgiscus) favilla* by Dall & Bartsch (*U. S. Nat. Mus.*, *Bull.* 68, December 13, 1909, p. 78).

outer lip thin, columella short, curved. The type measures: length, 3.0 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 184-D-2, Lat. 19° 04' 00" N., Long. 104° 22' 00" W., near Manzanillo, Mexico, dredged in 30 fathoms (55 meters), gravelly sand.

Although the type specimen is not fully mature it should be easily recognizable by the shape and sculpture.

The shell of this species bears a resemblance to that of *Turbonilla (Pyrgiscus) hypocurta* Dall & Bartsch<sup>98</sup> and similar forms but differs chiefly in that the whorls are roundly shouldered rather than flattened.

***Turbonilla (Pyrgiscus) zacae***

Hertlein & Strong, sp. nov.

Plate III, Fig. 3.

Shell elongate-conic, slender, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 10, flat sided; axial ribs narrow, straight, nearly vertical, 16 appearing on the first whorl, increasing to 20 on the last whorl; interspaces about twice as wide as the ribs, crossed by 10 spiral series of subequal incised spiral lines; periphery well rounded, marked by a rather wide band without spiral sculpture but rendered slightly nodulous by the lower ends of the axial ribs; base short, rounded, with 6 incised spiral lines; aperture subquadrate, outer lip broken, columella straight, high, leaving a slight umbilical chink. The type measures: length, 5.7 mm.; diameter, 1.4 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud.

The shell of this species differs from that of *Turbonilla (Pyrgiscus) melea* Bartsch<sup>99</sup> in that it is sculptured with 20 ribs on the last whorl rather than 28.

***Turbonilla (Pyrgiscus) sulacana***

Hertlein & Strong, sp. nov.

Plate VI, Fig. 12.

Shell elongate-conic, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 9, well rounded, upper whorls roundly shouldered, later ones less so; axial ribs low, rounded, sinuous, nearly vertical, of which 14 appear on the first whorl, increasing to 20 on the last whorl; interspaces about twice as wide as the ribs, crossed by 6 spiral series of pits varying somewhat in strength and spacing

and between these a varying number of very fine spiral lines; periphery rounded, marked by a narrow band without spiral sculpture but rendered somewhat nodulous by the ends of the axial ribs; base short, rounded, marked with 6 incised spiral lines, the upper one or two interrupted in some places by the feeble extension of an axial rib; aperture subquadrate, outer lip thin, columella nearly straight with a raised edge. The type measures: length, 5.0 mm.; diameter 1.1 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud.

The shell of this species may be differentiated from that of *Turbonilla (Pyrgiscus) pequensis* Dall & Bartsch<sup>100</sup> in that the whorls are only moderately roundly shouldered rather than strongly so.

***Turbonilla (Pyrgiscus) templetonis***

Hertlein & Strong, sp. nov.

Plate VI, Fig. 11.

Shell elongate-conic, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 9, well rounded; axial ribs strong, rounded, nearly vertical, distinctly sinuous, flattening out toward the summit, giving the whorls a slopingly shouldered appearance, of these ribs 16 appear on the first whorl, increasing to 20 on the last whorl; interspaces about 3 times as wide as the ribs, crossed by 6 spiral series of pits of which the basal 1 or 2 are slightly the stronger, and on the raised areas between the pits a few scattered, very fine incised spiral lines; periphery subangulated, marked by a band without spiral sculpture but undulated by the axial ribs; base short, with 6 narrow incised spiral lines of which the upper 2 or 3 cut across the feeble extensions of the axial ribs; aperture subquadrate, outer lip thin, columella straight. The type measures: length 4.3 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-1, Lat 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters), sandy mud, crushed shell.

The shell of this species differs from that of *Turbonilla (Pyrgiscus) angusta* Carpenter<sup>101</sup> in that the base is short rather than somewhat extended, also in that the periphery of the last whorl is subangulated rather than rounded.

This species is named for the late Templeton Crocker.

<sup>100</sup> *Turbonilla (Pyrgiscus) pequensis* Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, December 13, 1909, p. 79, pl. 7, figs. 5, 5a. "U. S. Bureau of Fisheries station 2834, near Point Abreojos, in 12 fathoms, on sand bottom, off Lower California."

<sup>101</sup> *Chrysalida angusta* Carpenter, *Ann. & Mag. Nat. Hist.*, Ser. 3, Vol. 14, July, 1864, p. 47. "Cape St. Lucas."—Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, 1909, p. 91, pl. 8, fig. 6 (as *Turbonilla (Pyrgiscus) angusta*).

<sup>98</sup> For references to this species see footnote No. 97 on p. 94.

<sup>99</sup> *Turbonilla (Pyrgiscus) melea* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 66, No. 2551, Art. 14, October 17, 1924, p. 5, pl. 2, fig. 8. From "Santa Elena Bay, Ecuador."

***Turbonilla (Pyrgiscus) ayamana***

Hertlein &amp; Strong, sp. nov.

Plate VI, Fig. 14.

Shell elongate-conic, slender, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 9, slightly rounded, narrowly slopingly shouldered; axial ribs strong, in general vertical but varying somewhat in angle from whorl to whorl, of these ribs 18 appear on the first whorl, increasing to 24 on the last whorl; interspaces about twice as wide as the ribs, crossed on the upper whorls by 7 spiral series of pits, on the last whorl the lower 2 of these become very strong while numerous finer spiral incised lines tend to break up the areas between the major pits; periphery well rounded, marked by a narrow smooth band; base short with 2 rows of spiral pits similar to those on the spire immediately below the periphery between the feeble extensions of the axial ribs, lower part of the base with 4 continuous incised spiral lines; aperture subquadrate, outer lip thin, columella somewhat twisted. The type measures: length, 5.6 mm.; diameter, 1.3 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters), sandy mud, crushed shell. Additional specimens were dredged at Port Parker, Costa Rica, (203-D-3), 12 fathoms (22 meters), shelly mud, and at Corinto, Nicaragua (200-D-19), 12-13 fathoms (22-24 meters), mangrove leaves.

The very slender form of the shell of this species serves to differentiate it from *Turbonilla (Pyrgiscus) macra* Dall & Bartsch<sup>102</sup>.

***Turbonilla (Pyrgiscus) otairocensis***

Hertlein &amp; Strong, sp. nov.

Plate V, Fig. 4.

Shell elongate-conic, slender, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 9, rather high between the sutures, narrowly, roundly shouldered, flat-sided; axial ribs low, rounded, nearly straight, somewhat retractive, 16 appearing on the first whorl, increasing to 24 on the last whorl; interspaces about twice as wide as the ribs, crossed by 12 fine, incised spiral lines, about equal in strength but unequal in spacing; periphery well rounded, without definite marking; base somewhat produced, rounded, the upper part with 3 spiral series of incised lines in the interspaces between the feeble extensions of the axial ribs, the lower part with 3 continuous incised spiral lines; aperture ovate, outer lip very thin, columella slightly curved.

<sup>102</sup> *Turbonilla (Pyrgiscus) macra* Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, December 13, 1909, p. 91, pl. 8, figs. 10, 10a. "Point Abrejos, Lower California."

The type measures: length, 4.2 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station, 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves. Additional specimens were secured in the beach drift at Corinto.

The shell of this species may be differentiated from that of *Turbonilla (Pyrgiscus) collea* Bartsch<sup>103</sup> in that the incised lines between the sutures number 12 rather than 6.

***Turbonilla (Pyrgiscus) ulysii***

Hertlein &amp; Strong, sp. nov.

Plate 5, Fig. 10.

Shell elongate-conic, rather stout, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 8, the upper whorls well rounded, the later whorls less so; axial ribs low, rounded, distinctly protractive on the upper whorls, nearly vertical on the later ones, 18 appearing on the first whorl, increasing to 28 on the last whorl, the ribs are contracted to sharp points at the summit, undulating the suture; interspaces only a little wider than the ribs, crossed by sharp, incised spiral lines, varying somewhat in number and spacing from whorl to whorl but averaging about 15; periphery rounded, without definite marking; base produced, with about 15 incised spiral lines similar in strength and spacing to those on the spire, the upper 5 or 6 interrupted by feeble extensions of the axial ribs; aperture ovate, outer lip slightly thickened, columella short, straight. The type measures: length, 5.0 mm.; diameter, 1.7 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves. Additional specimens were secured in the beach drift at Corinto.

The character of the axial ribbing of this species, sharply pointed at the ends of the ribs, serves to differentiate it from such species as *Turbonilla (Pyrgiscus) flavescens* Carpenter<sup>104</sup>.

This species is named for Dr. Ulysses S. Grant, IV, Professor of Paleontology, University of California at Los Angeles.

***Turbonilla (Pyrgiscus) nicoyana***

Hertlein &amp; Strong, sp. nov.

Plate III, Fig. 4.

Shell elongate-conic, slender, white, with

<sup>103</sup> *Turbonilla (Pyrgiscus) collea* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 69, No. 2646, Art. 20, December 16, 1926, p. 8, pl. 1, fig. 4. "coast southeast of Punta Santa Elena, Santa Elena Peninsula, Ecuador."

<sup>104</sup> *Chemnitzia flavescens* Carpenter, *Cat. Mazatlan Shells*, December, 1856, p. 432. "Hab.—Mazatlan; 1 sp. off Spondylus calcifer; Havre Col."—Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, 1909, p. 89, pl. 8, fig. 9 (as *Turbonilla (Pyrgiscus) flavescens*).

faint indications of brown on some whorls; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 7, the first 3 strongly, almost tabulately shouldered, the later whorls becoming shouldered; axial ribs straight, nearly vertical, rounded, flattening out on the shoulder, 16 appearing on the first whorl, increasing to 22 on the last; interspaces a little wider than the ribs, crossed by 12 incised spiral lines which extend up on the sides of the ribs but do not cross them, of these spiral lines there is on some whorls a tendency for the basal one and one a little above the middle of the whorls to become stronger; periphery rounded, marked by a narrow undulated band; base somewhat produced, marked with 5 incised spiral lines which cross over the feeble extensions of the axial ribs; aperture oval, outer lip thin, columella twisted. The type measures: length, 4.0 mm.; diameter, 1.1 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud. Additional specimens were dredged near Port Parker, Costa Rica (203-D-1), 15 fathoms (27 meters), sandy mud, crushed shell.

The shell of this species differs from that of *Turbonilla (Pyrgiscus) wetmorei* Strong & Hertlein<sup>105</sup> and similar forms in the much shorter and more rounded base.

This species is named for the Sixteenth Century Indian Chief Nicoya of Costa Rica.

***Turbonilla (Pyrgiscus) cholutecana***

Hertlein & Strong, sp. nov.

Plate V, Fig. 5.

Shell very slender, upper whorls translucent, white, the later whorls becoming pale brown, very thin, the basal portion of each whorl shining through the upper portion of the following whorl; nucleus large, having a depressed helicoid spire with the axis at right angles to that of the following whorl, in the first of which it is about one-fourth immersed; normal whorls 8, almost flat-sided, little raised above the sutures; axial ribs low, straight, vertical, 20 appearing on the first whorl, increasing to 26 on the last whorl; interspaces about as wide as the ribs, crossed by about 16 very fine, spiral series of incised lines of about equal strength and spacing; periphery rounded, marked by a wide space without spiral sculpture; base decidedly produced, the upper part with three incised spiral lines which are broken by the feeble extensions of the axial ribs, the lower part with 3 continuous incised spiral lines; aperture ovate, outer lip very

thin, columella curved. The type measures: length 4.1 mm.; diameter, 0.7 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from beach drift at Corinto, Nicaragua.

The shell of this species differs from that of *Turbonilla (Pyrgiscus) lazaroensis* Bartsch<sup>106</sup> in that the axial ribs are low and flattened rather than strong and rounded.

The specific name of this species is derived from the tribal name of the Cholotec Indians, Nicaragua.

***Turbonilla (Pyrgiscus) chinandegana***

Hertlein & Strong, sp. nov.

Plate V, Fig. 3.

Shell elongate-conic, milk-white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls in the first of which it is about one-fourth immersed; normal whorls 9, almost flat-sided, moderately elevated above the sutures; axial ribs rounded, straight, retractive; interspaces a little wider than the ribs, crossed by about 15 equal and equally spaced spiral series of incised lines; periphery well rounded, marked by a wide smooth space; base moderately produced, the upper part with 1 or 2 incised spiral lines which are interrupted by the feeble extensions of the axial ribs, followed by a second wide smooth space, lower part of the base with 5 closely spaced continuous incised spiral lines; aperture ovate, outer lip thin, columella twisted. The type measures: length, 4.8 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from beach drift at Corinto, Nicaragua.

The more broadly conic form of this species serves to separate it from similar species such as *T. lazaroensis* Bartsch and *T. cholutecana* in which the shells are exceedingly slender.

The specific name of this species is derived from the name of the state of Chinandega, Nicaragua.

***Turbonilla (Pyrgiscus) guanacastensis***

Hertlein & Strong, sp. nov.

Plate V, Fig. 11.

Shell elongate-conic, slender, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is only slightly immersed; normal whorls 10, moderately rounded, the first 3 increasing very little in size, later ones more rapidly; axial ribs low, rounded, nearly straight, moderately retractive, 18 appearing on the first whorl, increasing to 24 on the last whorl; interspaces a little wider than the ribs, crossed by a basal spiral series of deep pits and 10 unequal and unequally spaced shallower pits or incised lines; periphery round-

<sup>105</sup> *Turbonilla (Pyrgiscus) wetmorei* Strong & Hertlein, *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 22, No. 6, December 31, 1937, p. 172, pl. 35, fig. 1. "Lat. 23° 12' N., Long. 106° 29' W., dredged in 12 fathoms, about five miles west of Mazatlan, Sinaloa, Mexico."

<sup>106</sup> *Turbonilla (Pyrgiscus) lazaroensis* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 52, No. 2193, May 29, 1917, p. 655, pl. 45, fig. 11. "dredged in shallow water off Lazaro Point, Santa Maria Bay, Lower California."

ed, marked by a narrow smooth band, base produced, aperture broken. The type measures: length, 4.3 mm.; diameter, 0.9 mm. A smaller paratype shows the aperture to be ovate and the base marked with 6 incised spiral lines of which the first 2 are interrupted by the feeble extensions of the axial ribs.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud. An additional specimen was dredged near Port Parker, Costa Rica (203-D-1), 15 fathoms (27 meters), sandy mud, crushed shell.

The shell of this species differs from that of *Turbonilla (Pyrgiscus) bartonella* Strong & Hertlein<sup>107</sup> in that the axial ribs are protractive rather than nearly vertical.

The specific name of this species is derived from the name of the state of Guanacaste, Costa Rica.

***Turbonilla (Pyrgiscus) ozanneana***

Hertlein & Strong, sp. nov.

Plate V, Fig. 15.

Shell elongate-conic, slender, white; nucleus broken; normal whorls 9, slightly rounded, narrowly shouldered at the summit and contracted at the base; axial ribs low, rounded, nearly straight, vertical on the upper whorls, somewhat retractive on the last whorl, 16 appearing on the first whorl, increasing to 22 on the last whorl; interspaces about twice as wide as the ribs, crossed by a basal spiral series of pits and 9 incised lines of about equal strength and spacing; periphery well rounded, marked by a rather broad, smooth band; base short, with 6 incised spiral lines, the first 2 being interrupted by the enfeebled extensions of the axial ribs; aperture subquadrate, outer lip thin, columella nearly straight, with a slight fold at its insertion. The type measures: length, 3.9 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from beach drift at Corinto, Nicaragua.

The shell of this species may be differentiated from that of *Turbonilla (Pyrgiscus) domingana* in that the axial ribs are somewhat retractive rather than vertical.

This species is named for Mr. John Ozanne, First Mate on the *Zaca* during the expedition on which the type specimen of this species was collected.

***Turbonilla (Pyrgiscus) rhizophorae***

Hertlein & Strong, sp. nov.

Plate V, Fig. 12.

Shell elongate-conic, translucent, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is

about one-third immersed; normal whorls 8, rounded, upper whorls narrowly shouldered, the first 3 rapidly increasing in size; axial ribs strong, rounded, distinctly protractive, sinuous, 12 appearing on the first whorl, increasing to 18 on the last whorl; interspaces about 3 times as wide as the ribs, terminating abruptly at the periphery, crossed by a basal spiral series of pits and about 24 fine incised spiral lines; periphery well rounded, without definite marking; base rounded, marked with numerous fine spiral striations which on the upper part ride over low swellings formed by the feeble extensions of the axial ribs; outer lip broken, columella straight. The type measures: length, 3.4 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

This is one of the species which show intergradation between the subgenera *Strio-turbonilla* and *Pyrgiscus*.

The shell of this species differs from that of *Turbonilla (Pyrgiscus) biolleyi* in that there are 18 rather than 24 axial ribs on the last whorl.

***Turbonilla (Pyrgiscus) biolleyi***

Hertlein & Strong, sp. nov.

Plate III, Fig. 2.

Shell regularly elongate-conic, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 8, slightly rounded, upper whorls slopingly shouldered; axial ribs sharp, sinuous, moderately protractive, 16 appearing on the first whorl, increasing to 24 on the last whorl; interspaces about twice as wide as the ribs, crossed by a basal spiral series of pits and about 25 incised spiral lines of which every third or fourth appears slightly the stronger; periphery subangulated, marked by a narrow band without spiral sculpture but undulated by the axial ribs; base short, with incised spiral lines similar to those on the spire, which on the upper part ride over the feeble extensions of the axial ribs; aperture subquadrate, outer lip broken, columella straight. The type measures: length, 3.6 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud. Specimens were also dredged near Port Parker, Costa Rica (203-D-1), 15 fathoms (27 meters), sandy mud, crushed shell, and at Corinto, Nicaragua (200-D-19), 12-13 fathoms (22-24 meters), mangrove leaves, and in the beach drift at Corinto.

The shell of this species differs from that of *Turbonilla (Pyrgiscus) rhizophorae* in

<sup>107</sup> *Turbonilla (Pyrgiscus) bartonella* Strong & Hertlein, Allan Hancock Pac. Exped., Vol. 2, No. 12, August 21, 1939, p. 203, pl. 19, fig. 8. "dredged in from 3 to 9 fms. in Bahía Honda, Panama."



that there are 24 rather than 18 axial ribs on the last whorl.

This species is named for Paul Biolley, former professor of Natural History at San Jose de Costa Rica.

***Turbonilla (Pyrgiscus) ekidana***

Hertlein & Strong, sp. nov.

Plate IV, Fig. 8.

Shell elongate-conic, milk-white; nucleus small, with a depressed helicoid spire having the axis at right angles to that of the following whorls, in the first of which it is about one-half immersed; normal whorls 9, broadly slopingly shouldered, somewhat flattened below the shoulder; axial ribs strong, rounded, sinuous, vertical on the upper whorls, becoming slightly retractive on the last, 14 appearing on the first whorl, increasing to 20 on the last whorl; interspaces about twice as wide as the ribs, crossed by a basal series of pits and a second series just below the angle of the shoulder, in addition there are 7 spiral series of incised lines between the 2 series of pits and 6 series of much finer incised lines on the shoulder; periphery rounded, marked by a narrow band without spiral sculpture; base short, with 7 incised spiral lines of which the second below the periphery is the strongest and the first 3 more or less interrupted by the feeble extensions of the axial ribs; aperture subquadrate, outer lip slightly thickened, columella curved, a little expanded over the umbilical region. The type measures: length, 4.8 mm.; diameter, 1.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters), sandy mud, crushed shell.

The shell of this species bears a resemblance to that of *Turbonilla (Pyrgiscus) callipeplum* Dall & Bartsch<sup>108</sup> and similar forms but differs in that the axial ribs are rounded, not sublamellar.

***Turbonilla (Pyrgiscus) gordoniana***

Hertlein & Strong, sp. nov.

Plate V, Fig. 1.

Shell regularly elongate-conic, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 11, slightly rounded, little elevated above the sutures; axial ribs low, rounded, straight, nearly vertical, 16 appearing on the first whorl, increasing to 24 on the last whorl; interspaces about as wide as the ribs, crossed by 10 equal and equally spaced spiral series of incised lines; periphery rounded, without definite marking; base rather short, rounded, the axial ribs extending to the umbilical region with, in the interspaces,

series of incised spiral lines similar to those on the spire; aperture oval, outer lip thin, columella raised, curved, somewhat expanded over the umbilical region. The type measures: length, 6.0 mm.; diameter, 1.4 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from beach drift at Corinto, Nicaragua.

The character of the upper whorls, slightly rounded rather than narrowly shouldered, serves to separate this species from *Turbonilla (Pyrgiscus) craticulata* Mörch<sup>109</sup>.

This species is named for Mackenzie Gordon, Jr., of Palo Alto, California.

***Turbonilla (Pyrgiscus) ottomoerchi***

Hertlein & Strong, sp. nov.

Plate IV, Fig. 5.

Shell elongate-conic, slender, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 10, flat-sided, narrowly, slopingly shouldered on the upper whorls, little raised above the sutures on the later whorls; axial ribs low, moderately retractive, straight, extending to the umbilical region, 16 appearing on the first whorl, increasing to 26 on the last; interspaces about as wide as the ribs, crossed by 12 equal and equally spaced spiral series of incised lines; periphery rounded, without definite marking; base rounded, marked with incised spiral lines similar to those on the spire except that on the lower part they ride over the low swellings which mark the extensions of the axial ribs in the umbilical region; aperture oval, outer lip thin, columella somewhat twisted. The type measures: length, 6.0 mm.; diameter, 1.4 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from beach drift at Corinto, Nicaragua. Specimens were also secured at Corinto (200-D-19), 12-13 fathoms (22-24 meters), mangrove leaves.

The shell of this species may be differentiated from that of *Turbonilla (Pyrgiscus) porteri* Baker, Hanna & Strong<sup>110</sup> in that the upper whorls are narrowly slopingly shouldered rather than well rounded.

This species is named for Otto A. L. Mörch, author of a paper describing the mollusks collected by A. S. Oersted along the west coast of Central America.

***Turbonilla (Pyrgiscus) tehuantepecana***

Hertlein & Strong, sp. nov.

Plate V, Fig. 7.

Shell subcylindrical, pale brown, very small; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, much smaller than the

<sup>109</sup> *Turbonilla craticulata* Mörch, *Malakozool. Blätter*, Bd. 6, p. 119, October, 1859. "Hab. Bocorones, 30 org. prof. Specimina 3."—Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, 1909, p. 104, pl. 10, figs. 1, 1a.

<sup>108</sup> *Turbonilla (Pyrgiscus) callipeplum* Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, December 13, 1909, p. 96, pl. 9, figs. 11, 11a. "dredged at U. S. Bureau of Fisheries station 2805 in 51 fathoms, on mud bottom, in Panama Bay."

<sup>110</sup> *Turbonilla (Pyrgiscus) porteri* Baker, Hanna & Strong, *Proc. Calif. Acad. Sci., Ser. 4*, Vol. 17, No. 7, June 29, 1928, p. 217, pl. 11, fig. 10. "Gulf of California."

first in which it is about one-half immersed; normal whorls 7, slightly rounded, narrowly shouldered; axial ribs sharp, straight, nearly vertical, of which 16 appear on the first whorl, increasing to 26 on the last whorl; interspaces a little wider than the ribs, crossed by 4 spiral series of rectangular pits of which the uppermost corresponds to a depression in the axial ribs, thus forming a narrow, nodulous band just below the sutures, the raised spaces between the pits with very fine incised spiral lines; periphery well rounded, without definite marking; base rather short, with 6 series of spiral pits in the interspaces between the axial ribs which extend to the umbilical region; aperture ovate, outer lip slightly thickened, columella curved. The type measures: length, 2.8 mm.; diameter, 0.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

The shell of this species is somewhat similar to that of *Turbonilla (Pyrgiscus) indentata* Carpenter<sup>111</sup> but may be differentiated from that form in that the whorls are narrowly rather than subtabulately shouldered.

***Turbonilla (Pyrgiscus) gruberi***

Hertlein & Strong, sp. nov.

Plate IV, Fig. 3.

Shell elongate-conic, slender, pale, brownish; nucleus large, having a depressed helicoid spire with the axis at right angles to the following whorls, on the first of which it rests; normal whorls 9, the first 2 smooth, the others sculptured, slightly rounded, little raised above the sutures; axial ribs low, straight, strongly retractive, 24 appearing on the third whorl, increasing to about 40 on the last whorl; interspaces a little wider than the ribs, crossed by 7 spiral series of pits and incised lines unequal in strength and spacing; periphery rounded, marked by a narrow, smooth band; base well rounded with the axial ribs continuing over the umbilical region, the interspaces crossed by spiral series of pits and incised lines similar to those on the spire; aperture oval, outer lip slightly thickened, columella curved. The type measures: length, 6.1 mm.; diameter, 1.4 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from beach drift at Corinto, Nicaragua. Additional specimens were secured at Corinto, Nicaragua (200-D-19), 12-13 fathoms (22-24 meters), mangrove leaves.

The shell of this species differs from such species as *Turbonilla (Pyrgiscus) larunda* Dall & Bartsch and *Turbonilla (Pyrgiscus) sortezi* Bartsch in that there are about 40

rather than 20 or 30 axial ribs on the last whorl.

This species is named for Ferdinand Gruber, a former Curator of Ornithology and Mammalogy, California Academy of Sciences. He was the inventor of the zoographical installed at Woodward's Gardens of which organization he was Curator of Museums, and later was Director of Natural History at M. H. De Young Memorial Museum, San Francisco, California.

Subgenus ***Pyrgolampros*** Sacco.

***Turbonilla (Pyrgolampros) soniliana***

Hertlein & Strong, sp. nov.

Plate IV, Fig. 2.

Shell elongate-conic, pale brown with a dark brown line a little above the suture and a second similar line on the middle of the base; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 9, slightly rounded, little raised above the sutures; axial ribs low, nearly vertical on the upper whorls, increasingly retractive on the middle whorls, curved and strongly retractive on the last whorl, 18 appearing on the first whorl, increasing to 30 on the last whorl; interspaces somewhat wider than the ribs, crossed by basal and median spiral lines of shallow pits and many fine spiral striations; periphery somewhat inflated, rounded, without definite marking; base rounded, the axial ribs fading out at the brown basal line, lower half with numerous continuous spiral striations; aperture ovate, outer lip thin, showing the two brown lines within, columella narrow, slightly curved and somewhat raised. The type measures: length, 5.8 mm.; diameter, 1.7 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

The shell of this species differs from that of *Turbonilla (Pyrgolampros) meanguerensis* in that the axial ribs are retractive rather than protractive.

***Turbonilla (Pyrgolampros) meanguerensis***

Hertlein & Strong, sp. nov.

Plate IV, Fig. 6.

Shell elongate-conic, uniformly pale brownish; nucleus having an elevated spire with the axis at right angles to that of the following whorls, the tip extending a little beyond and notching the edge of the first, in which it is nearly one-half immersed; normal whorls well rounded; axial ribs low, rounded, straight, almost vertical, 18 appearing on all whorls; interspaces about as wide as the ribs on the upper whorls, the width increasing to about 4 times as wide as the ribs on the last whorl, crossed by peripheral lines of pits and many fine spiral striations, of which 3 or 4 are distinctly the stronger

<sup>111</sup> *Chrysalidella indentata* Carpenter, Cat. Mazatlan Shells, December, 1856, p. 425. "Hab.—Mazatlan; 2 sp. off Spondylus; L'pool Col."—Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, 1909, p. 102, pl. 10, fig. 10 (as *Turbonilla (Pyrgiscus) indentata*).

on some of the whorls; periphery subangulated, base short, the axial ribs terminating just below the periphery, with numerous wavy incised spiral lines; aperture subquadrate, outer lip thin, columella straight. The type measures: length 5.6 mm.; diameter, 1.4 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 199-D-1, Lat 13° 08' 00" N., Long. 87° 43' 00" W., Meanguera Island, Gulf of Fonseca, El Salvador, dredged in 16 fathoms (29 meters), sand, mud, crushed shell.

The shell of this species can be differentiated from that of *Turbonilla* (*Pyrgolampros*) *soniliana* in that the axial ribs are protractive rather than retractive.

Subgenus *Strioturbonilla* Sacco.

*Turbonilla* (*Strioturbonilla*) *masayana*

Hertlein & Strong, sp. nov.

Plate IV, Fig. 4.

Shell elongate-conic, translucent, white; nucleus having an elevated spire, with the axis at right angles to that of the following whorls, the tip extending beyond and notching the edge of the first whorl in which it is nearly one-half immersed; normal whorls 7, nearly flat-sided, narrowly squarely shouldered; the entire surface with very fine spiral striations; axial ribs low, narrow, almost vertical, 24 appearing on the first whorl, increasing to 30 on the last whorl; interspaces a little wider than the ribs, terminating a little above the periphery, leaving a narrow smooth band in the suture; periphery well rounded, base rounded; aperture subquadrate, outer lip thin, columella somewhat twisted. The type measures: length, 3.4 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

The shell of this species differs from that of *Turbonilla* (*Strioturbonilla*) *santamariana* Bartsch<sup>112</sup> in that the axial ribs on the last whorl number 30 rather than 20.

The specific name of this species is derived from that of the tribal name of the Masaya Indians of Nicaragua.

*Turbonilla* (*Strioturbonilla*) *corintonis*

Hertlein & Strong, sp. nov.

Plate IV, Fig. 1.

Shell elongate-conic, white; nucleus having an elevated spire, with the axis at right angles to that of the following whorls, the tip extending a little beyond and notching the edge of the first whorl in which it is about one-half immersed; normal whorls 10, slightly rounded, very narrowly shouldered; entire surface with very fine spiral striations; axial ribs low, rounded, nearly

straight, somewhat protractive, 18 appearing on the first whorl, increasing to 25 on the last whorl; interspaces a little wider than the ribs, terminating a little above the periphery, leaving a narrow, smooth band in the suture; periphery rounded, base short, well rounded; aperture subquadrate, outer lip thin, columella somewhat reflected over the umbilical area. The type measures: length, 5.2 mm.; diameter, 1.3 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from beach drift at Corinto, Nicaragua.

The shell of this species may be differentiated from that of *Turbonilla* (*Strioturbonilla*) *oaxacana* in that the base is short and rounded rather than decidedly extended.

*Turbonilla* (*Strioturbonilla*) *oaxacana*

Hertlein & Strong, sp. nov.

Plate V, Fig. 9.

Shell elongate-conic, rather stout, translucent, white; nucleus very small, having an elevated spire with the axis at right angles to that of the following whorls in the first of which it is about one-fourth immersed; normal whorls 8, strongly rounded, almost tabulately shouldered; entire surface with very fine spiral striations; axial ribs rounded, nearly straight, protractive, 14 appearing on the first whorl, increasing to 24 on the last whorl; interspaces about twice as wide as the ribs, terminating a little above the periphery, leaving a narrow smooth band in the sutures; periphery rounded, base decidedly produced; aperture ovate, outer lip thin, columella straight. The type measures: length, 3.5 mm.; diameter, 1.1 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

This species differs from *Turbonilla* (*Strioturbonilla*) *corintonis* in that the base of the shell is decidedly produced rather than short and rounded.

*Turbonilla* (*Strioturbonilla*) *nahuatlana*

Hertlein & Strong, sp. nov.

Plate V, Fig. 14.

Shell small, elongate-conic, translucent, white; nucleus having an elevated spire with the axis at right angles to that of the following whorls, the tip extending beyond the edge of the first whorl in which it is slightly immersed; normal whorls 9, well rounded, entire surface with very fine spiral striae; axial ribs strong, rounded, nearly straight, decidedly protractive, 14 appearing on the first whorl, increasing to 20 on the last whorl; interspaces well impressed, a little wider than the ribs, extending from suture to suture and terminating at the periphery; periphery rounded, base short, well rounded; aperture subquadrate, outer lip thin, columella straight. The type measures: length, 2.8 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo.

<sup>112</sup> *Turbonilla* (*Strioturbonilla*) *santamariana* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 52, No. 2193, May 29, 1917, p. 642, pl. 44, fig. 2. "dredged in shallow water in Santa Maria Bay, Lower California."

Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

The shell of this species may be differentiated from that of *Turbonilla (Strioturbonilla) mcguirei* Strong & Hertlein<sup>113</sup> in that the axial ribs are decidedly protractile rather than only moderately so.

The specific name of this species is derived from the tribal name of the Nahuatl Indians of Central America.

***Turbonilla (Strioturbonilla) contrerasiana***

Hertlein & Strong, sp. nov.

Plate V, Fig. 13.

Shell elongate-conic, white; nucleus having an elevated spire, with the axis at right angles to that of the following whorls, the tip extending beyond the edge of the first whorl, in which it is about one-fourth immersed; normal whorls 9, very narrowly shouldered, well rounded, entire surface with very fine, microscopic spiral striations; axial ribs strong, nearly straight, decidedly protractile, 14 appearing on the first whorl, increasing to 20 on the last whorl; interspaces about twice as wide as the ribs, extending from suture to suture and terminating at the periphery which is rounded and without band or other marking; base short, rounded, with feeble extensions of the axial ribs on the upper part, and microscopic spiral striae similar to that on the spire; aperture subquadrate, outer lip thin, columella short, straight. The type measures: length, 3.4 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

The shell of this species may be differentiated from that of *Turbonilla (Strioturbonilla) nahuana* Baker, Hanna & Strong<sup>114</sup> in that the axial ribs are nearly straight rather than sinuous.

This species is named for Professor Francisco Contreras of the National Museum of Natural History of Mexico.

***Turbonilla (Strioturbonilla) nicaraguana***

Hertlein & Strong, sp. nov.

Plate IV, Fig. 7.

Shell elongate-conic, white; nucleus with a depressed helicoid spire having the axis at right angles to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 9, moderately rounded, very narrowly shouldered at the summit, somewhat overhanging at the base; axial ribs low, rounded, sinuous, moderately protractile, 18 appearing on the first whorl, increasing to 26 on the last whorl; in-

terspaces a little wider than the ribs, crossed by a narrow peripheral line of pits and about 30 fine, incised spiral lines; periphery well rounded, marked by a narrow band without spiral sculpture but undulated by the ends of the axial ribs and with a few incised axial lines in the interspaces; base short, rounded, with about 12 incised spiral lines which cut across the feeble extensions of the axial ribs; aperture subquadrate, outer lip thin, columella straight. The type measures: length, 4.5 mm.; diameter, 1.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged 12-13 fathoms (22-24 meters), mangrove leaves.

The shell of this species differs from that of *Turbonilla (Strioturbonilla) affinis* C. B. Adams<sup>115</sup> in that the axial ribs are sinuous rather than straight.

This species is named for the Indian Chief Nicaragua.

**Genus *Odostomia* Fleming.**

Subgenus *Besla* Dall & Bartsch.

***Odostomia (Besla) caneloensis***

Hertlein & Strong, sp. nov.

Plate VII, Fig. 3.

Shell minute, slender, elongate-conic, nucleus large, having a slightly elevated spire, with the axis at nearly a right angle to that of the following whorls, in the first of which it is about one-third immersed; normal whorls 5, strongly angulated at the posterior extremity of the anterior third; axial ribs strong, sinuous, somewhat protractile, 14 appearing on the first whorl, increasing to 18 on the last whorl; spiral sculpture in 2 series, on the upper two-thirds of the whorls there appear 3 fine incised lines in the interspaces between the ribs, followed by a strong cord at the angle, a second cord, equally strong, just above the sutures and a third similar cord half way between the two, forming spiral series of rectangular pits in the interspaces; periphery rounded, marked by a spiral cord similar to the preceding 3; base rounded, marked with the enfeebled extensions of the axial ribs and finer spiral cords; aperture ovate, outer lip thin, columella slender, curved, with a slender fold at its insertion. The type measures: length 1.6 mm.; diameter, 0.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters), sandy mud, crushed shell.

The shell of this species differs from that of *Odostomia (Besla) convexa* Carpenter<sup>116</sup>

<sup>113</sup> *Turbonilla (Strioturbonilla) mcguirei* Strong & Hertlein, Allan Hancock Pac. Exped., Vol. 2, No. 12, August 21, 1939, p. 197, pl. 19, fig. 1. "dredged in from 3 to 9 fms. off Taboga Island, Panama."

<sup>114</sup> *Turbonilla (Strioturbonilla) nahuana* Baker, Hanna & Strong, Proc. Calif. Acad. Sci., Ser. 4, Vol. 17, No. 7, June 29, 1928, p. 211, pl. 11, fig. 5. "Gulf of California."

<sup>115</sup> *Chennitzia affinis* C. B. Adams, Ann. Lyceum Nat. Hist. New York, Vol. 5, July, 1852, pp. 389, 535 (separate, pp. 165, 311). "Panama."—Dall & Bartsch, U. S. Nat. Mus., Bull. 68, 1909, p. 56, pl. 4, fig. 14 (as *Turbonilla (Strioturbonilla) affinis*).

<sup>116</sup> *Chrysalida convexa* Carpenter, Cat. Mazatlan Shells, December, 1856, p. 424. "Hab.-Mazatlan; 2 sp. off Spondylus; L'pool Col."—Dall & Bartsch, U. S. Nat. Mus., Bull. 68, 1909, p. 135, pl. 13, fig. 4 (as *Odostomia (Besla) convexa*).

in that the spiral sculpture occurs over most of the surface of the whorls rather than being confined to the lower third.

The name of this species is derived from El Canelo, Cinnamon Bay, the Spanish name for Port Parker, Costa Rica.

Subgenus *Chrysallida* Carpenter.

*Odostomia (Chrysallida) costaricensis*

Hertlein & Strong, sp. nov.

Plate VII, Fig. 9.

Shell small, elongate-conic, white; nucleus with a slightly elevated spire having the axis at an oblique angle with that of the following whorls, in the first of which it is about one-half immersed; normal whorls 7, almost flat-sided; axial sculpture of strong, retractive ribs of which 16 appear on the first whorl, increasing to 24 on the last whorl; spiral sculpture of cords a little less strong than the axial ribs of which 4 appear on the upper whorls, the upper one, just below the suture rather indistinct; on the fourth whorl a slender cord begins to appear in the suture, rapidly increases in size until on the penultimate whorl it equals the preceding one in strength and spacing; the intersections of the axial ribs and the upper 4 cords are slightly nodulous and the spaces enclosed by them appear as nearly square pits, the fifth cord is smooth; periphery marked by a smooth cord about as strong as the one preceding it; base rather long, marked by 5 strong cords, with, in the interspaces, numerous fine axial threads; aperture ovate, outer lip thin, columella slender, somewhat reflected, with a slight fold at its insertion. The type measures: length, 2.9 mm.; diameter, 0.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud. Additional specimens were dredged at Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, in 15 fathoms (27 meters), sandy mud, crushed shell.

The shell of this species differs from that of *Odostomia (Chrysallida) olssoni* Bartsch<sup>117</sup> in that there are 24 rather than 18 axial ribs on the penultimate whorl.

*Odostomia (Chrysallida) woodbridgei*

Hertlein & Strong, sp. nov.

Plate III, Fig. 8.

Shell small, elongate-conic, white; nucleus with a slightly elevated spire having the axis at nearly a right angle to that of the following whorls, in the first of which it is about one-half immersed; normal whorls 6, slightly rounded; axial sculpture of strong, slightly retractive ribs of which 16 appear on all whorls; spiral sculpture of raised cords not quite as strong as the ribs, 4 appearing on the

first 2 whorls, on about the third whorl the upper cord splits and continues on the remainder of the whorls as two closely spaced weak cords, the following 3 cords are much stronger and more widely spaced, on about the fourth whorl a sixth cord begins to appear in the suture and rapidly increases in size until on the penultimate whorl it equals the preceding cords in strength and spacing; the intersections of the axial ribs and the upper 5 spiral cords are slightly nodulous and the spaces enclosed between the ribs and the 3 median cords appear as deep rectangular pits, the sixth cord is smooth and the space between it and the preceding cord is crossed by feeble extensions of the axial ribs; periphery rounded, marked by a smooth cord about as strong as the preceding one; base rather long, marked by 5 strong spiral cords, with, in the interspaces, numerous fine axial threads; aperture ovate, outer lip fractured in the type, columella slender, somewhat reflected, with a strong fold at its insertion. The type measures: length, 2.3 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters), shelly mud, crushed shell. Additional specimens were dredged at Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, in 12 fathoms (22 meters), shelly mud.

This species differs from such species as *Odostomia (Chrysallida) olssoni* Bartsch in that there are 6 rather than 5 spiral cords on the penultimate whorl.

This species is named for Mr. Woodbridge Williams of Inverness, California, who has presented many fine specimens of mollusks to the California Academy of Sciences.

*Odostomia (Chrysallida) guatulcoensis*

Hertlein & Strong, sp. nov.

Plate VII, Fig. 2.

Shell small, elongate-ovate, vitreous; nucleus decollated; normal whorls 5, almost flat-sided; sculptured with broad spiral cords with narrow interspaces, bearing axially elongated nodules arranged in retractive axial rows on the upper whorls, 24 rows appearing on the penultimate whorl, on about the third whorl a fifth smooth cord begins to appear in the suture and rapidly increases in strength until on the penultimate whorl it equals the others in strength and spacing; periphery marked by a smooth cord slightly narrower than the one preceding it; base short, marked with 5 strong cords; aperture ovate, outer lip thin, columella appressed to the base, with a strong fold at its insertion. The type measures: length, 2.0 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

<sup>117</sup> *Odostomia (Chrysallida) olssoni* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 66, No. 2551, Art. 14, October 17, 1924, p. 7, pl. 2, fig. 3. From "Santa Elena Bay, Ecuador."

The shell of this species differs from that of *Odostomia (Chrysallida) promeces* Dall & Bartsch<sup>118</sup> in that the base is sculptured with 5 rather than 3 spiral cords.

***Odostomia (Chrysallida) corintoensis***

Hertlein & Strong, sp. nov.

Plate VIII, Fig. 11.

Shell large, elongate-ovate, white; nucleus having a depressed helicoid spire with the axis at right angles to that of the following whorls, in the first of which it is deeply immersed; normal whorls 7, flat-sided, separated by deep sutures; axial sculpture of strongly protractive ribs of which 20 appear on the second whorl, increasing to 24 on the penultimate whorl; spiral sculpture of cords about as strong as the axial ribs, of which 5 appear on the first four whorls, on about the fifth whorl a slender cord begins to appear in the suture which rapidly increases in strength until on the penultimate whorl it equals the others in strength and spacing; the intersections of the axial ribs and the first 5 cords are somewhat nodulous while the sixth cord is smooth; periphery marked by a strong cord; base rather long, marked with 5 spiral cords; the spaces between the fifth and sixth cords, between the sixth and peripheral cords, and between the basal cords are marked with fine axial threads; aperture oval, outer lip thin, columella appressed to the base with a strong fold at its insertion. The type measures: length, 4.0 mm.; diameter, 1.7 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Corinto, Nicaragua, collected in beach drift.

The shell of this species is similar to that of *Odostomia (Chrysallida) capa* Bartsch<sup>119</sup> but among other differences it exceeds 3 mm. in length whereas Bartsch's species is less than 3 mm. in length.

***Telloda* Hertlein & Strong, subgen. nov.**

Type: *Odostomia (Scalenostoma) dotella* Dall & Bartsch, 1909.

Shell with the angulation high upon the posterior portion of the whorls.

Dall & Bartsch, 1909, included *Odostomia dotella* under the subgenus *Scalenostoma* Deshayes. Bartsch<sup>120</sup>, 1917, considered *Scalenostoma* to be a genus in the family Melanellidae and included in it two species, *S. rangii* de Folin and *S. babylonica* Bartsch. This left *Odostomia dotella* without a subgeneric assignment. The high angulation on the whorls of *O. dotella* and of the new species here described as *O. subdotella* furnish shell characters so different from the other west American species of *Odostomia* that we have

<sup>118</sup> *Odostomia (Chrysallida) promeces* Dall & Bartsch, *U. S. Nat. Mus., Bull.* 68, December 13, 1909, p. 164, pl. 13, figs. 2, 2a. "Todos Santos Bay, Lower California."

<sup>119</sup> *Odostomia (Chrysallida) capa* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 69, No. 2646, Art. 20, December 16, 1926, p. 15, pl. 2, fig. 4. "on the coast southeast of Punta Santa Elena, Santa Elena Peninsula, Ecuador."

<sup>120</sup> Bartsch, P., *Proc. U. S. Nat. Mus.*, Vol. 53, No. 2207, August 13, 1917, p. 337.

been led to propose a new subgenus *Telloda*<sup>121</sup> to include them.

Key to the species of *Telloda*.

- A. Angulation on penultimate whorl at anterior third of whorl; a spiral cord present on angulation.....*subdotella*  
 B. Angulation on penultimate whorl at less than anterior third of whorl; angulation lacking a spiral cord.....*dotella*

***Odostomia (Telloda) subdotella***

Hertlein & Strong, sp. nov.

Plate VIII, Fig. 5.

Shell elongate-conic, white, with the nucleus tilted at an oblique angle and almost entirely immersed in the first of the following whorls; normal whorls 7, the lower whorls strongly angulated, the first 2 whorls slightly rounded, separated by a deep suture, middle whorls flattened with an angulation and point of greatest diameter at an increasing distance above the suture, until on the penultimate whorl the angulation is at the anterior third with the surface from there to the summit slightly concave and the slope to the suture very abrupt; entire surface with microscopic lines of growth and indistinct spiral striation; base moderately long, flattened; aperture ovate, outer lip thin, slightly angulated in the middle, columella curved, with a slight fold at its insertion. The type measures: length, 2.9 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters), sandy mud, crushed shell. Additional specimens were dredged at Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., Corinto, Nicaragua, in 12-13 fathoms (22-24 meters), mangrove leaves.

**Subgenus *Evalea* A. Adams.**

***Odostomia (Evalea) gallegosiana***

Hertlein & Strong, sp. nov.

Plate VIII, Fig. 1.

Shell regularly elongate-conic, white; nucleus deeply immersed in the first of the following whorls with only the tilted edge appearing, giving the apex a truncated appearance; normal whorls 6, almost flat-sided, separated by a narrow, deep suture; entire surface with microscopic spiral striations and equally fine lines of growth; periphery subangulated, base short, rounded; aperture irregular in the type, due to a fracture which has been partially mended; columella short, curved, with a raised edge separated from the body whorl by a shallow groove but showing no umbilical pit, the fold at the insertion strong. The type measures: length, 2.8 mm.; diameter, 1.1 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port

<sup>121</sup> *Telloda*, anagram of *dotella*.

Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell. Specimens were also dredged at Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

The shell of this species differs from that of such species as *Odostomia (Evalea) parella* Dall & Bartsch and *Odostomia (Evalea) palmeri* Bartsch in that the periphery of the body whorl is subangulated rather than well rounded.

This species is named for Professor José María Gallegos, former explorer for the Departamento de Agricultura y Fomento, Mexico.

Subgenus *Evalina* Dall & Bartsch.

*Odostomia (Evalina) tehuantepecana*

Hertlein & Strong, sp. nov.

Plate VIII, Fig. 7.

Shell small, elongate-conic, translucent, white; nucleus having the axis at nearly right angles to that of the following whorls, in the first of which it is deeply immersed with only the tilted edge appearing; normal whorls 5, rounded, rather broad between the sutures; axial sculpture of strong ribs, on the first 2 whorls extending from suture to suture, on the third whorl fading out on the lower portion and on the penultimate whorl only occupying the upper half, 16 appearing on the penultimate whorl; spiral sculpture of flattened cords separated by shallow incised lines, 4 appearing in the interspaces between the ribs and 4 between the lower end of the ribs and the following suture on the penultimate whorl; periphery rounded, marked with a slender cord; base rounded, marked with 8 spiral cords similar to that on the periphery; aperture somewhat flaring, oval, outer lip thin, showing the spiral sculpture plainly within, columella short, curved, with a weak fold at its insertion. The type measures: length, 2.3 mm.; diameter, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

The shell of this species differs from that of *Odostomia (Evalina) intermedia* Carpenter<sup>122</sup> in that on the summit of the whorls the axial ribs are strong rather than feeble.

Subgenus *Menestho* Möller.

*Odostomia (Menestho) nicoyana*

Hertlein & Strong, sp. nov.

Plate VIII, Fig. 3.

Shell elongate-conic, white; nucleus with an elevated spire having the axis at right angles to that of the following whorls, in the first of which it is deeply immersed, the tip

deeply notching the edge; normal whorls 7, flat-sided, regularly increasing in size; sculpture on all whorls of 3 strong, sharp edged cords with deep, rounded interspaces, crossed by fine axial threads, of these cords the anterior is somewhat stronger than the other 2; periphery angulated, marked by a cord only a little less strong than those on the spire; base short, slightly rounded, marked with 4 spiral cords, the first a little below the peripheral cord and about as strong, this is followed by a smooth space and then 3 closely spaced, much finer cords; aperture subquadrate, outer lip thin, rendered wavy by the spiral cords, columella short, curved, with a strong fold at its insertion. The type measures: length, 3.3 mm.; diameter, 1.7 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud. Additional specimens were dredged at Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, in 15 fathoms (27 meters), sandy mud, crushed shell.

The shell of this species differs from that of *Odostomia (Menestho) ciguanis* Strong<sup>123</sup> in that the anterior cord between the sutures is stronger than the other two whereas in the species described by Strong the cords are equal and are separated by narrower interspaces.

Subgenus *Miralda* A. Adams.

*Odostomia (Miralda) rhizophorae*

Hertlein & Strong, sp. nov.

Plate VII, Fig. 1.

Shell very small, elongate-ovate, white; nucleus almost completely immersed in the first of the following whorls, above which only the tilted edge projects; normal whorls 6; spiral sculpture between the sutures of 2 nodulous keels, of which the upper is just below the suture while the lower is some distance above the following suture, nodules on the upper keel axially elongated and on the lower keel well rounded; axial sculpture of low ribs connecting the nodules and extending as weaker threads between the lower keel and the edge of the peripheral keel which is exposed in the suture, 24 appearing on the penultimate whorl; periphery marked by a rather broad, almost smooth keel; base short, marked by 3 spiral keels, with, in the interspaces, axial threads corresponding to the axial ribs; aperture ovate, outer lip fractured in the type, columella strong, curved, with a weak fold at its insertion. The type measures: length, 2.1 mm., diameter, 1.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

<sup>122</sup> *Dunkeria intermedia* Carpenter, Cat. Mazatlan Shells, December, 1856, p. 435. "Hab.-Mazatlan; 2 sp. off Spondylus: L'pool Col."—Dall & Bartsch, *U. S. Nat. Mus., Bull.* 63, 1909, p. 181, pl. 20, fig. 6 (as *Odostomia (Evalina) intermedia*).

<sup>123</sup> *Odostomia (Menestho) ciguanis* Strong, *Bull. South. Calif. Acad. Sci.*, Vol. 48, Pt. 2, May-August (issued November 4), 1949, p. 89, pl. 12, fig. 3. "Gulf of California without definite location."

The shell of this species differs from that of species such as *Odostomia (Mivalda) armata* Carpenter in that the base is sculptured with 4 rather than 3 spiral cords.

Superfamily Taenioglossa.

FAMILY CERITHIOPSIDAE.

Genus *Cerithiopsis* Forbes & Hanley.

*Cerithiopsis guatulcoensis*

Hertlein & Strong, sp. nov.

Plate VII, Fig. 7.

Shell regularly elongate-conic, slender, light brown, with the whorls somewhat darker toward the summits; nucleus forming a conical spire with 4 smooth, white whorls set off from the following whorls by a sharp line; postnuclear whorls 8, slightly rounded, sutures impressed; spiral sculpture of 3 strong, nodulous cords, the posterior at the summit, the anterior a little above the suture and the median half way between the other 2, the posterior cord a little weaker than the others on all whorls; nodules somewhat spirally elongated without sharp truncation, 16 appearing on the first whorl, increasing to 20 on the penultimate whorl, the nodules connected by slender axial threads, those between the anterior and median cord being nearly vertical, while those between the median and posterior cords are strongly retractive; the spaces enclosed by the axial threads and the anterior and median spiral cords form square pits and those between the median and posterior spiral cords form a parallelogram; periphery marked by a slender cord separated from the anterior cord by a space about as wide as that between the anterior and median cords and rendered slightly nodulous by the extensions of the axial threads; base very short, with an incised line encircling the columella and faint axial striae corresponding to the extensions of the axial threads; aperture subquadrate, strongly channeled anteriorly, outer lip thin, scalloped by the spiral cords, columella short, slightly curved. The type measures: length, 3.7 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell. Additional specimens were dredged at Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., Corinto, Nicaragua, in 12-13 fathoms (22-24 meters), mangrove leaves. A specimen from this locality with the two lower nuclear whorls, 9 postnuclear whorls and a broken aperture measures: length, 5.1 mm.; diameter, 1.5 mm.

The pits between the spiral cords on the shell of this species are unequal rather than equal as on *Cerithiopsis grippi* Bartsch.<sup>124</sup>

*Cerithiopsis guanacastensis*

Hertlein & Strong, sp. nov.

Plate VII, Fig. 10.

Shell regularly elongate-conic, dark brown, with the top of the tubercles paler; nuclear whorls broken with only a portion of the last whorl remaining which is smooth except for a sharp central keel; postnuclear whorls 11, sculptured with 3 spiral cords and almost equally strong axial ribs, of which 16 appear on the first whorl, increasing to 24 on the penultimate whorl; the intersection of the spiral cords and axial ribs forming large, raised tubercles and the spaces enclosed by them deep, square pits; on the spiral cords the posterior is at the summit of the whorls and the anterior a little above the suture with the median about half way between them; the tubercles of the posterior spiral row rounded, rather faint on the first 2 or 3 whorls but slightly the largest on the later whorls, the tubercles of the median and anterior row somewhat truncated on the posterior face; periphery with a spiral cord only a little less strong than those on the spire and rendered somewhat nodulous by the extensions of the axial ribs; base short, rounded, with 2 spiral cords of which the upper is nearer to the peripheral cord than to the lower, entire surface of spire and base with microscopic striations; aperture subquadrate, outer lip thin, scalloped by the spiral cords, anterior channel strong, columella short, not reflected. The type measures: length, 6.2 mm.; diameter, 2.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Long Beach NW. of Port Parker, Costa Rica.

The base of the shell of this species is sculptured with 2 unequal cords in comparison to 3 equal cords on *Cerithiopsis cosmia* Bartsch.<sup>125</sup>

*Cerithiopsis perrini*

Hertlein & Strong, sp. nov.

Plate VII, Fig. 5.

Shell minute, pupiform, light chestnut brown; nuclear whorls forming a slender, white spire, the first whorl smooth, the remainder with closely spaced retractive axial threads of which about 20 appear on the last whorl; postnuclear whorls 5½, spiral sculpture of, on the first whorl, 2 nodulous cords, of which the posterior is much the smaller, on the second whorl it rapidly increases in strength and the tubercles become axially elongated, while on the third whorl this cord is split into 2 distinct, closely spaced cords, which on the penultimate whorl about equal the anterior cord in strength; axial sculpture of somewhat retractive ribs connecting the tubercles, 14 appearing on the first whorl, increasing to 18 on the penultimate whorl, the spaces enclosed by the axial cords and the posterior and median cords appearing as

<sup>124</sup> *Cerithiopsis (Cerithiopsis) grippi* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 52, No. 2193, May 29, 1917, p. 669, pl. 46, fig. 12. "In 15 fathoms, outside of kelp, off San Diego Bay, California."

<sup>125</sup> *Cerithiopsis cosmia* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 33, No. 1564, October 23, 1907, p. 180. "Whites Point, San Pedro." California.—Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 40, No. 1823, 1911, p. 348, pl. 38, fig. 7 (as *Cerithiopsis (Cerithiopsidella) cosmia*).



narrow, spirally elongated pits, and those between the median and anterior cord as irregular, squarish pits, posterior and median rows of nodules rounded, the anterior somewhat truncated posteriorly; periphery marked by a cord a little less strong than those on the spire on which the axial ribs terminate; base rather produced, with a broad, rounded cord in the middle, and a second, slightly smaller just above the insertion of the columella; aperture rounded with a short canal, outer lip thin, columella slightly reflected, body with a thin callus. The type measures: length, 1.9 mm.; diameter, 0.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N.; Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

The shell of this species can be differentiated from that of *Cerithiopsis bristolae* Baker, Hanna & Strong<sup>126</sup> in that the posterior row of pits is narrower than the others.

This species is named for the late James Perrin Smith, Professor of Paleontology at Stanford University.

***Cerithiopsis oaxacana***

Hertlein & Strong, sp. nov.

Plate VII, Fig. 4.

Shell elongate-conic, chestnut brown; nuclear whorls 4, white, forming an elevated spire, smooth except for a keel at the anterior third and on the last whorl a smaller cord just above the suture; postnuclear whorls 7, slightly rounded; spiral sculpture of tuberculate cords, 2 appearing on the first two whorls, the posterior at the summit and the anterior a little above the suture, on the third whorl the nodules of the posterior cord become axially elongated with an incised line in the middle, this division increases in depth and width until on the penultimate whorl there are 3 spiral cords of about equal strength and spacing; axial sculpture of narrow, slightly retractive ribs connecting the nodules, not as strong as the spiral cords, 16 appearing on the first whorl, increasing to 22 on the penultimate whorl, the spaces inclosed between the axial ribs and spiral cords on the lower whorls appearing as well impressed, rounded pits, the posterior spiral row of nodules rounded, the median and anterior somewhat truncated on the posterior face; the periphery marked by a cord only a little less strong than those on the spire with the space between it and the anterior cord a little narrower than that between the anterior and median cords, rendered slightly nodulous by the feeble extensions of the axial ribs; base moderately long, slightly concave, with a strong, rounded cord in the middle; aperture rounded, with a short canal, the

edge of the outer lip fractured, columella curved, strongly reflected, body with a strong callus. The type measures: length, 2.6 mm.; diameter 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

The tubercles ornamenting the shell of this species are truncated posteriorly whereas on such forms as *Cerithiopsis pupiformis* Carpenter<sup>127</sup> the tubercles are rounded.

FAMILY CERITHIIDAE.

Genus *Bittium* Leach in Gray.

Subgenus *Lirobittium* Bartsch.

***Bittium (Lirobittium) arenaense***

Hertlein & Strong, sp. nov.

Plate VII, Fig. 8.

Shell rather large for the genus, elongate-conic, light yellowish-brown; nuclear whorls 2, the first tilted, smooth, the second with 2 spiral keels; postnuclear whorls 11, at first regularly increasing in size and angulated in the middle, later becoming almost cylindrical and without angulation; sculptured with 3 equal spiral rows of nodules, truncated on the anterior face and connected by low spiral cords and axial ribs; the first of these rows is some distance below the suture, the last close to the following suture, and the third about halfway between the other two; periphery with a nodulous spiral cord which is more or less exposed in the suture; base short, with 5 closely spaced spiral cords, of which the upper one, just below the peripheral cord, is the strongest and somewhat nodulous; of the nodules 10 appear in each spiral row on the first whorl and about 20 on the last whorl; entire surface with microscopic lines of growth and in some places very fine intercalary spiral threads; aperture small, channeled anteriorly; outer lip thin, defective in the type, columella flexuous, body with a thin callus. The type measures: length, 10.5 mm.; maximum diameter, 2.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 136-D-22, Arena Bank, Gulf of California, Lat. 23° 28' 30" N., Long. 109° 25' 00" W., in 45 fathoms (82 meters), mud. About 100 additional specimens were dredged at the same locality. Five specimens were dredged in the same general locality at Station 136-D-18, in 40 fathoms (73 meters), mud. 16 specimens were dredged at Station 150-D-8, Gorda Banks, Lat. 23° 05' 00" N., Long. 109° 30' 00" W., in 40-45 fathoms (73-82 meters), muddy sand.

Some of the paratypes show the peripheral keel entirely exposed in the suture as a fourth spiral row of nodes, also some of them

<sup>126</sup> *Cerithiopsis (Cerithiopsida) bristolae* Baker, Hanna & Strong, *Proc. Calif. Acad. Sci.*, Ser. 4, Vol. 23, No. 15, May 24, 1938, p. 219, pl. 19, fig. 4. "Cape San Lucas, Lower California."

<sup>127</sup> *Cerithiopsis pupiformis* Carpenter, *Cat. Mazatlan Shells*, December, 1856, p. 443. "Hab.-Mazatlan; extremely rare, off Spondylus; L'pool Col."—Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 40, No. 1823, 1911, p. 337, pl. 38, figs. 1, 5 (as *Cerithiopsis (Cerithiopsis) pupiformis*).

show patches or bands of much darker brown.

In Bartsch's key<sup>128</sup> to the west American species of *Bittium* this new species would follow *Bittium oldroydae* Bartsch<sup>129</sup> from which it differs principally in the smaller size, less shouldered whorls and more slender form.

FAMILY TURRITELLIDAE.

Genus *Turritella* Lamarck.

*Turritella clarionensis*

Hertlein & Strong, sp. nov.

Plate II, Fig. 13.

Shell tapering, apical angle fairly broad, tip curved to the right, chalky white, with rather indistinct, narrow, interrupted, brown, axial lines following the lines of growth; extreme tip broken on type, remaining whorls 17; spiral sculpture consists of a rounded cord or ridge just below the suture and a similar cord a short distance above the following suture, the area between the cords concave; additional spiral sculpture of a few indistinct threads on the spire and a narrow, stronger thread on the sharply angulated periphery, separated from the lower cord by a groove and showing more or less distinctly on the spire; axial sculpture consists of rough, raised, antispiral lines of growth, which reach their maximum in about the median portion of the whorl, the spiral sinus reaches its maximum at the periphery; base flat, sculptured with curved lines of growth in some cases forming a small antispiral sinus, in addition to this there are fine spiral threads of which the 2 or 3 immediately below the periphery are the most distinct; aperture subquadrate; outer lip thin, the upper part concave and the angle at the junction with the basal lip is drawn forward into a projecting point. Dimensions of the type: length, 56 mm.; maximum diameter, 16.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 163-D-2, 3 miles off Pyramid Rock off Clarion Island; Revillagigedo Islands, Mexico, Lat. 18° 19' 00" N., Long. 114° 45' 00" W., dredged in 55 fathoms (100 meters), on rock and coral bottom. Two other specimens were dredged at the same locality. One specimen was dredged on Arena Bank, in the Gulf of California (136-D-22), Lat. 23° 28' 30" N., Long. 109° 25' 00" W., in 45 fathoms (82 meters), on a mud bottom. One large, eroded specimen was dredged on Hannibal Bank, Panama.

This species is somewhat similar to *Turritella cooperi* Carpenter in having two spiral ridges separated by a concave central area but it has a greater apical angle, the large antispiral sinus reaches its maximum in the middle of the whorl rather than near the

<sup>128</sup> Bartsch, P., *Proc. U. S. Nat. Mus.*, Vol. 40, 1911, pp. 389-390.

<sup>129</sup> *Bittium oldroydae* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 40, No. 1826, May 12, 1911, p. 408, pl. 51, fig. 5. "The type was collected in drift in Lower California." Specimens also from Destruction Island, Washington.

lower ridge, and the color is different. The new species differs from *T. radula* and *T. mariana* in the much greater apical angle, in lacking strong spiral beaded sculpture and in the much lighter color.

The very deep antispiral sinus in the outer lip of this species is somewhat suggestive of forms from the southwestern Pacific which were placed under *Colpospira* by Donald.<sup>130</sup> Merriam,<sup>131</sup> after a study of various species of *Turritella*, concluded that "the growth-line characters of *Colpospira* are not typically Murchisonid but simply a modification of the type found in many turritellas, and that in *Colpospira* they have acquired sinus depth to a greater degree than has any other known member of this family."

FAMILY RISSOIDAE.

Genus *Alvania* Leach in Risso.

*Alvania? ingrami* Hertlein & Strong, sp. nov.

Plate VII, Fig. 6.

Shell ovate, conic, white with the basal cords brown; nucleus eroded; remaining whorls 6, sculptured with 10 strong rounded axial ribs most prominent on the middle of the whorls, terminating a little above the periphery, interspaces rounded, crossed by spiral threads which ride over the ribs but do not render them nodulous, these threads are indistinct on the upper whorls, about 10 appearing on the penultimate whorl; entire surface with microscopic axial striations; sutures impressed, showing 1 or 2 of the brown spiral basal cords; periphery rounded, without definite markings, base rather long, slightly rounded, with 10 spiral cords somewhat stronger than the threads on the spire; aperture somewhat oblique, posterior angle with a slight sinus and separated from the body whorl by a wedge of callus, outer lip little thickened, strongly produced, rounding into the columella, body with a strong callus. The type measures: length, 3.1 mm.; diameter, 1.7 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

The shell of this species is somewhat similar to that of *Rissoina (Folinia) signae* Bartsch<sup>132</sup> but the shape of the outer lip is quite different.

This species is named for Dr. William M. Ingram, Professor of Zoology, Mills College, Oakland, California.

<sup>130</sup> *Colpospira* Donald, *Proc. Malacol. Soc. London*, Vol. 4, No. 2, August 1, 1900, p. 51. "Type.—*Turritella runcinata*, Watson." Illustrated on pl. 5, figs. 7, 7a. Bass Strait between Australia and Tasmania.

<sup>131</sup> Merriam, C. W., *Univ. Calif. Publ. Bull. Dept. Geol. Sci.*, Vol. 26, No. 1, March 8, 1941, p. 19.

<sup>132</sup> *Rissoina (Folinia) signae* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 49, July 24, 1915, p. 61, pl. 31, figs. 1 and 4. "The type, which is said to come from Negrito Island (loc.?) or Margarita Island, Bay of Panama." = *Rissoina insignis* De Folin, Les Méléagrinoles, (Havre), 1867, pp. 48-49, pl. 5, figs. 2 and 3. Not *Rissoina insignis* Adams & Reeve, 1850.

## FAMILY RISSOINIDAE.

Genus *Rissoina* d'Orbigny.*Rissoina alarconi*

Hertlein &amp; Strong, sp. nov.

Plate VIII, Fig. 12.

Shell elongate-conic, white; nuclear whorls 3, smooth, well rounded; postnuclear whorls 6, rounded, with the point of greatest diameter a little above the impressed suture; axial sculpture of low, strongly protractive ribs which fade out at the suture, of these 18 appear on the first whorl, increasing to about 40 on the penultimate whorl; spiral sculpture of slender threads in the interspaces between the ribs, 10 appearing on the first whorl, increasing to 16 on the penultimate whorl; on the first whorl a median spiral thread is much the strongest, angulating the whorl, and a second, just above the suture, is only a little less strong, on the second whorl the median thread fades out while the one above the suture remains the strongest throughout the remaining whorls, the remainder of the threads being subequal and subequally spaced; periphery rounded, base somewhat produced, with 15 spiral cords distinctly stronger than the spiral threads on the spire, with, in the interspaces on the upper part of the base, feeble extensions of the axial ribs; aperture ovate, slightly channeled posteriorly and anteriorly, outer lip with a thick callus immediately behind the edge, body with a strong callus. The type measures: length, 4.8 mm.; diameter 1.8 mm.

Holotype (Calif. Acad. Sci. Dept. Paleol. Type Coll.), from Station 203-D-3, Lat. 15° 55' 45" N.; Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud. Specimens also were dredged at Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, in 12-13 fathoms (22-24 meters), mangrove leaves.

This species bears a resemblance to *Rissoina townsendi* Bartsch<sup>133</sup> but differs in that the axial ribs are much more protractive.

This species is named for Hernando de Alarcón, Admiral of the Spanish Viceroy Mendoza, who in 1540 sailed to the headwaters of the Gulf of California.

*Rissoina axeliana* Hertlein & Strong, sp. nov.

Plate III, Fig. 6.

Shell small, elongate-conic, translucent, white; nuclear whorls 3, well rounded, smooth; postnuclear whorls 5, well rounded, with the sutures impressed; axial sculpture absent; spiral sculpture of indistinct threads, about 16 appearing on the penultimate whorl, of which the one immediately below the suture is slightly the widest and separated from the following thread by a distinct incised line, thus forming a slightly impressed band at the summit of the whorls; periphery well rounded, base somewhat produced, sculptured with fine spiral threads

similar to those on the spire; aperture large, ovate, outer lip with a slight constriction at the posterior angle, rounding into the basal lip, thin at the edge, reinforced by a slight callus, columella narrow, curved, body without callus. The type measures: length, 2.4 mm.; diameter, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleol. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell.

The present specimens may not be fully mature and it appears possible that the outer lip might become more thickened with the addition of another whorl.

This species bears a resemblance to *Rissoina lapazana* Bartsch<sup>134</sup> but differs in possessing a much smaller shell which is more finely sculptured.

This species is named for Axel A. Olsson who has made many contributions to the knowledge of the Cenozoic mollusks of South and Central America.

Subgenus *Folinia* Crosse.*Rissoina (Folinia) ericana*

Hertlein &amp; Strong, sp. nov.

Plate VIII, Fig. 10.

Shell elongate-conic, white; nucleus with 4 well rounded, translucent whorls separated from the postnuclear whorls by a distinct line; postnuclear whorls 6, rounded, narrowly shouldered at the summit; axial sculpture of strong, retractive, sinuous ribs forming sharp points at their summits which project over the suture, of these ribs 12 appear on the first postnuclear whorl, increasing to 18 on the penultimate whorl; spiral sculpture of raised threads which ride over the ribs rendering them slightly tuberculate, rather indistinct on the upper whorls, strong on the penultimate whorl where 16 appear; periphery rounded, marked by a narrow incised line; base produced with a strong fasciole anteriorly, sculptured with strong continuations of the axial ribs which cross the fasciole to the umbilical region, and 7 spiral threads similar to those on the spire above the fasciole which is finely spirally threaded; aperture oval with a small area at the posterior angle set off by a denticle on the outer lip; outer lip rounded at the edge, reinforced by a strong callus rendered nodulous by the ends of the spiral cords; anterior end of aperture slightly channeled, columella strong, curved, body with a slight callus. The type measures: length, 3.0 mm.; diameter, 1.2 mm.

Holotype (Calif. Acad. Sci. Dept. Paleol. Type Coll.), from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters), gr. sand, crushed shell. Specimens also were dredged at Station 203-D-3,

<sup>133</sup> *Rissoina townsendi* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 49, No. 2094, July 24, 1915, p. 48, pl. 29, fig. 3. Dredged at "Agua Verde Bay, Lower California."

<sup>134</sup> *Rissoina lapazana* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 49, No. 2094, July 24, 1915, p. 50, pl. 30, fig. 6. "dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 2823 in 26½ fathoms on broken shell bottom off La Paz, Gulf of California."

Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud.

This species resembles *Rissoina* (*Folinia*) *signae* Bartsch<sup>135</sup> but differs in that the axial ribs are more numerous and the whorls are less shouldered.

This species is named for Eric Knight Jordan, formerly Assistant Curator of the Department of Paleontology, California Academy of Sciences.

#### FAMILY VANIKORIDAE.

Genus *Vanikoro* Quoy & Gaimard.

##### *Vanikoro galapagana*

Hertlein & Strong, sp. nov.

Plate XI, Figs. 7, 8.

Shell naticoid, thin, white, with about 2 nearly smooth nuclear whorls and a little over 2 well rounded and finely sculptured normal whorls; sculpture at first of 3 spiral cords or ridges which steadily increase in number but not in strength until at the outer lip there are about 20 fine threads, these are crossed by nearly equally strong and equally spaced lines of growth, slightly nodulous at the intersections, at first this sculpture has a cancellated appearance but later appears as a more widely spaced net of fine lines; aperture semilunate, oblique, outer lip thin, regularly curved, columella slightly curved, ending posteriorly in a thin callus spreading over the body of the shell; umbilicus narrow, deep; operculum corneous, thin. Dimensions of holotype: height of shell, 7.5 mm.; diameter 13.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 54, Hood Island, Galapagos Islands, collected by the *Arcturus* Expedition, 1925.

The early whorls of this species bear cancellated sculpture and somewhat resemble those of *Vanikoro aperta* Carpenter<sup>136</sup> originally described from Cape San Lucas, Lower California. The shell of that species is sculptured with stronger, more nodulose spiral threads.

#### Superfamily Rhipidoglossa.

#### FAMILY LIOTIIDAE.

Genus *Macrarenne* Hertlein & Strong, gen. nov.

Type: *Liotia* (*Arene*) *californica* Dall, *Bull. Mus. Comp. Zool.*, Vol. 43, No. 6, October, 1908, p. 344. "U. S. S. 'Albatross,' station 2984<sup>137</sup>, off Lower California, in 113 fathoms, sand, bottom temperature 49.8° F."—Strong, *Trans. San Diego Soc. Nat. Hist.*, Vol. 7, No. 37, 1934, p. 441, pl. 23, figs. 4, 5, 6.

<sup>135</sup> *Rissoina* (*Folinia*) *signae* Bartsch, *Proc. U. S. Nat. Mus.*, Vol. 49, No. 2094, July 24, 1915, p. 61, pl. 31, figs. 1, 4. New name for *Rissoa insignis* de Folin, 1867, not *Rissoa insignis* Adams & Reeve, 1850. "The type which is said to come from Negrito Island (loc.?) or Margarita Island, Bay of Panama."

<sup>136</sup> *Narica aperta* Carpenter, *Ann. & Mag. Nat. Hist.*, Ser. 3, Vol. 13, June, 1864, p. 476. Reprint in *Smithson. Miscell. Coll.*, No. 252, 1872, p. 215. "Cape St. Lucas," Lower California.

<sup>137</sup> In the list of dredging stations of the "Albatross," Station 2984 is cited as located in Lat. 21° 14' 53" N., Long. 157° 51' 10" W., in 50 fathoms.

Shell depressed turbinata, with strong peripheral projections. The surface is sculptured with both spiral cords and axial ribs or threads. The two species placed in this genus, described as *Liotia* (*Arene*) *californica* Dall and *Liotia* (*Arene*) *pacis* Dall, are much larger than the other west American species of *Liotia* and *Arene*.

#### FAMILY VITRINELLIDAE.

Genus *Cyclostrema* Marryat.

##### *Cyclostrema gordana*

Hertlein & Strong, sp. nov.

Plate IX, Figs. 3, 4, 7.

Shell small, depressed, white; nuclear whorls 2, very small, smooth, projecting very little above the succeeding whorls; post-nuclear whorls a little more than 3, rapidly increasing in diameter; distinctly sculptured with equal, spiral cords, of which the first is some distance below the suture, from which it is separated by a broad concave area, while the following 4 are much more closely spaced, the last of these cords forms the upper edge of a broad, flattened, spirally striated periphery; base slightly convex, with 3 spiral cords, the upper one forming the lower edge of the flattened periphery, the other 2 forming a closely spaced pair at the edge of the umbilicus; umbilicus wide, deep, showing all the whorls within; entire surface of the shell with fine axial lines which near the aperture and on the inside of the umbilicus become narrow, curved folds; aperture circular, thickened within, the edge thin with the spiral cords forming small, projecting points; peristome continuous, flattened and with callus over the body of the shell. Dimensions of type: maximum diameter, 9.7 mm.; minimum diameter, 7.0 mm.; height, 3.3 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), dredged at Station 150-D-8, Lat. 23° 05' 00" N., Long. 109° 30' 00" W., Gorda Banks, Gulf of California, in 40-45 fathoms (73-82 meters), muddy sand.

The unique type of this new species is very similar to *Cyclostrema angulata* A. Adams<sup>138</sup> from the West Indies, differing principally in the smaller size and more depressed form.

Genus *Cyclostremiscus* Pilsbry & Olsson.

##### *Cyclostremiscus humboldti*

Hertlein & Strong, sp. nov.

Plate X, Fig. 1.

Shell sharply angulated and keeled, white; nuclear whorls 2, rounded, smooth, shining, forming a flattened apex, set off from the following whorls by a well defined line; post-nuclear whorls a little over 2, with a sharply

<sup>138</sup> *Cyclostrema angulata* A. Adams, *Proc. Zool. Soc. London*, November 12, 1850, p. 44. "Hab. in insulis Philippinis." "Hab. Sibonga, island of Zebu, 10 fathoms, sandy mud; H. C. (Mus. Cuming)."—Sowerby *Thes. Conch.*, Vol. 3, 1863, p. 250, pl. 255, figs. 1, 2. Philippine Archipelago. Pilsbry (*Man. Conch.*, Vol. 10, 1888, p. 92, pl. 32, figs. 63, 64, 65) stated that the locality, Philippine Islands, originally cited, needs confirmation and that "There can be no doubt of the identity with this species of *C. Beau*, Fischer (fig. 63), a West Indian species."

keeled angle at the shoulder and another at the periphery which projects over the suture, leaving the upper portion exposed on the spire, the space between the upper keel and the suture flat and that between the upper keel and the peripheral keel deeply concave; base flatly sloping to a blunt angle bounding the deep, open umbilicus; entire surface with spiral threads, 4 appearing between the shoulder and the suture, 4 between the shoulder and peripheral keels, 6 on the base, and similarly spaced within the umbilicus; interspaces between the spiral threads crossed by finer axial threads, giving the surface a finely pitted appearance; aperture subquadrate, outer lip thin, sharp, angulated by the keels, inner lip curved, continuous over the body of the shell but scarcely attached. The type measures: maximum diameter, 1.8 mm.; height 1.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat. 10° 55' 45" N.; Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 metres), shelly mud.

This species appears to belong in a group which includes *Cyclostremiscus trigonatus* Carpenter and *C. janus* C. B. Adams, but it differs from those species, as illustrated by Pilsbry & Olsson<sup>139</sup>, in the higher spire and more sharply angulated whorls.

This species is named for the famous explorer Baron Alexander von Humboldt, who contributed so much to the knowledge of South America.

#### Genus *Circulus* Jeffreys.

##### *Circulus taigai* Hertlein & Strong, sp. nov.

Plate X, Figs. 6, 8, 9.

Shell depressed, translucent, white, shining; nuclear whorls 2, rounded smooth; postnuclear whorls 2, sculptured with a strong cord or keel half way between the suture and periphery which terminates abruptly a little short of the aperture, periphery with a narrow flattened space with a strong cord on each side, base with a fourth cord, the 4 cords being about equal in strength and spacing; umbilicus moderately wide, deep, bounded by a tumid, opaque area which rises to form a fifth cord near the aperture; entire surface between the cords with microscopic lines of growth; aperture rounded, outer lip somewhat thickened, slightly angulated by the spiral cords, parietal wall with a strong callus. The type measures: maximum diameter, 2.0 mm.; height, 1.0 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), collected in beach drift at Corinto, Nicaragua. Additional specimens were dredged at Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

This species is named for Frank Taiga,

<sup>139</sup> See Pilsbry, H. A., and A. A. Olsson, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 97, December 27, 1945, p. 268, pl. 27, figs. 2, 2a, 2b, and p. 270, pl. 27, figs. 5, 5a, 5b.

who accompanied the expedition during which the type specimen of this species was collected, and who demonstrated remarkable skill in the capture of sea and shore life.

##### *Circulus bailyi* Hertlein & Strong, sp. nov.

Plate IX, Figs. 2, 6, 9.

Shell minute, depressed, translucent, white; nuclear whorls 2, smooth, rounded, slightly projecting; postnuclear whorls 2, sculptured with a fine spiral cord just below the impressed suture, followed by a rather wide, flat-topped cord, and 4 narrow, closely spaced, sharp cords of which the last 2 are on the periphery; base convex, smooth; entire surface with microscopic lines of growth; umbilicus moderately wide, deep, with the columellar walls rounded; aperture oblique, outer lip thin, notched by the ends of the spiral cords, body with a thin wash of callus. The type measures: maximum diameter, 2.1 mm.; height, 0.9 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), collected in beach drift at Corinto, Nicaragua. Additional specimens were dredged at Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

This species is named for Dr. Joshua L. Baily, Jr., of San Diego, California.

#### Genus *Scissilabra* Bartsch.

##### *Scissilabra martensiana*

Hertlein & Strong, sp. nov.

Plate IX, Figs. 1, 5, 10.

Shell minute, discoidal, with the apex rising only slightly above the body whorl, semi-transparent, white; whorls about 4, rapidly enlarging, without visible division into nuclear and postnuclear whorls; suture distinct but not deeply impressed; surface smooth; periphery evenly rounded; umbilicus wide, extending to the apex, the parietal walls flattened, sculptured with 3 spiral threads; aperture subquadrate, outer lip thin, truncated and slightly concave in the middle, columella strongly curved, body with a thin callus. The type measures: maximum diameter, 1.5 mm.; height, 0.5 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from beach drift at Corinto, Nicaragua. Additional specimens were dredged at Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters), mangrove leaves.

The sinus of the outer lip of this form is not as distinct as it is in other species placed in the genus *Scissilabra* but it seems to be referable to this genus. The absence of sculpture or angulation of the whorls will serve to distinguish it from other species previously placed in this genus.

This species is named for the well known conchologist Eduard von Martens, whose monumental volume dealing with mollusks forms a portion of *Biologia Centrali-Americana*.

Genus *Teinostoma* A. Adams.*Teinostoma herbertiana*

Hertlein &amp; Strong, sp. nov.

Plate IX, Figs. 8, 11, 12.

Shell minute, translucent, white, shining, spire almost flatly depressed; nuclear whorls 2, set off from the following whorls by an indistinct line; postnuclear whorls  $2\frac{1}{2}$ , sculptured with microscopic lines of growth and a low spiral cord immediately below the flatly impressed suture which on the last whorl becomes a sharp keel on the angulated periphery; under high magnification it can be observed that the upper portions of the shell are covered with very fine dots arranged in a concentric and radial pattern resembling that of a printed image through a halftone screen except that the dots are light rather than dark and on the basal portion of the shell the sculpture consists of very fine concentric lines; base moderately convex, umbilicus entirely covered by a heavy, slightly swollen callus pad; aperture somewhat oblique, circular, outer lip thin. The type measures: maximum diameter, 1.5 mm.; height, 0.7 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat.  $10^{\circ} 55' 45''$  N., Long.  $85^{\circ} 49' 05''$  W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud. Specimens were dredged also at Station 203-D-1, Lat.  $10^{\circ} 56' 05''$  N., Long.  $85^{\circ} 49' 25''$  W., near Port Parker, Costa Rica, in 15 fathoms (27 meters), sandy mud, crushed shell.

The flattened spire and sharply angulated and keeled periphery are very distinctive characters of this species. The type is probably not quite fully mature. The shape of the shell of this species bears a general resemblance to that of *Teinostoma percarinatum* Pilsbry & Olsson<sup>140</sup>. The shell of the species here described as new is more carinate, the aperture is more elongately ovate and the exterior is sculptured with fine dots and lines whereas no mention is made of microscopic sculpture in the original description of *T. percarinatum*.

This species is named for the late Herbert N. Lowe who collected extensively along the west coast of North America.

*Teinostoma zacae*

Hertlein &amp; Strong, sp. nov.

Plate X, Figs. 11, 12, 13.

Shell minute, naticoid, with the spire moderately elevated, shining, white; nuclear whorls about 2, smooth, rounded; postnuclear whorls  $2\frac{1}{2}$ , evenly rounded, smooth except for microscopic axial striations which are most distinct immediately below the suture; periphery and base rounded; outer lip slightly thickened; inner portion of basal lip and inner lip sharply raised, continuing

over the body as a raised callus, retractively waved at the periphery; a callus tongue begins at the middle of the basal lip, curves over the base and terminates abruptly at the edge of the small open umbilicus. The type measures: maximum diameter, 2.0 mm.; height 1.1 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-3, Lat.  $10^{\circ} 55' 45''$  N., Long.  $85^{\circ} 49' 05''$  W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters), shelly mud.

This species is not typical of the genus *Teinostoma* but seems referable to that genus rather than to any other recorded from the west coast. The species here described evidently is somewhat like the unfigured *Teinostoma bibbiana* Dall<sup>141</sup> from San Diego, California, which is described as having "only a small linguiform pad behind the pillar lip."

Genus *Anticlimax* Pilsbry & McGinty.Subgenus *Subclimax* Pilsbry & Olsson.*Anticlimax (Subclimax) willetti*

Hertlein &amp; Strong, sp. nov.

Plate IX, Figs. 13, 14, 15.

Shell large for the genus, depressed, white; nuclear whorls 2, rounded, smooth, shining; postnuclear whorls  $2\frac{1}{2}$ , sculptured with closely spaced, equal, spiral threads crossed by much finer, incised, axial lines; sutures flatly impressed, periphery well rounded; body whorl produced, aperture oblique, outer lip thickened at the edge, with a blunt point at the junction with the elongated basal lip, which continues as a broad callus over the body of the shell, extending to the periphery; umbilical area covered with the heavy tongue of callus, extending from about the middle of the basal lip and extending nearly to the periphery, wider and bulging over the middle of the umbilical area; exposed portion of the base moderately rounded, sculptured similar to the spire, with in addition a series of broad folds extending from a little below the periphery to the edge of the umbilical callus, becoming much less pronounced as they recede from the basal lip of the aperture. The type measures: maximum diameter, 3.5 mm.; height, 1.6 mm.

Holotype (Calif. Acad. Sci. Dept. Paleo. Type Coll.), from Station 203-D-1, near Port Parker, Costa Rica, Lat.  $10^{\circ} 56' 05''$  N., Long.  $85^{\circ} 49' 25''$  W., dredged in 15 fathoms (27 meters), sandy mud, crushed shell. Additional specimens were dredged at Station 203-D-3, Lat.  $10^{\circ} 55' 45''$  N., Long.  $85^{\circ} 49' 05''$  W., in 12 fathoms (22 meters), shelly mud.

It is possible that the shell described as *Ethalia pyricalloso* by Carpenter<sup>142</sup> may have been described from the young of this

<sup>141</sup> *Teinostoma (Pseudorotella) bibbiana* Dall, *Proc. U. S. Nat. Mus.*, Vol. 56, No. 2295, August 30, 1919, p. 369. "Type-locality—San Diego, California, Mrs. Oldroyd."

<sup>142</sup> *Ethalia pyricalloso* Carpenter, *Cat. Mazatlan Shells*, June, 1856, p. 251. "Hab.—Mazatlan; 1 sp. off Spondylus; L'pool Col."

<sup>140</sup> *Teinostoma percarinatum* Pilsbry & Olsson, *Proc. Acad. Nat. Sci. Philadelphia*, Vol. 97, December 27, 1945, p. 252, pl. 23, figs. 6, 6a, 6b. Type locality, "Bayovar, Bay of Sechura, Peru." Also taken at Ancon Point, Ecuador.

species, the shape changing with age. However none of the paratypes have measurements agreeing with those given by Carpenter.

The shell of the species here described as new resembles that of *Anticlimax* (*Subclimax*) *tholus* Pilsbry & McGinty<sup>143</sup> from Florida but is less carinate and somewhat more depressed in outline. *Anticlimax* (*Subclimax*) *tholus prodromus* Pilsbry & Olsson<sup>144</sup>, described from the Pliocene of Florida, possesses a more strongly carinated shell than that of *A. tholus*.

This species is named for the late George Willett whose careful work added much to the knowledge of West American mollusks.

Superfamily Zygobranchia.

FAMILY FISSURELLIDAE.

Genus *Fissurella* Bruguière.

*Fissurella beebie*

Hertlein & Strong, sp. nov.

Plate X, Figs. 3, 4, 5.

Shell ovately oblong, thin, conical, moderately elevated; orifice large, ovate, slightly anterior to the center; sculptured with numerous fine, regular, alternating larger and smaller radiating ribs which are crossed by concentric threads giving rise to a finely cancellated or beaded appearance; color yellowish-gray crossed by about 8 major radiating brownish-black rays of varying width; interior margin finely crenulated; color of interior white. Length, 41.2 mm.; width, 28 mm.; height, 12.1 mm.

Holotype (Calif. Acad. Sci. Dept. Paleont. Type Coll.), from station 150-D-3, Gorda Banks, Gulf of California, Lat. 23° 00' 00" N., Long. 109° 28' 00" W., dredged in 58 fathoms (106 meters), sand. Paratype from the same vicinity at Station 150-D-5, in 40-100 fathoms (73-182 meters), sand. Collected by the Templeton Crocker Expedition to the Gulf of California, 1936.

The sculpture of the paratype is considerably coarser than that on the holotype. This is believed to be due to individual variation and not specific because in the other characters they agree very well.

This new species bears some resemblance to *Fissurella oriens* Sowerby<sup>145</sup> described from Chile, but in the present form the orifice is evenly and widely oval and the sides are not excavated in the middle, also the

radial sculpture appears to be finer and is evenly cancellated.

The characters of the orifice already enumerated, the proportionately wider shape of the shell, as well as the lack of a conspicuous white border around the orifice exteriorly, are features separating this new species from *Fissurella mexicana* Sowerby<sup>146</sup>.

This species is named for Dr. William Beebe, director of the expedition during the course of which the type specimens of this species were collected.

Genus *Hemitoma* Swainson.

*Hemitoma chiquita*

Hertlein & Strong, sp. nov.

Plate X, Figs. 2, 7, 10.

Shell small, thin, ovately oblong, moderately elevated, narrower anteriorly; apex situated somewhat anteriorly and curved toward the posterior; shell sloping from the apex, slightly excavated posteriorly below the apex; sinus small, situated between 2 posterior ribs; sculptured with rather coarse, radial ribs of which the alternating ones are coarser, about 7 or 8 are considerably coarser than the others and posteriorly these are double, the radial ribs are crossed by concentric lines of growth giving a somewhat nodulous appearance; yellowish-white, a fresh specimen light horn-colored. Measurements of the type: greater diameter, 5 mm.; lesser diameter, 3.7 mm.; height, 1.6 mm.

Holotype (Calif. Acad. Sci. Dept. Paleont. Type Coll.), from Station 195-D-9, Port Guatulco, Mexico, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., dredged in 7 fathoms (12.6 meters), in gr. sand and crushed shell. One additional small specimen was taken at the same locality.

This new species differs from *Hemitoma bella* Gabb<sup>147</sup>, described from Monterey, California, in that the apex is more anteriorly situated, it has much stronger alternate ribbing and the anterior ribs are much coarser in comparison to those on the species described by Gabb.

Compared to *Hemitoma hermosa* Lowe<sup>148</sup>, described from Carmen Island in the Gulf of California, the shell of this new species is less elevated, less rugose, the sides slope more gently from the apex and the ribbing is finer. Lowe's species bears a general resemblance to *Hematoma sclera* Woodring which was described from the Bowden Mio-

<sup>143</sup> *Climacia tholus* Pilsbry & McGinty, *Nautilus*, Vol. 59, No. 3, January, 1946, p. 79, pl. 8, figs. 1, 1a, 1b, 2, 2a. "About four miles off Carysfort Light, Florida, in about 500 ft."

<sup>144</sup> *Anticlimax tholus prodromus* Pilsbry & Olsson, *Bull. Amer. Paleont.*, Vol. 33, No. 135, July 5, 1950, p. 113 (11), pl. 20 (4), figs. 13, 13a, 14. "Pliocene: Alligator Creek, Acline, Florida."

<sup>145</sup> *Fissurella oriens* Sowerby, *Proc. Zool. Soc. London* for 1834, p. 124 (issued March 20, 1835). "Hab. ad Insulam Chiloe sub lapidibus littoralibus."—Sowerby, *Conch. Illustr.*, *Fissurella*, Cat., p. 3, issued June 30, 1835, pl. 71, fig. 25, December 21, 1831 [misprint for 1834 according to Sherborn]. "Island of Chiloe, Mr. Cuming."—Reeve, *Conch. Icon.*, Vol. 6, *Fissurella*, 1849, species 13, pl. 2, fig. 13. "Hab. Valparaiso (attached to rocks); Cuming."

<sup>146</sup> *Fissurella mexicana* Sowerby, *Conch. Illustr.*, *Fissurella*, Cat. p. 8, issued June 30, 1835, pl. 77, fig. 61, issued between January, 1835, and May 25, 1835. "Real Llejos, Mexico; Mr. Cuming." [Nicaragua].—Reeve, *Conch. Icon.*, Vol. 6, *Fissurella*, 1849, species 40, pl. 6, fig. 40. Original locality cited.—Melvill & Standen, *Jour. Conch.*, Vol. 9, No. 4, 1898, p. 102.

<sup>147</sup> *Emarginula bella* Gabb, *Proc. Calif. Acad. Nat. Sci.*, Vol. 3, January, 1865, p. 188. "Locality Monterey, Dr. Cooper. 'Two dredged dead'."—Smith & Gordon, *Proc. Calif. Acad. Sci. Ser. 4*, Vol. 26, No. 8, 1948, p. 204, pl. 4, figs. 14, 15, 16 (as *Hemitoma bella*).

<sup>148</sup> *Hemitoma hermosa* Lowe, *Trans. San Diego Soc. Nat. Hist.*, Vol. 8, No. 6, March 21, 1935, p. 24, pl. 4, fig. 4. "Carmen Island, Gulf of California, 20 fathoms (1932). Type 11385, Lowe Collection."

cene of Jamaica. The finer ribbing, more acutely pointed spire, and thinner and flatter margins of *Hemitoma chiquita* are features which serve to separate it from *H. scrippsae* Durham<sup>149</sup> which was described from the Pliocene of Carmen Island in the Gulf of California.

### Subclass Amphineura.

#### ORDER POLYPLACOPHORA.

##### Superfamily Mesoplacophora.

##### FAMILY ISCHNOCHITONIDAE.

##### Genus *Ischnochiton* Gray.

By George Willett.

##### *Ischnochiton crockeri* Willett, sp. nov.

Plate XI, Fig. 12.

*Description*: Shell rather small, elongate-oval, elevated; dorsal ridge thin, side slopes well rounded. Entire surface finely pustulate.

Anterior valve with about 30 radiating series of rounded pustules, 15-20 in a series, these occasionally bifurcating near the anterior margin; posterior margin irregularly pustulate but not dentate.

Median valves: lateral areas prominent, with 6-8 rows of pustulate ribs, and irregular indication of dentation on the posterior margins. Central areas on each side with 22-25 thin, longitudinal ribs, the lower ones inclining sharply downward, and those on the dorsal area being horizontal excepting on the second valve; on this valve they are widely-spaced anteriorly and converge posteriorly. These ribs are connected by frequent, low, delicate riblets which, on the posterior part of the dorsal region, are obliterated by the surface pustulation.

Posterior valve convex above the low mucro, concave below it. The part of the valve anterior to the mucro is sculptured like the central areas of the median valves; the posterior part has about 27 radiating rows of pustules, which are fairly clear excepting immediately beneath the mucro, where they are absent.

Girdle about 2 millimeters in width, clothed with small, oval, imbricating scales, which are somewhat rounded on top. These scales appear smooth to the naked eye, but under sufficient magnification they show 15-20 fine cross striations. Color of outer surface brown, irregularly flecked with olive, the jugal region being clouded with reddish-brown, and some pustules on lateral areas and end valves being whitish. Girdle cream-colored, mottled with reddish-brown and irregularly spotted with black.

Holotype (Calif. Acad. Sci. Dept. Paleont. Type Coll.), from Station 150-D-6, Gorda Banks in the Gulf of California off the southern end of Lower California, Lat. 23° 02' 00" N., Long. 109° 31' 00" W., dredged in 60 fathoms (109 meters), rocks, muddy sand. Dimensions of type (exclusive of girdle):

length, 18.4 mm.; diameter, 9.6 mm.; altitude, 4 mm.

*Remarks*: At a cursory glance this chiton, excepting for its larger size, appears much like *Ischnochiton decipiens* Carpenter<sup>150</sup>. However, a careful examination reveals that it differs from that species in more (6-8) rows of pustules on the lateral areas, and more (22-25) transverse ribs on the central areas. The scales on the girdle are also very different. In *I. decipiens* these are crossed by 6-8 coarse striations, easily visible under magnification of 10 diameters; in *I. crockeri* the scales appear smooth under the latter magnification, but when enlarged 25 times they show 15-20 very fine striations.

This species is named for the late Templeton Crocker, owner of the yacht *Zaca*, who collected assiduously during the expedition during which the type specimen of this species was taken.

#### EXPLANATION OF THE PLATES.\*

##### PLATE I.

- Fig. 1. *Kylix turveri* Hertlein & Strong, sp. nov. Holotype, from Station 142-D-2, Lat. 27° 04' 00" N., Long. 111° 55' 00" W., Santa Inez Bay, Gulf of California, dredged in 30-35 fathoms (54-64 meters). Length, 19.3 mm.; maximum diameter, 7.4 mm. P. 76.
- Fig. 2. *Elaeocyma craneana* Hertlein & Strong, sp. nov. Holotype, from Bahia Honda, Panama. Length, 21 mm.; maximum diameter, 8 mm. P. 75.
- Fig. 3. *Crassispira xanti* Hertlein & Strong, sp. nov. Holotype, from Station 135, San Lucas Bay, Lower California. Length, 15.5 mm.; maximum diameter, 5.8 mm. P. 74.
- Fig. 4. *Cymatosyrinx asaedai* Hertlein & Strong, sp. nov. Holotype, from Station 136-D-2, Lat. 23° 30' 30" N., Long. 109° 26' 00" W., Arena Bank, Gulf of California, dredged in 45 fathoms (82 meters). Length, 27 mm.; maximum diameter, 9.8 mm. P. 78.
- Fig. 5. *Kylix zacae* Hertlein & Strong, sp. nov. Holotype, from Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., off San Domingo Point, Santa Inez Bay, Gulf of California, dredged in 4-13 fathoms (7.5-24 meters). Length, 14.5 mm.; maximum diameter, 5.0 mm. P. 76.
- Fig. 6. *Cytharella burchi* Hertlein & Strong, sp. nov. Holotype, from Station 136-D-22, Lat. 23° 28' 30" N., Long. 109° 25' 00" W., Arena Bank, Gulf of California, dredged in 45 fathoms (82 meters). Length, 16.5 mm.; maximum diameter, 6.3 mm. P. 79.
- Fig. 7. *Cymatosyrinx allyniana* Hertlein & Strong, sp. nov. Holotype, from Station 136-D-4, Lat. 23° 32' 00" N., Long. 109°

<sup>150</sup> *I[schnochiton]. decipiens* Carpenter in Pilsbry, Man. Conch., Vol. 14, November 25, 1892, p. 123. "Monterey, California."

\* The cost of preparing photographs of the specimens used for illustrations on the plates in this paper was defrayed by a grant-in-aid to the senior author by the American Philosophical Society. The photographs were made by Frank L. Rogers.

<sup>149</sup> *Hemitoma scrippsae* Durham, Geol. Soc. Amer., Mem. 43, Pt. 2, August 10, 1950, p. 133, pl. 28, figs. 9, 14.



27° 00' W., dredged in 55 fathoms (100 meters). Length, 20.7 mm.; maximum diameter, 8.2 mm. P. 77.

- Fig. 8. *Clathurella erminiana* Hertlein & Strong, sp. nov. Holotype, from Station 147-D-2, Lat. 26° 57' 30" N., Long. 111° 48' 30" W., off Concepcion Point, Santa Inez Bay, Gulf of California, dredged in 60 fathoms (110 meters). Length, 12.5 mm.; maximum diameter 5.0 mm. P. 71.
- Fig. 9. *Strombinoturris crockeri* Hertlein & Strong, sp. nov. Holotype, from Station 136-D-24, Lat. 23° 29' 00" N., Long. 109° 23' 30" W., Arena Bank, Gulf of California, dredged in 50 fathoms (91 meters). Length, 43.2 mm.; maximum diameter, 14.0 mm. P. 84.
- Fig. 10. *Carinodrillia pilsbryi* Lowe. Hypotype, from Station 136-D-14, Lat. 23° 29' 30" N., Long. 109° 25' 00" W., off Arena Point, Lower California, dredged in 45 fathoms (82 meters). Length, 34 mm.; maximum diameter, 11.5 mm. P. 71.
- This specimen differs somewhat in color from the type of *Carinodrillia pilsbryi* but otherwise it is so similar that it is here assigned to that species.
- Fig. 11. *Crassispira ericana* Hertlein & Strong, sp. nov. Holotype, from Santa Inez Bay, Gulf of California, from the same locality as that of the specimen shown in Fig. 5. Length, 11.5 mm.; maximum diameter, 4.3 mm. P. 74.
- Fig. 12. *Crassispira chacei* Hertlein & Strong, sp. nov. Holotype, from Station 150-D-23, Lat. 23° 01' 00" N., Long. 109° 27' 30" W., Gorda Banks, Gulf of California, dredged in 45 fathoms (82 meters). Length, 29.5 mm.; diameter, 10.7 mm. P. 73.
- Fig. 13. *Crassispira tangolaensis* Hertlein & Strong, sp. nov. Holotype, from Station 196-D-6, 7, Lat. 15° 45' 34" N., Long. 96° 06' 02" to 96° 06' 03" W., Tangola-Tangola Bay, Mexico, dredged in 6-7 fathoms (11-12.8 meters). Length, 14 mm.; maximum diameter, 5.4 mm. P. 75.
- Fig. 14. *Cymatosyrinx strohbeeni* Hertlein & Strong, sp. nov. Holotype, dredged off Cape San Lucas, Lower California. Length, 11.5 mm.; maximum diameter, 3.5 mm. P. 77.
- Fig. 15. *Crockerella pedersenii* Hertlein & Strong, sp. nov. Holotype, from Santa Inez Bay, Gulf of California, same locality as that of the specimen shown in Fig. 5. Length, 4.8 mm.; maximum diameter, 1.9 mm. P. 78.
- Fig. 16. *Crockerella hilli* Hertlein & Strong, sp. nov. Holotype, from Santa Inez Bay, Gulf of California, same locality as that of the specimen shown in Fig. 5. Length, 3.8 mm.; maximum diameter, 1.5 mm. P. 79.
- Fig. 17. *Cymatosyrinx arenensis* Hertlein & Strong, sp. nov. Holotype, from Arena Bank, Gulf of California, same locality as that of the specimen shown in Fig. 6. Length, 45 mm.; maximum diameter, 14.5 mm. P. 76.
- Fig. 18. *Crassispira brujae* Hertlein & Strong, sp. nov. Holotype, from Station 136-D-13, Lat. 23° 29' 00" N., Long. 109°

24° 00' W., Arena Bank, Gulf of California, dredged in 45 fathoms (82 meters). Length, 29 mm.; maximum diameter, 9.2 mm. P. 74.

All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.

## PLATE II.

- Fig. 1. *Trophon (Acanthotrophon) sorenseni* Hertlein & Strong, sp. nov. Holotype, from Station 150-D-24, Lat. 23° 01' 00" N., Long. 109° 29' 00" W., Gorda Banks, Gulf of California, dredged in 60 fathoms (109 meters). Length, 31 mm.; maximum diameter (not including spines), 14 mm. P. 86.
- Fig. 2. *Calotrophon bristolae* Hertlein & Strong, sp. nov. Holotype, from Gorda Banks, from the same locality as the specimen shown in Fig. 1. Length, 39 mm.; maximum diameter, 20 mm. P. 87.
- Fig. 3. *Anachis coronata hannana* Hertlein & Strong, sp. nov. Holotype, from Cape San Lucas, Lower California, Mexico. Length, 13.6 mm.; maximum diameter, 6.3 mm. P. 82.
- Fig. 4. *Latirus hemphilli* Hertlein & Strong, sp. nov. Holotype, from Port Parker, Costa Rica. Length, 68.5 mm.; maximum diameter, 23.8 mm. P. 79.
- Fig. 5. *Anachis teevani* Hertlein & Strong, sp. nov. Holotype, from Station 189-D-4, Lat. 16° 38' 30" N., Long. 99° 40' 00" W., 17 miles SE. × E. of Acapulco, Mexico, dredged in 28 fathoms (51 meters). Length, 8 mm.; diameter, 3.5 mm. P. 83.
- Fig. 6. *Pseudoneptunea panamica* Hertlein & Strong, sp. nov. Paratype from Station 142-D-3, Lat. 27° 04' 00" N., Long. 111° 54' 00" W., Santa Inez Bay, Gulf of California, dredged in 40 fathoms (73 meters). Length, 29.6 mm.; diameter, 25 mm. P. 81.
- Fig. 7. *Strombina marksii* Hertlein & Strong, sp. nov. Holotype, Station 136-D-4, Lat. 23° 32' 00" N., Long. 109° 27' 00" W., Arena Bank, Gulf of California, dredged in 55 fathoms (100 meters). Length, 23.8 mm.; maximum diameter, 9.5 mm. P. 84.
- Fig. 8. *Pterynotus (Pteropurpura) swansonii* Hertlein & Strong, sp. nov. Holotype, from Station 136-D-22, Lat. 23° 28' 30" N., Long. 109° 25' 00" W., Arena Bank, Gulf of California, dredged in 45 fathoms (82 meters). Length, 59 mm.; maximum diameter (including varices), 49 mm. P. 85.
- Fig. 9. *Muricopsis zeteki* Hertlein & Strong, sp. nov. Holotype, from Panama City, Panama. Length, 27.3 mm.; maximum diameter, including spines, 18.5 mm. P. 85.
- Fig. 10. *Pseudoneptunea panamica* Hertlein & Strong, sp. nov. Holotype, from Station 224, Lat. 7° 23' 30" N., Long. 82° 03' 00" W., Hannibal Bank, Panama, dredged in 35-40 fathoms (64-73 meters). Length, 39 mm.; maximum diameter, 25 mm. P. 81.

- Fig. 11. *Anachis ritteri* Hertlein & Strong, sp. nov. Holotype, from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters). Length, 7.4 mm.; diameter, 3.8 mm. P. 82.
- Fig. 12. *Pterynotus (Pteropurpura) swansoni* Hertlein & Strong, sp. nov. Apertural view of the specimen shown in Fig. 8.
- Fig. 13. *Turritella clarionensis* Hertlein & Strong, sp. nov. Holotype, from Station 163-D-2, Lat. 18° 19' 00" N., Long. 114° 45' 00" W., 3 miles off Pyramid Rock, near Clarion Island, Revillagigedo Islands, Mexico, dredged in 55 fathoms (100 meters). Length, 56 mm.; maximum diameter, 16.5 mm. P. 108.
- Fig. 14. *Anachis rehderi* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters). Length, 8.5 mm.; diameter, 3.3 mm. P. 83.
- All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.

## PLATE III.

- Fig. 1. *Epitonium (Cirsotrema) togatum* Hertlein & Strong, sp. nov. Holotype, from Station 150-D-19, Lat. 23° 01' 00" N., Long. 109° 27' 30" W., Gorda Banks, Gulf of California, dredged in 50 fathoms (91 meters). Length, 37.5 mm.; maximum diameter (including the varices), 13.8 mm. P. 89.
- Fig. 2. *Turbonilla (Pyrgiscus) biolleyi* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters). Length, 3.6 mm.; diameter, 0.9 mm. P. 98.
- Fig. 3. *Turbonilla (Pyrgiscus) zacae* Hertlein & Strong, sp. nov. Holotype, from near Port Parker, Costa Rica, from the same locality as the specimen shown in Fig. 2. Length, 5.7 mm.; diameter, 1.4 mm. P. 95.
- Fig. 4. *Turbonilla (Pyrgiscus) nicoyana* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, near Port Parker, Costa Rica, from the same locality as the specimen shown in Fig. 2. Length, 4.0 mm.; diameter, 1.1 mm. P. 96.
- Fig. 5. *Epitonium (Cirsotrema) togatum* Hertlein & Strong, sp. nov. Paratype, from Station 214-D-1-4, Lat. 9° 19' 32" to 9° 17' 40" N., Long. 84° 29' 30" to 84° 27' 30" W., 14 miles S. × E. of Judas Point, Costa Rica, dredged in 42-61 fathoms (76.5-112 meters). Length, 33.4 mm.; diameter (including varices), 11.2 mm. P. 89.
- Fig. 6. *Rissoina axeliana* Hertlein & Strong, sp. nov. Holotype, from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters). Length, 2.4 mm.; diameter, 1.0 mm. P. 109.
- Fig. 7. *Epitonium (Sthenorytis) paradisi* Hertlein & Strong, sp. nov. Holotype, from Station 150-D-13, Lat. 23° 01' 00" N., Long. 109° 27' 30" W., Gorda Banks, Gulf of California, dredged in 70-80 fathoms (128-146 meters). Length, 35 mm.; maximum diameter (including varicose ribs), 26.5 mm. P. 90.
- Fig. 8. *Odostomia (Chrysallida) woodbridgei* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters). Length, 2.3 mm.; diameter, 0.9 mm. P. 103.
- Fig. 9. *Epitonium (Nitidiscala) durhamianum* Hertlein & Strong, sp. nov. Holotype, from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters). Length, 5.7 mm.; diameter, 1.8 mm. P. 89.
- Fig. 10. *Epitonium (Nitidiscala) oerstedianum* Hertlein & Strong, sp. nov. Holotype, from Station 145-D-1-3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., off San Domingo Point, Santa Inez Bay, Gulf of California, dredged in 4-13 fathoms (7.5-24 meters). Length, 6.5 mm.; diameter, 4.2 mm. P. 89.
- Fig. 11. *Epitonium (Asperiscala) vivesi* Hertlein & Strong, sp. nov. Holotype, from Santa Inez Bay, Gulf of California, from the same locality as the specimen illustrated in Fig. 10. Length, 7.0 mm.; diameter, 3.2 mm. P. 88.
- Fig. 12. *Epitonium (Asperiscala) walkerianum* Hertlein & Strong, sp. nov. Holotype, from near Corinto, Nicaragua, from the same locality as the specimen shown in Fig. 9. Length, 3.7 mm.; diameter, 1.2 mm. P. 88.
- Fig. 13. *Epitonium (Asperiscala) manzanillense* Hertlein & Strong, sp. nov. Holotype, from Station 184-D-2, Lat. 19° 04' 00" N., Long. 104° 22' 00" W., near Manzanillo, Mexico, dredged in 30 fathoms (55 meters). Length, 3.7 mm.; diameter, 1.4 mm. P. 88.
- Fig. 14. *Epitonium (Punctiscala?) colimanum* Hertlein & Strong, sp. nov. Holotype, from near Manzanillo, Mexico, from the same locality as the specimen shown in Fig. 13. Length, 7.6 mm.; diameter, 2.8 mm. P. 90.
- All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.

## PLATE IV.

- Fig. 1. *Turbonilla (Strioturbonilla) corintonis* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 5.2 mm.; maximum diameter, 1.3 mm. P. 101.
- Fig. 2. *Turbonilla (Pyrgolampros) soniliana* Hertlein & Strong, sp. nov. Holotype, from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters). Length, 5.8 mm.; diameter, 1.7 mm. P. 100.
- Fig. 3. *Turbonilla (Pyrgiscus) gruberi* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 6.1 mm.; maximum diameter, 1.4 mm. P. 100.
- Fig. 4. *Turbonilla (Strioturbonilla) masayana* Hertlein & Strong, sp. nov. Holotype,

from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters). Length, 3.4 mm.; maximum diameter, 1.0 mm. P. 101.

Fig. 5. *Turbonilla (Pyrgiscus) ottomoerchi* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 6.0 mm.; maximum diameter, 1.4 mm. P. 99.

Fig. 6. *Turbonilla (Pyrgolampros) meanguerensis* Hertlein & Strong, sp. nov. Holotype, from Station 199-D-1, Lat. 13° 08' 00" N., Long. 87° 43' 00" W., Meanguera Island, Gulf of Fonseca, El Salvador, dredged in 16 fathoms (29 meters). Length, 5.6 mm.; maximum diameter, 1.4 mm. P. 100.

Fig. 7. *Turbonilla (Strioturbonilla) nicaraguana* Hertlein & Strong, sp. nov. Holotype, from near Corinto, Nicaragua, from the same locality as that of the specimen shown in Fig. 4. Length, 4.5 mm.; maximum diameter, 1.2 mm. P. 102.

Fig. 8. *Turbonilla (Pyrgiscus) ekidana* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters). Length, 4.8 mm.; maximum diameter, 1.2 mm. P. 99.

All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.

#### PLATE V.

Fig. 1. *Turbonilla (Pyrgiscus) gordoniana* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 6.0 mm.; maximum diameter, 1.4 mm. P. 99.

Fig. 2. *Turbonilla (Cingulina) realejoensis* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 2.7 mm.; maximum diameter, 1.0 mm. P. 92.

Fig. 3. *Turbonilla (Pyrgiscus) chinandegana* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 4.8 mm.; maximum diameter, 0.9 mm. P. 97.

Fig. 4. *Turbonilla (Pyrgiscus) otirocensis* Hertlein & Strong, sp. nov. Holotype, from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters). Length, 4.2 mm.; maximum diameter, 0.9 mm. P. 96.

Fig. 5. *Turbonilla (Pyrgiscus) cholutecana* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 4.1 mm.; maximum diameter, 0.7 mm. P. 97.

Fig. 6. *Turbonilla (Pyrgisculus) utuana* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters). Length, 3.1 mm.; diameter, 0.9 mm. P. 93.

Fig. 7. *Turbonilla (Pyrgiscus) tehuantepecana* Hertlein & Strong, sp. nov. Holotype, from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near

Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters). Length, 2.8 mm.; maximum diameter, 0.8 mm. P. 99.

Fig. 8. *Turbonilla (Pyrgisculus) utuana* Hertlein & Strong, sp. nov. Paratype, from Station 203-D-1, near Port Parker, Costa Rica, from the same locality as the specimen shown in Fig. 6. Length, 1.46 mm.; diameter, .703 mm. P. 93.

Fig. 9. *Turbonilla (Strioturbonilla) oaxacana* Hertlein & Strong, sp. nov. Holotype, from near Port Guatulco, Mexico, from the same station as the specimen shown in Fig. 7. Length, 3.5 mm.; maximum diameter, 1.1 mm. P. 101.

Fig. 10. *Turbonilla (Pyrgiscus) ulyssi* Hertlein & Strong, sp. nov. Holotype, from near Corinto, Nicaragua, from the same station as the specimen shown in Fig. 4. Length, 5.0 mm.; diameter, 1.7 mm. P. 96.

Fig. 11. *Turbonilla (Pyrgiscus) guanacastensis* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters). Length, 4.3 mm.; diameter, 0.9 mm. P. 97.

Fig. 12. *Turbonilla (Pyrgiscus) rhizophorae* Hertlein & Strong, sp. nov. Holotype, from near Corinto, Nicaragua, from the same locality as the specimen in Fig. 4. Length, 3.4 mm.; diameter, 1.0 mm. P. 98.

Fig. 13. *Turbonilla (Strioturbonilla) contrerasiana* Hertlein & Strong, sp. nov. Holotype, from near Port Guatulco, Mexico, from the same locality as the specimen shown in Fig. 7. Length, 3.4 mm.; diameter, 0.9 mm. P. 102.

Fig. 14. *Turbonilla (Strioturbonilla) nahuatlana* Hertlein & Strong, sp. nov. Holotype, from near Corinto, Nicaragua, from the same locality as the specimen shown in Fig. 4. Length, 2.8 mm.; diameter, 0.9 mm. P. 101.

Fig. 15. *Turbonilla (Pyrgiscus) ozanneana* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 3.9 mm.; diameter, 1.0 mm. P. 98.

All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.

#### PLATE VI.

Fig. 1. *Balcis (Balcis) corintonis* Hertlein & Strong, sp. nov. Holotype, from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters). Length, 1.9 mm.; diameter, 0.7 mm. P. 90.

Fig. 2. *Balcis (Vitreolina) drangai* Hertlein & Strong, sp. nov. Holotype, from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters). Length, 3.3 mm.; diameter, 1.2 mm. P. 91.

Fig. 3. *Turbonilla (Careliopsis) beltiana* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 3.2 mm.; diameter, 0.9 mm. P. 91.

- Fig. 4. *Turbonilla (Bartschella) vestae* Hertlein & Strong, sp. nov. Holotype, from near Corinto, Nicaragua, from the same locality as the specimen shown in Fig. 1. Length, 3.1 mm.; diameter, 1.0 mm. P. 91.
- Fig. 5. *Turbonilla (Pyrgiscus) colimana* Hertlein & Strong, sp. nov. Holotype, from Station 184-D-2, Lat. 19° 04' 00" N., Long. 104° 22' 00" W., near Manzanillo, Mexico, dredged in 30 fathoms (55 meters). Length, 3.0 mm.; diameter, 0.9 mm. P. 94.
- Fig. 6. *Turbonilla (Pyrgiscus) domingana* Hertlein & Strong, sp. nov. Holotype, from Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., off San Domingo Point, Santa Inez Bay, Gulf of California, dredged in 4-13 fathoms (7.5-24 meters). Length, 6.3 mm.; diameter, 1.5 mm. P. 93.
- Fig. 7. *Turbonilla (Pyrgiscus) amiriana* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters). Length, 5.8 mm.; diameter, 2.0 mm. P. 94.
- Fig. 8. *Turbonilla (Chemnitzia) nicarasana* Hertlein & Strong, sp. nov. Holotype, from near Corinto, Nicaragua, from the same locality as the specimen shown in Fig. 1. Length, 5.2 mm.; diameter, 1.2 mm. P. 92.
- Fig. 9. *Turbonilla (Mormula) guatulcoensis* Hertlein & Strong, sp. nov. Holotype, from near Port Guatulco, Mexico, from the same locality as the specimen shown in Fig. 2. Length, 5.9 mm.; diameter, 1.9 mm. P. 92.
- Fig. 10. *Turbonilla (Ptycheulimella) portoparkerensis* Hertlein & Strong, sp. nov. Holotype, from near Port Parker, Costa Rica, from the same locality as the specimen shown in Fig. 7. Length, 7.3 mm.; diameter, 1.4 mm. P. 92.
- Fig. 11. *Turbonilla (Pyrgiscus) templetonis* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters). Length, 4.3 mm.; diameter, 1.0 mm. P. 95.
- Fig. 12. *Turbonilla (Pyrgiscus) sulacana* Hertlein & Strong, sp. nov. Holotype, from near Port Parker, Costa Rica, from the same locality as the specimen shown in Fig. 7. Length, 5.0 mm.; diameter, 1.1 mm. P. 95.
- Fig. 13. *Turbonilla (Pyrgiscus) yolettiae* Hertlein & Strong, sp. nov. Holotype, from off San Domingo Point, Santa Inez Bay, Gulf of California, from the same locality as the specimen shown in Fig. 6. Length, 4.1 mm.; diameter, 1.1 mm. P. 94.
- Fig. 14. *Turbonilla (Pyrgiscus) ayamana* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-1, near Port Parker, Costa Rica, from the same locality as the specimen shown in Fig. 11. Length, 5.6 mm.; diameter, 1.3 mm. P. 96.
- Fig. 15. *Turbonilla (Pyrgiscus) vivesi* Hertlein & Strong, sp. nov. Holotype, from off San Domingo Point, Santa Inez Bay, Gulf of California, from the same lo-

cality as the specimen shown in Fig. 6. Length, 6.8 mm.; diameter, 1.6 mm. P. 93.

All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.

## PLATE VII.

- Fig. 1. *Odostomia (Miralda) rhizophorae* Hertlein & Strong, sp. nov. Holotype, from Station 200-D-19, Lat. 12° 28' 03" N., Long. 87° 12' 39" W., near Corinto, Nicaragua, dredged in 12-13 fathoms (22-24 meters). Length, 2.1 mm.; diameter, 1.9 mm. P. 105.
- Fig. 2. *Odostomia (Chrysallida) guatulcoensis* Hertlein & Strong, sp. nov. Holotype, from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters). Length, 2.0 mm.; diameter, 1.0 mm. P. 103.
- Fig. 3. *Odostomia (Besla) caneloensis* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters). Length, 1.6 mm.; diameter, 0.5 mm. P. 102.
- Fig. 4. *Cerithiopsis oaxacana* Hertlein & Strong, sp. nov. Holotype, from near Port Guatulco, Mexico, from the same locality as the specimen shown in Fig. 2. Length, 2.6 mm.; diameter, 0.9 mm. P. 107.
- Fig. 5. *Cerithiopsis perrini* Hertlein & Strong, sp. nov. Holotype, from near Port Guatulco, Mexico, from the same locality as the specimen shown in Fig. 2. Length, 1.9 mm.; diameter, 0.8 mm. P. 106.
- Fig. 6. *Alvania? ingrani* Hertlein & Strong, sp. nov. Holotype, from near Port Guatulco, Mexico, from the same locality as the specimen shown in Fig. 2. Length, 3.1 mm.; diameter, 1.7 mm. P. 108.
- Fig. 7. *Cerithiopsis guatulcoensis* Hertlein & Strong, sp. nov. Holotype, from near Port Guatulco, Mexico, from the same locality as the specimen shown in Fig. 2. Length, 3.7 mm.; diameter, 1.0 mm. P. 106.
- Fig. 8. *Bititium (Lirobititium) arenaense* Hertlein & Strong, sp. nov. Holotype, from Station 136-D-22, Lat. 23° 28' 30" N., Long. 109° 25' 00" W., Arena Bank, Gulf of California, dredged in 45 fathoms (82 meters). Length, 10.5 mm.; diameter, 2.8 mm. P. 107.
- Fig. 9. *Odostomia (Chrysallida) costaricensis* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters). Length, 2.9 mm.; diameter, 0.8 mm. P. 103.
- Fig. 10. *Cerithiopsis guanacastensis* Hertlein & Strong, sp. nov. Holotype, from Long Beach NW. of Port Parker, Costa Rica. Length, 6.2 mm.; diameter, 2.0 mm. P. 106.

All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.

## PLATE VIII.

- Fig. 1. *Odostomia (Evalea) gallegosiana* Hertlein & Strong, sp. nov. Holotype, from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters). Length, 2.8 mm.; diameter, 1.1 mm. P. 104.
- Fig. 2. *Atyis (Aliculastrum) liriopae* Hertlein & Strong, sp. nov. Holotype, probably from Station 136-D-27, Lat. 23° 28' 00" N., Long. 109° 24' 00" W., Arena Bank, Gulf of California, dredged in 50 fathoms (91 meters). Length, 9.8 mm.; maximum diameter, 3.6 mm. P. 71.
- Fig. 3. *Odostomia (Menestho) nicoyana* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters). Length, 3.3 mm.; diameter, 1.7 mm. P. 105.
- Fig. 4. *Fusiturricula armilda* Dall. Hypotype, from Station 136-D-23, Lat. 23° 28' 00" N., Long. 100° 24' 00" W., Arena Bank, Gulf of California, dredged in 40 fathoms (73 meters). Length, 40.3 mm.; diameter, 14 mm. P. 72.
- Fig. 5. *Odostomia (Telloda) subdotella* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters). Length, 2.9 mm.; diameter, 1.0 mm. P. 104.
- Fig. 6. *Nassarius insculptus gordanus* Hertlein & Strong, subsp. nov. Holotype, from Station 150-D-6, Lat. 23° 02' 00" N., Long. 109° 31' 00" W., Gorda Banks, Gulf of California, dredged in 60 fathoms (109 meters). Length, 22 mm.; diameter, 11.5 mm. P. 81.
- Fig. 7. *Odostomia (Evalina) tehuantepecana* Hertlein & Strong, sp. nov. Holotype, from near Port Guatulco, Mexico, from the same locality as the specimen illustrated in Fig. 1. Length, 2.3 mm.; diameter, 0.9 mm. P. 105.
- Fig. 8. *Fusiturricula howelli* Hertlein & Strong, sp. nov. Holotype, from Station 214-D-1, 4, Lat. 9° 19' 32" to 9° 17' 40" N., Long. 84° 29' 30" to 84° 27' 30" W., 14 miles S. × E. of Judas Point, Costa Rica, dredged in 42-61 fathoms (76.5-112 meters). Length, 31 mm.; maximum diameter, 11 mm. P. 72.
- Fig. 9. *Kurtzina cyrene* Dall. Hypotype, from Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., off San Domingo Point, Santa Inez Bay, Gulf of California, dredged in 4-13 fathoms (7.5-24 meters). Length, 8.5 mm.; diameter, 3.4 mm. P. 78.
- Fig. 10. *Rissoina (Folinia) ericana* Hertlein & Strong, sp. nov. Holotype, from near Port Guatulco, Mexico, from the same locality as the specimen shown in Fig. 1. Length, 3.0 mm.; diameter, 1.2 mm. P. 109.
- Fig. 11. *Odostomia (Chrysallida) corintoensis* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Length, 4.0 mm.; diameter, 1.7 mm. P. 104.
- Fig. 12. *Rissoina alarconi* Hertlein & Strong, sp. nov. Holotype, from near Port Parker, Costa Rica, from the same lo-

cality as the specimen shown in Fig. 3. Length, 4.8 mm.; diameter, 1.8 mm. P. 109.

All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.

## PLATE IX.

- Fig. 1. *Scissilabra martensiana* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Maximum diameter, 1.5 mm.; height, 0.5 mm. P. 111.
- Fig. 2. *Circulus bailyi* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Maximum diameter, 2.1 mm.; height, 0.9 mm. P. 111.
- Fig. 3. *Cyclostrema gordana* Hertlein & Strong, sp. nov. Holotype, from Station 150-D-3, Lat. 23° 05' 00" N., Long. 109° 30' 00" W., Gorda Banks, Gulf of California, dredged in 40-45 fathoms (73-82 meters). Maximum diameter, 9.7 mm.; minimum diameter, 7.0 mm.; height, 3.3 mm. P. 110.
- Fig. 4. *Cyclostrema gordana* Hertlein & Strong, sp. nov. Apical view of specimen shown in Figs. 3 and 7.
- Fig. 5. *Scissilabra martensiana* Hertlein & Strong, sp. nov. Apical view of specimen shown in Figs. 1 and 10.
- Fig. 6. *Circulus bailyi* Hertlein & Strong, sp. nov. Apical view of specimen shown in Figs. 2 and 9.
- Fig. 7. *Cyclostrema gordana* Hertlein & Strong, sp. nov. Basal view of specimen shown in Figs. 3 and 4.
- Fig. 8. *Teinostoma herbertiana* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters). Maximum diameter, 1.5 mm.; height, 0.7 mm. View of base. What appears to be an open umbilicus in this figure is actually due to refraction of light on the callus pad covering the umbilical opening. P. 112.
- Fig. 9. *Circulus bailyi* Hertlein & Strong, sp. nov. Basal view of specimen shown in Figs. 2 and 6.
- Fig. 10. *Scissilabra martensiana* Hertlein & Strong, sp. nov. Basal view of specimen shown in Figs. 1 and 5.
- Fig. 11. *Teinostoma herbertiana* Hertlein & Strong, sp. nov. Apertural view of specimen shown in Figs. 8 and 12.
- Fig. 12. *Teinostoma herbertiana* Hertlein & Strong, sp. nov. Apical view of specimen shown in Figs. 8 and 11.
- Fig. 13. *Anticlimax (Subclimax) willetti* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-1, Lat. 10° 56' 05" N., Long. 85° 49' 25" W., near Port Parker, Costa Rica, dredged in 15 fathoms (27 meters). Maximum diameter, 3.5 mm.; height, 1.6 mm. P. 112.
- Fig. 14. *Anticlimax (Subclimax) willetti* Hertlein & Strong, sp. nov. Apertural view of specimen shown in Figs. 13 and 15.
- Fig. 15. *Anticlimax (Subclimax) willetti* Hertlein & Strong, sp. nov. Apical view of specimen shown in Figs. 13 and 14.

All the specimens illustrated on this plate are in the type collection of the

Department of Paleontology of the California Academy of Sciences.

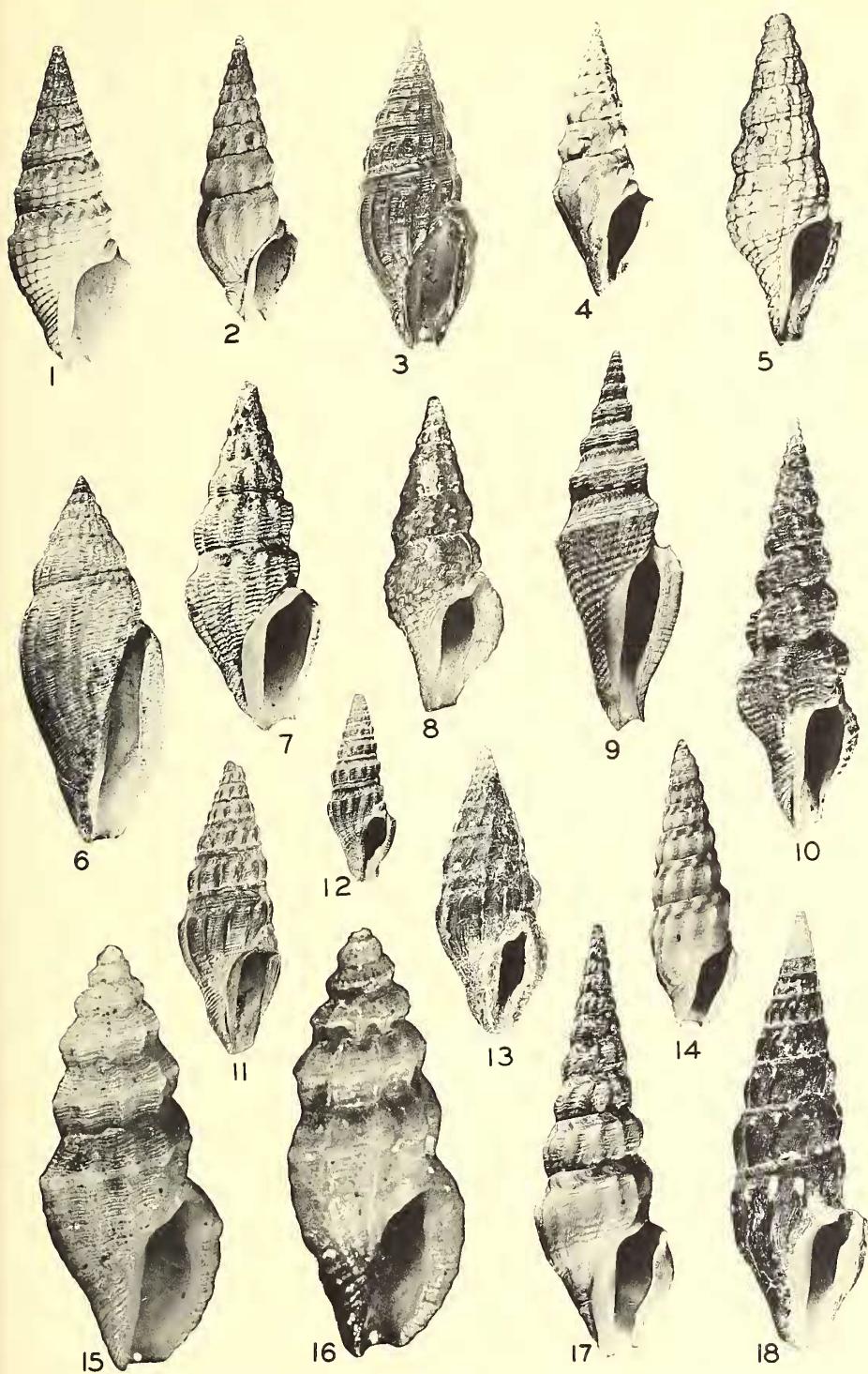
PLATE X.

- Fig. 1. *Cyclostremiscus humboldti* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters). Maximum diameter, 1.8 mm.; height, 1.5 mm. P. 110.
- Fig. 2. *Hemitoma chiquita* Hertlein & Strong, sp. nov. Holotype, from Station 195-D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms (12.6 meters). Greater diameter, 5 mm.; lesser diameter, 3.7 mm.; height, 1.6 mm. P. 113.
- Fig. 3. *Fissurella beebei* Hertlein & Strong, sp. nov. Holotype, from Station 150-D-3, Lat. 23° 00' 00" N., Long. 109° 28' 00" W., Gorda Banks, Gulf of California, dredged in 58 fathoms (106 meters). Length, 41.2 mm.; width, 28 mm.; height, 12.1 mm. P. 113.
- Fig. 4. *Fissurella beebei* Hertlein & Strong, sp. nov. View of interior of specimen shown in Fig. 3.
- Fig. 5. *Fissurella beebei* Hertlein & Strong, sp. nov. Apical view of specimen shown in Figs. 3 and 4.
- Fig. 6. *Circulus taigai* Hertlein & Strong, sp. nov. Holotype, from Corinto, Nicaragua. Maximum diameter, 2.0 mm.; height, 1.0 mm. P. 111.
- Fig. 7. *Hemitoma chiquita* Hertlein & Strong, sp. nov. Apical view of specimen shown in Figs. 2 and 10.
- Fig. 8. *Circulus taigai* Hertlein & Strong, sp. nov. Apertural view of specimen shown in Figs. 6 and 9.
- Fig. 9. *Circulus taigai* Hertlein & Strong, sp. nov. Basal view of specimen shown in Figs. 6 and 8.
- Fig. 10. *Hemitoma chiquita* Hertlein & Strong, sp. nov. View of side of specimen shown in Figs. 2 and 7.
- Fig. 11. *Teinostoma zacaе* Hertlein & Strong, sp. nov. Holotype, from Station 203-D-3, Lat. 10° 55' 45" N., Long. 85° 49' 05" W., near Port Parker, Costa Rica, dredged in 12 fathoms (22 meters). Maximum diameter, 2.0 mm.; height, 1.1 mm. P. 112.
- Fig. 12. *Teinostoma zacaе* Hertlein & Strong, sp. nov. Apical view of specimen shown in Figs. 11 and 13.
- Fig. 13. *Teinostoma zacaе* Hertlein & Strong, sp. nov. Basal view of specimen shown in Figs. 11 and 12.
- All the specimens illustrated on this plate are in the type collection of the Department of Paleontology of the California Academy of Sciences.
- mm.; diameter at aperture, 0.18 mm. P. 70.
- Fig. 2. *Aesopus osborni* Hertlein & Strong, sp. nov. Holotype, from Station 195, D-9, Lat. 15° 44' 28" N., Long. 96° 07' 51" W., near Port Guatulco, Mexico, dredged in 7 fathoms, 12.6 meters). Length, 3.0 mm.; diameter, 1.0 mm. P. 83.
- Fig. 3. *Latirus mediamericanus* Hertlein & Strong, sp. nov. Holotype, from Gorgona Island, Colombia. Length, 52.8 mm.; maximum diameter, 13 mm. P. 80.
- Fig. 4. *Crassispira turricula ballenaensis* Hertlein & Strong, subsp. nov. Holotype, from Station 206-D-1, 3, Lat. 10° 37' 03" to 10° 36' 22" N., Long. 85° 41' 08" to 85° 41' 12" W., off Port Culebra, Costa Rica, dredged in 14 fathoms (25.5 meters). Length, 33.2 mm.; maximum diameter, 11 mm. P. 73.
- Fig. 5. *Elaeocyma salvadorica* Hertlein & Strong, sp. nov. Holotype, from Station 198-D-1, Lat. 13° 27' 20" N., Long. 89° 19' 20" W., off La Libertad, El Salvador, dredged in 13 fathoms (24 meters). Length, 29 mm.; maximum diameter, 11 mm. P. 76.
- Fig. 6. *Cadulus (Platyschides) austinclarki* Emerson. View showing slits in apex of specimen shown in Fig. 1.
- Fig. 7. *Vanikoro galapagana* Hertlein & Strong, sp. nov. Holotype, from Station 54, *Arcturus* Expedition, Hood Island, Galapagos Islands. Height, 7.5 mm.; diameter, 13.5 mm. P. 110.
- Fig. 8. *Vanikoro galapagana* Hertlein & Strong, sp. nov. Apical view of specimen shown in Fig. 7.
- Fig. 9. *Dentalium (Rhabdus) cedrosense* Hertlein & Strong, sp. nov. Holotype, from Station 126-D-12, Lat. 28° 20' 00" N., Long. 115° 10' 30" W., a mile off east coast of Cedros Island, Lower California, Mexico, dredged in 45 fathoms (82 meters). Length, 9 mm.; diameter at aperture, .24 mm. P. 69.
- Fig. 10. *Latirus mediamericanus* Hertlein & Strong, sp. nov. Paratype, from Pearl Islands, Bay of Panama. Length (incomplete), 58.3 mm.; diameter, 22 mm. P. 80.
- Fig. 11. *Crassispira turricula ballenaensis* Hertlein & Strong, subsp. nov. Paratype, from Station 213-D-11, 17, Lat. 9° 44' 52" N., Long. 84° 51' 25" W., to Lat. 9° 42' 00" N., Long. 84° 56' 00" W., off Ballena Bay, Gulf of Nicoya, Costa Rica, in 35 fathoms (63.7 meters). Length, 37.4 mm.; maximum diameter, 11.5 mm. P. 73.
- Fig. 12. *Ischnochiton crockeri* Willett, sp. nov. Holotype, from Station 150-D-6, Lat. 23° 02' 00" N., Long. 109° 31' 00" W., Gorda Banks, Gulf of California, dredged in 60 fathoms (109 meters). Length (exclusive of girdle), 18.4 mm.; diameter, 9.6 mm.; altitude, 4 mm. P. 114.

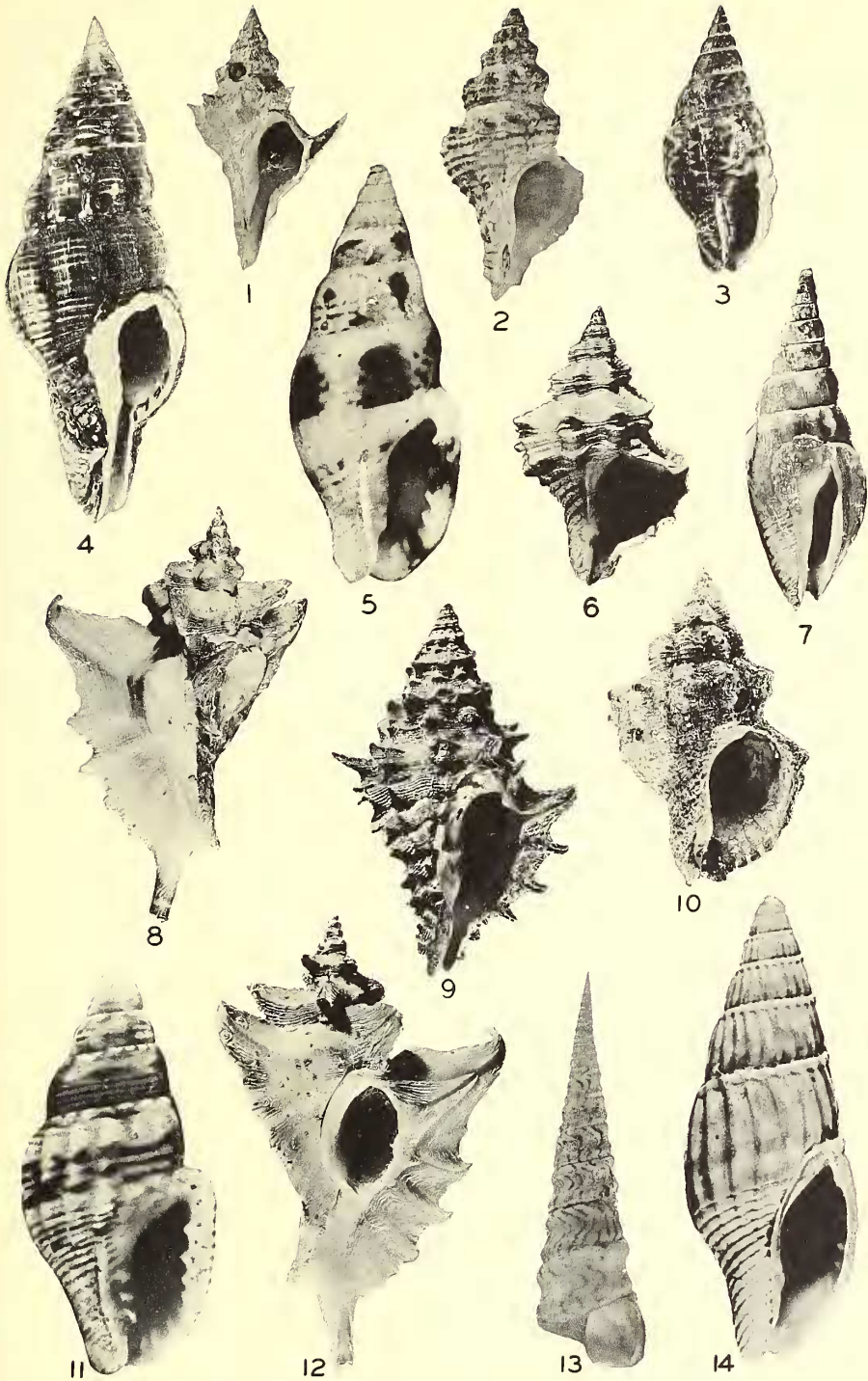
PLATE XI.

- Fig. 1. *Cadulus (Platyschides) austinclarki* Emerson. Hypotype, from Station 145-D-1, 3, Lat. 26° 52' 00" N., Long. 111° 53' 00" W., Santa Inez Bay, Gulf of California, dredged in 4-13 fathoms (7.5-24 meters). Length, 4.05

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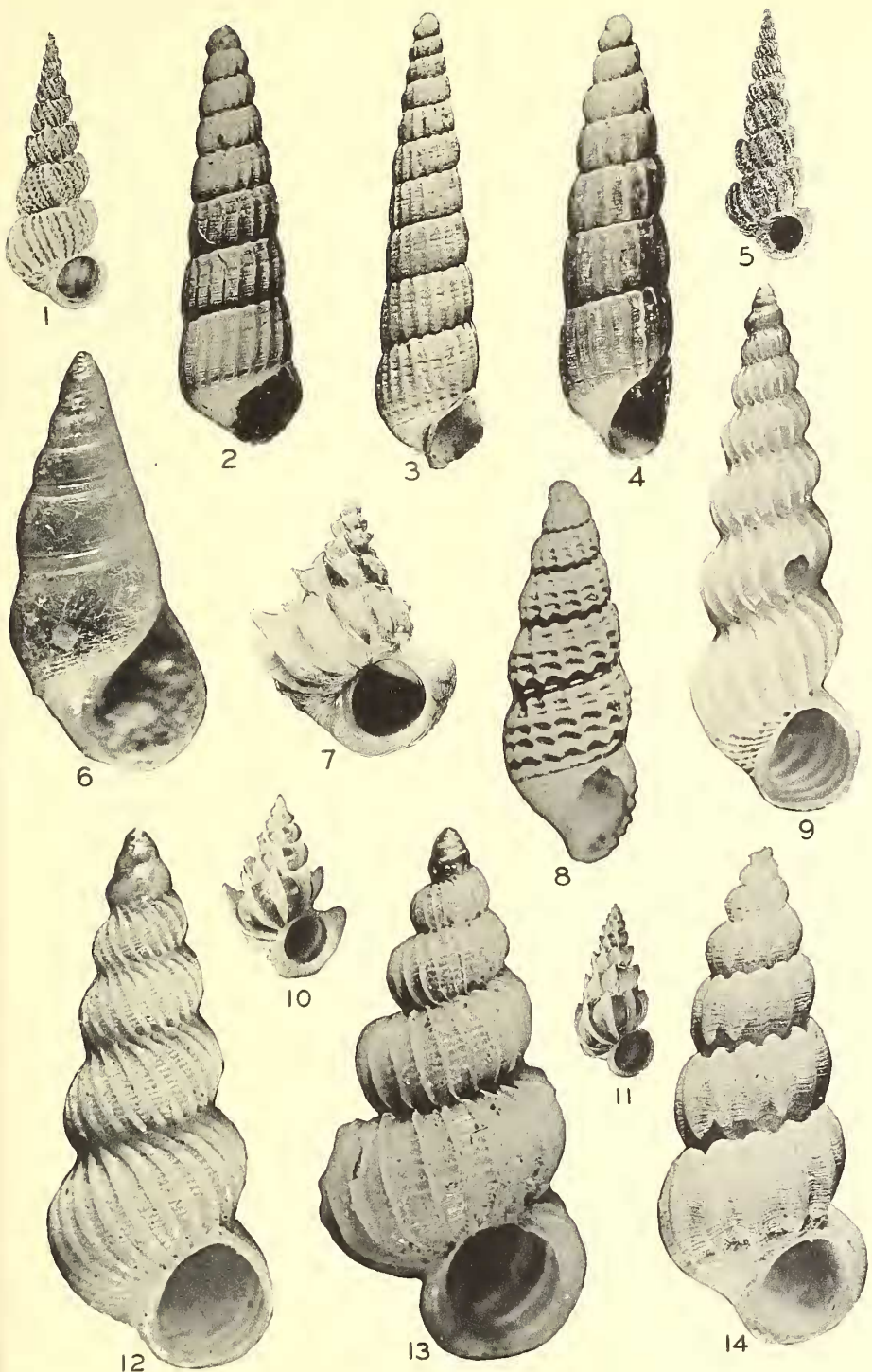


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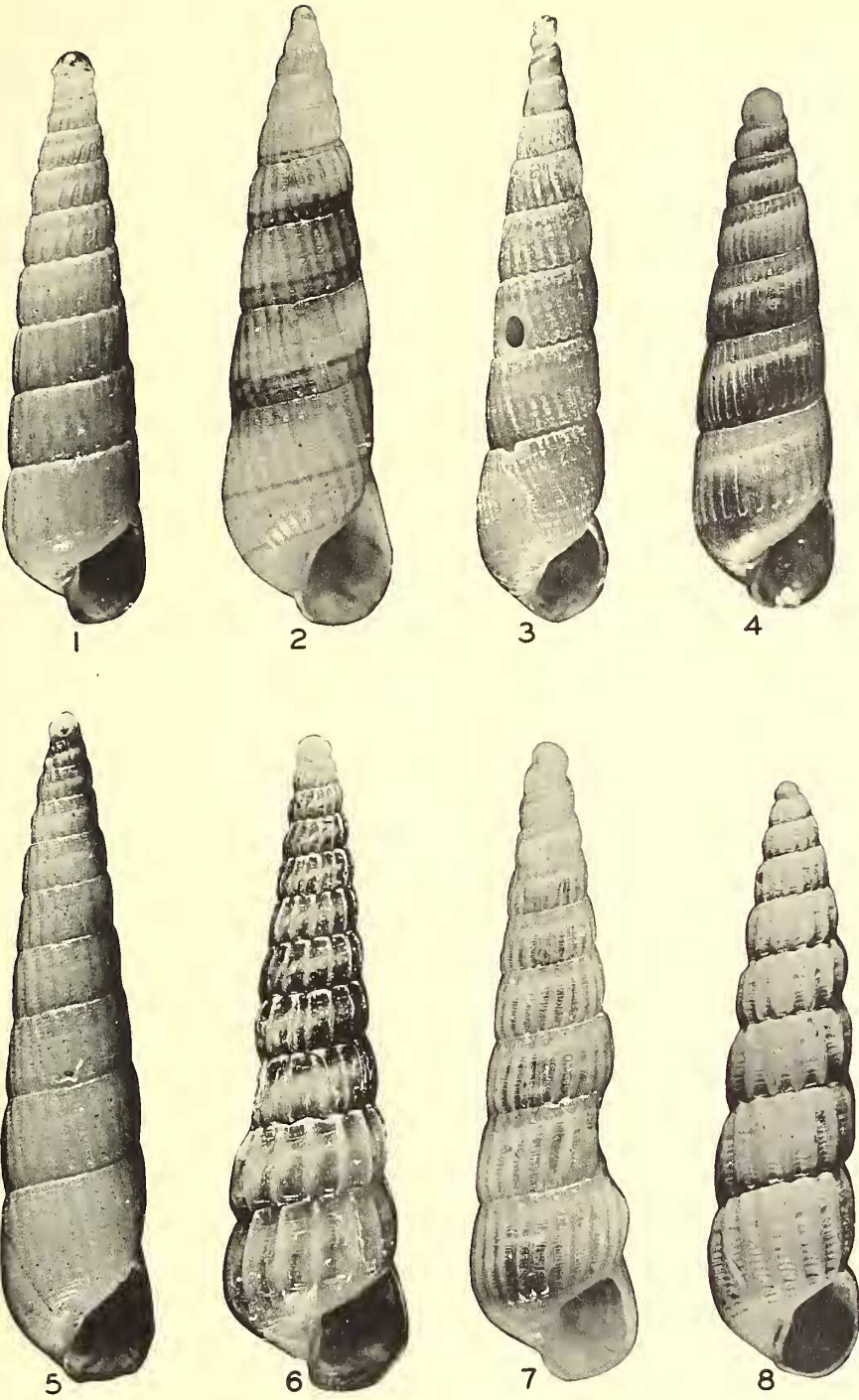


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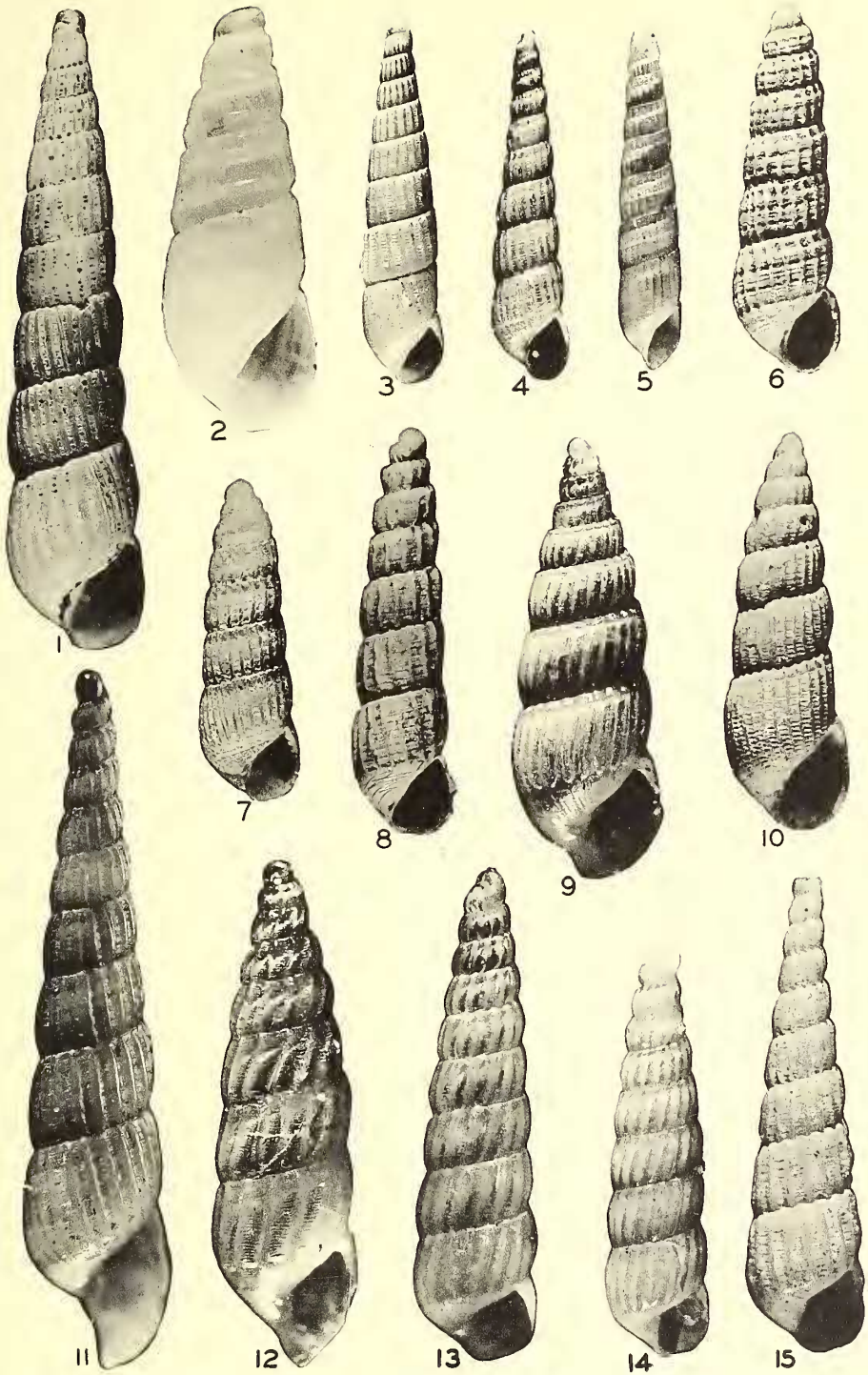




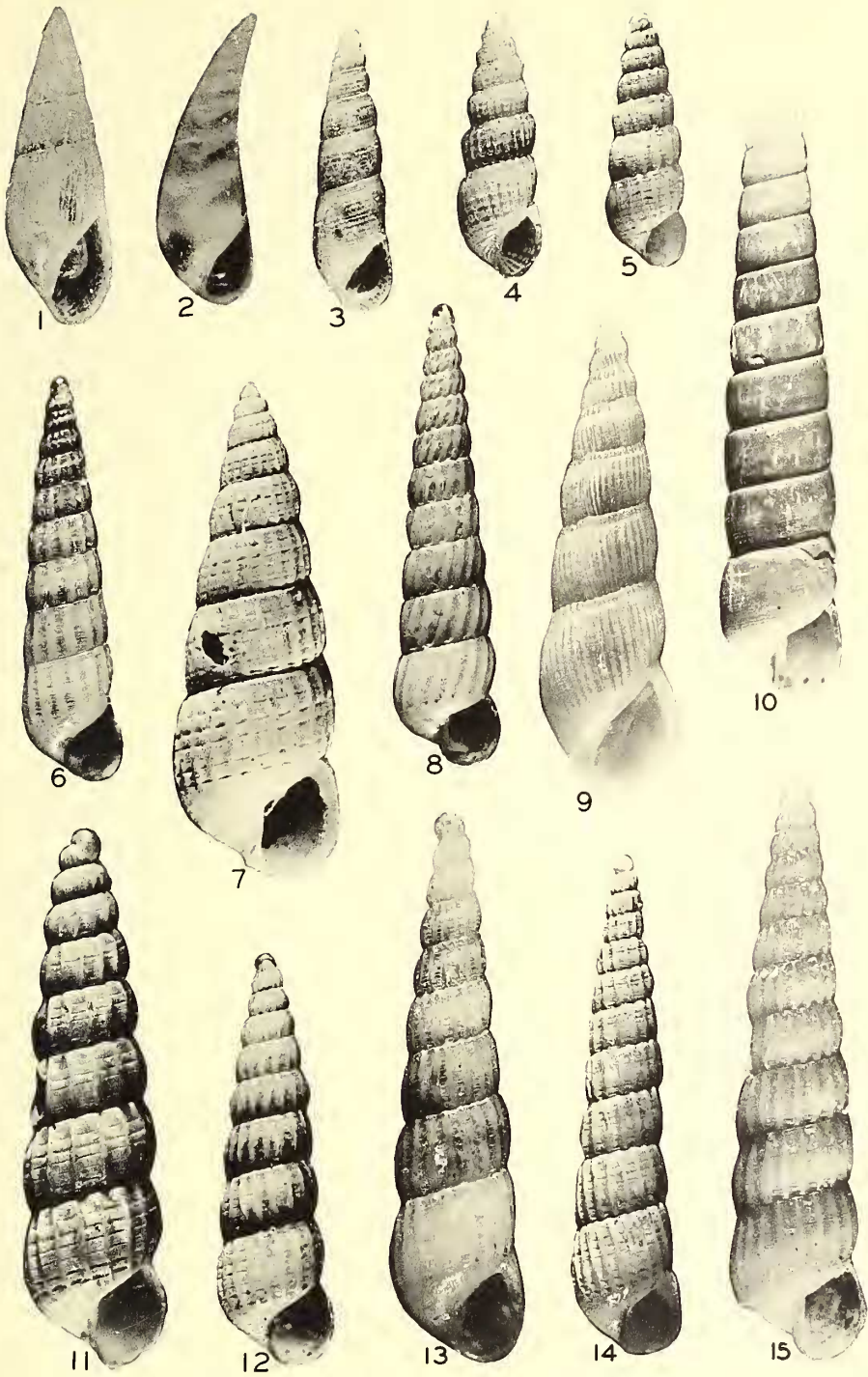
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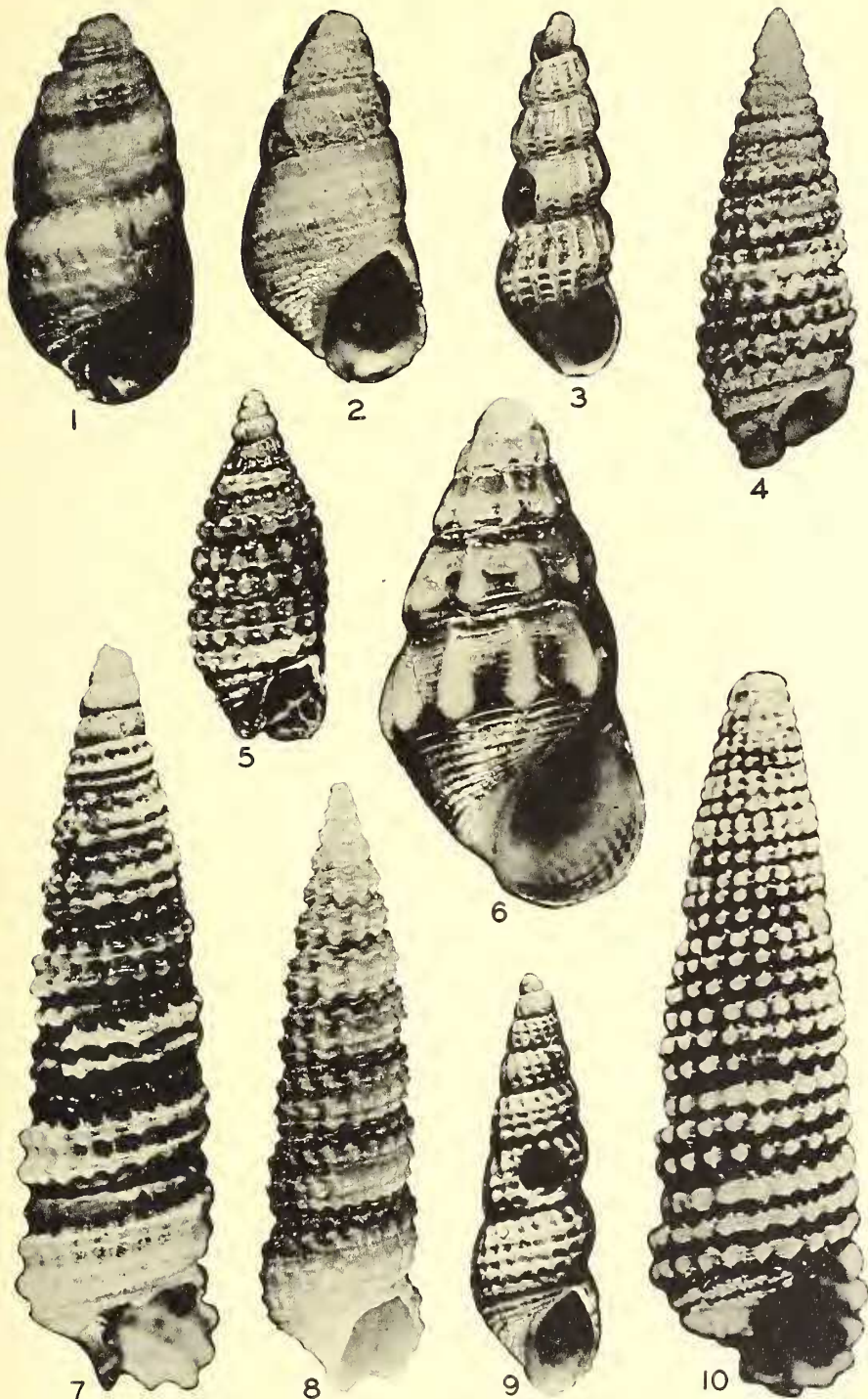
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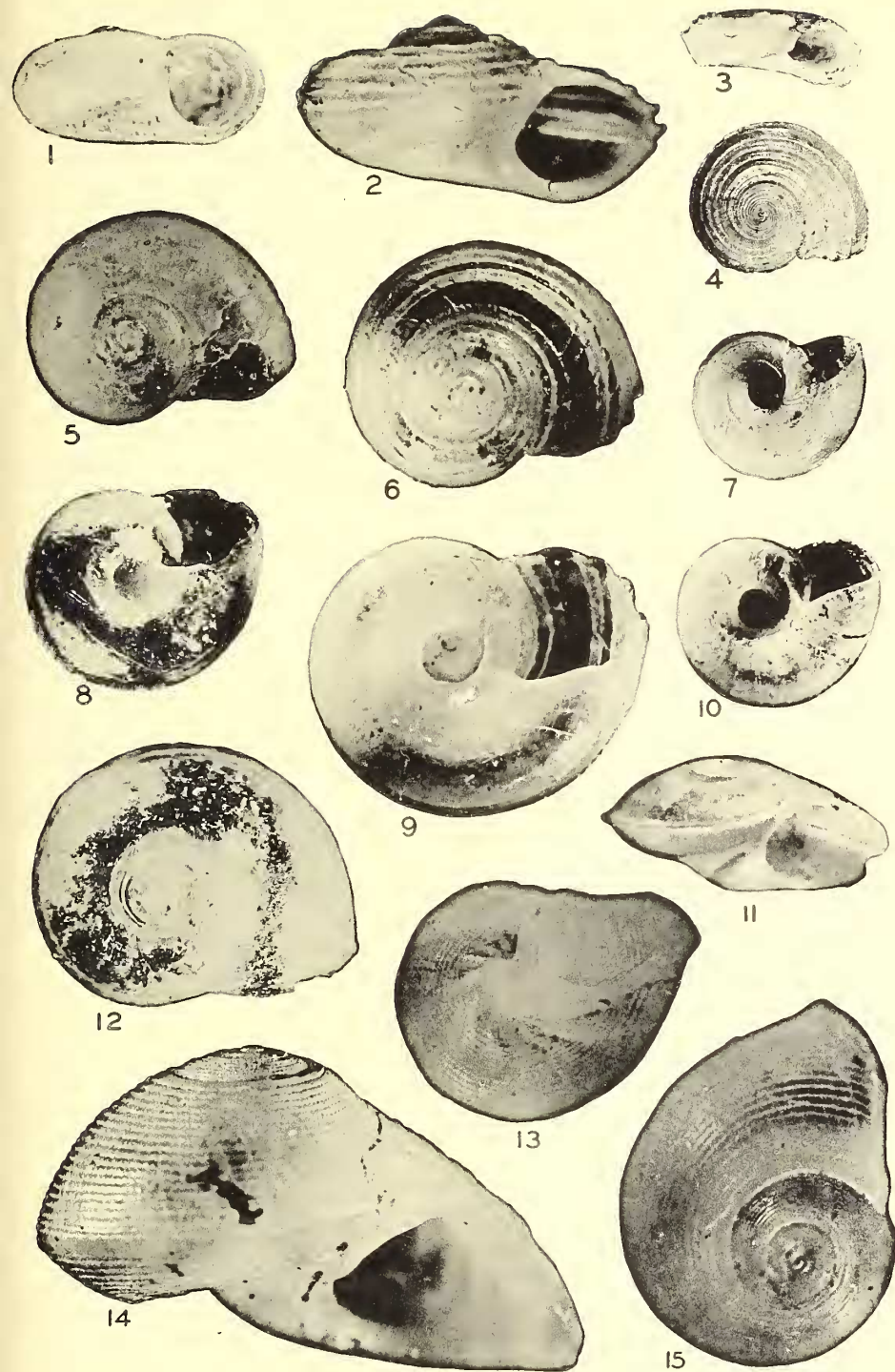
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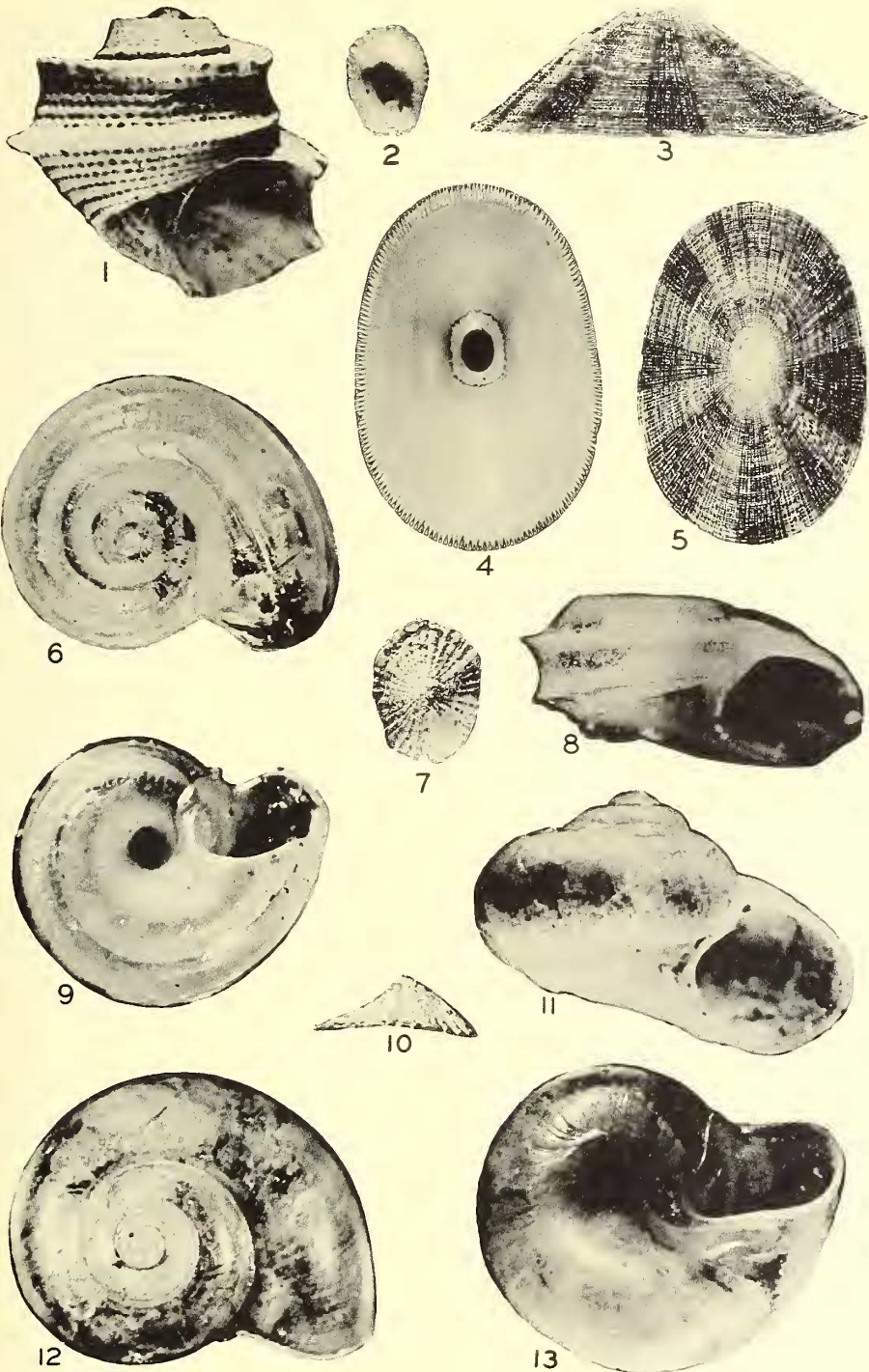
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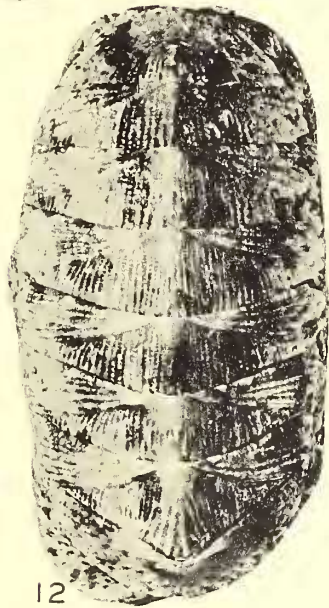


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