

CORONIUM, A NEW GENUS OF MURICIDAE (MOLLUSCA, NEOGASTROPODA) FROM OFF THE SOUTHEASTERN COAST OF BRAZIL, WITH DESCRIPTION OF TWO NEW SPECIES

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ABSTRACT

Two new deep-water species of Muricidae are described from the southeastern Brazilian coast, within the new genus *Coronium*. *Coronium coronatum* (Penna-Neme and Leme, 1978) is a new combination. The main characters of the new genus are the keel, the strongly lirate sculpture, several axial ridges per whorl and the long canal.

A part of the Brazilian Columbariinae are studied herein, based on additional material, in part collected in the "Projeto Integrado Utilização Racional dos Ecossistemas Costeiros da Região Tropical Brasileira: Estado de São Paulo," recently developed in "Instituto Oceanográfico da Universidade de São Paulo" (IOUSP), and in part from the collection of the "Museu Oceanográfico da Fundação Universidade de Rio Grande." The analysis of the shell, radula and anatomical characters of the specimens demonstrated that these belong to three species, one of which is *Columbarium coronatum* Penna-Neme and Leme, two are new, and none are to be assigned to *Columbarium* but to a new genus of Muricidae. The genera of Columbariinae (Vasidae) and of Muricidae were revised respectively in the monographs by Darragh (1969) and Radwin and D'Attilio (1976).

MATERIAL AND METHODS

The specimens collected by Instituto Oceanográfico of USP were deposited in the collection of the Museu de Zoologia of USP. Only one specimen was collected with soft parts, preserved in 70% ethanol; from it, the head-foot complex was extracted and dissected. The part of the digestive system was dehydrated in ethanol series, dyed in carmine, cleared and fixed in creosote. The radula was examined on slides with hoyer fluid. All drawings were made with the aid of a camera lucida. The fourth teleoconch whorl was arbitrarily chosen for comparisons of the number of spines and ridges.

The abbreviations of the Museum collections are: MZUSP for Museu de Zoologia da Universidade de São Paulo and MORG for Museu Oceanográfico da Fundação Universidade de Rio Grande.

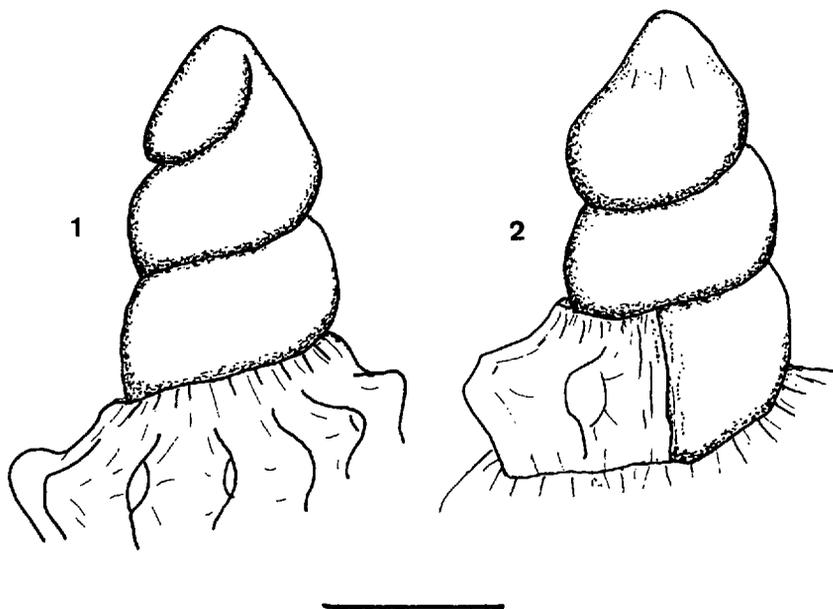
SYSTEMATIC

Family Muricidae *Coronium* new genus

Type Species.—*Columbarium (Histricosceptrum) coronatum* Penna-Neme and Leme, 1978.

Description.—shell elongate, fusiform, regularly convex whorls marked by keel bearing short triangular spines. Protoconch (Figs. 1, 2) of 2.5 similar-sized, smooth whorls, first somewhat angulose. Spiral sculpture of first teleoconch whorl in form of nodose keel, begin rather abruptly at end of protoconch. Teleoconch whorls convex, somewhat angulated by keel, sculptured by series of well-developed axial ridges and spiral cords, between cords is a series of small scales. Aperture oval, inner lip covered with curved plate; outer lip smooth. Canal long, slightly twisted. Operculum with terminal nucleus. Rachidian radular tooth rather flat, with five acuminate cusps. Lateral tooth with very long cusp. Proboscis short.

List of included species: *C. coronatum* (Penna-Neme and Leme, 1978) new combination; *C. oblongum* new species and *C. elegans* new species. Distribution:



Figures 1 and 2. Two views of the protoconch and first teleoconch whorl of *C. oblongum*. Scale = 1 mm.

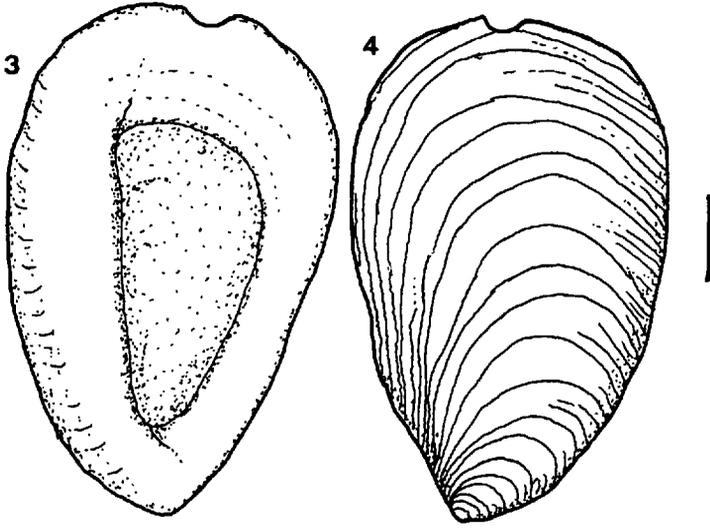
upper slope, from the southeast Brazil to northern Argentina. Gender: masculine. Etymology: referring to the keel with regular spines, like a crown (*corona* changed to *coronium* arbitrarily).

Systematic Discussion—The Columbariinae (Vasidae), which has seven generic taxa (Darragh, 1969; Bayer, 1971), has the protoconch generally globose, with 1.5 whorls; the radular rachidian is arched, with only three cusps (Darragh, 1969) and a very long proboscis (Ponder, 1973: 329). In contrast, *Coronium* has an angulose protoconch, with 2.5 whorls; the radular rachidian is almost flat, with five cusps, and has a short proboscis. These characters are found in several genera of Muricidae (Ponder, 1973; Radwin and D'Attilio, 1976; Ponder and Vokes, 1988). Rios (1985: 116; 1994: 141) noted that the protoconch of *C. coronatum*, differed from other Columbariinae, but had a similarity with *Trophon* (Muricidae).

The affinities of *Coronium* are with the Trophoninae, from which the most similar genera are chosen for comparison. *Coronium* differs from the Mediterranean *Trophonopsis* Bucquoy and Dautzenberg, 1882 in having larger size, keel, scales and in lacking anal sulcus. Differs from *Nodulotrophon* Habe and Ito, 1965 (from the Pacific) in having a taller spire, canal shorter and broader, spiral sculpture more developed and axial sculpture not lamellate. Differs from *Pagodula* Monterosato, 1884 (Mediterranean) in having shell larger and with thick walls, whorls not carinate in mid region, but with a keel in superior region, spiral sculpture and in lacking axial laminate varices. The very acuminate cusps of the radular teeth differ *Coronium* from other Muricidae.

Coronium coronatum (Penna-Neme and Leme, 1978), new combination
Figures 3, 4

Columbarium (Histricosceptrum) coronatum Penna-Neme and Leme, 1978: 286 (figs. 11 + 29).
"Fulgurofus" (*Histricosceptrum*) *coronatum*: Rios, 1985: 116 (pl. 40, f. 514); Rios, 1994: 141 (pl. 45, f. 602).



Figures 3 (inner) and 4 (outer) view of the operculum of *C. coronatum*. Scale = 2 mm.

Types.—Holotype MZUSP 18994 "Station IX," 22°34'S, 40°29'W", 213 m deep; paratype MZUSP 18895 "Station 1856," 30°42'S, 49°03'W", 182–186 m deep.

The following characters complement the original description: spire angulation about 65°, area between keel and adjacent posterior suture slightly convex and sculptured with orthocline to slightly opisthocline scales, and 4 or 5 narrow spiral lines. Sculpture between keel and canal of body whorl is a series of spiral cords, with transverse scales between them. Operculum (Figs. 3, 4) corneous, ovate-unguiculate, terminal nucleus, externally lamellate, occupies entire aperture.

Range.—Continental slope from Rio de Janeiro (24°S) to North Argentina (36°30'S), from 148 to 340 m depth.

Material Examined.—BRAZIL, Rio de Janeiro, MORG 17535, 4 specimens, 24°04'S, 43°37'W Radial Ilha Grande, 148 m depth, W. BESNARD, Jul/69; São Paulo, the holotype and paratype; MZUSP 27904, 2 specimens, Station 5368, 24°31'0"S, 44°28'0"W, 250 m deep, 8/Dec/1988; MZUSP 27917, 1 specimen, Station 5365, 24°25'0"S, 44°16'5"W, 320 m deep, 7/Dec/1988. Rio Grande do Sul, MORG 17449, 2 young specimens, off Solidão, 200 m depth, M. JERONIMO, 2/Out/72; MORG 17452, 2 young specimens, off Mostardas, 180 m depth, 2/Out/87; MORG 24987, 5 specimens, off Torres, 240 m depth, A. SUL, Feb/87. ARGENTINA, MORG 20682, 1 specimen figured by Rios (1985), off Rio la Plata, 36°30'S, 53°45'W, 230–340 m depth, SAN GENARO.

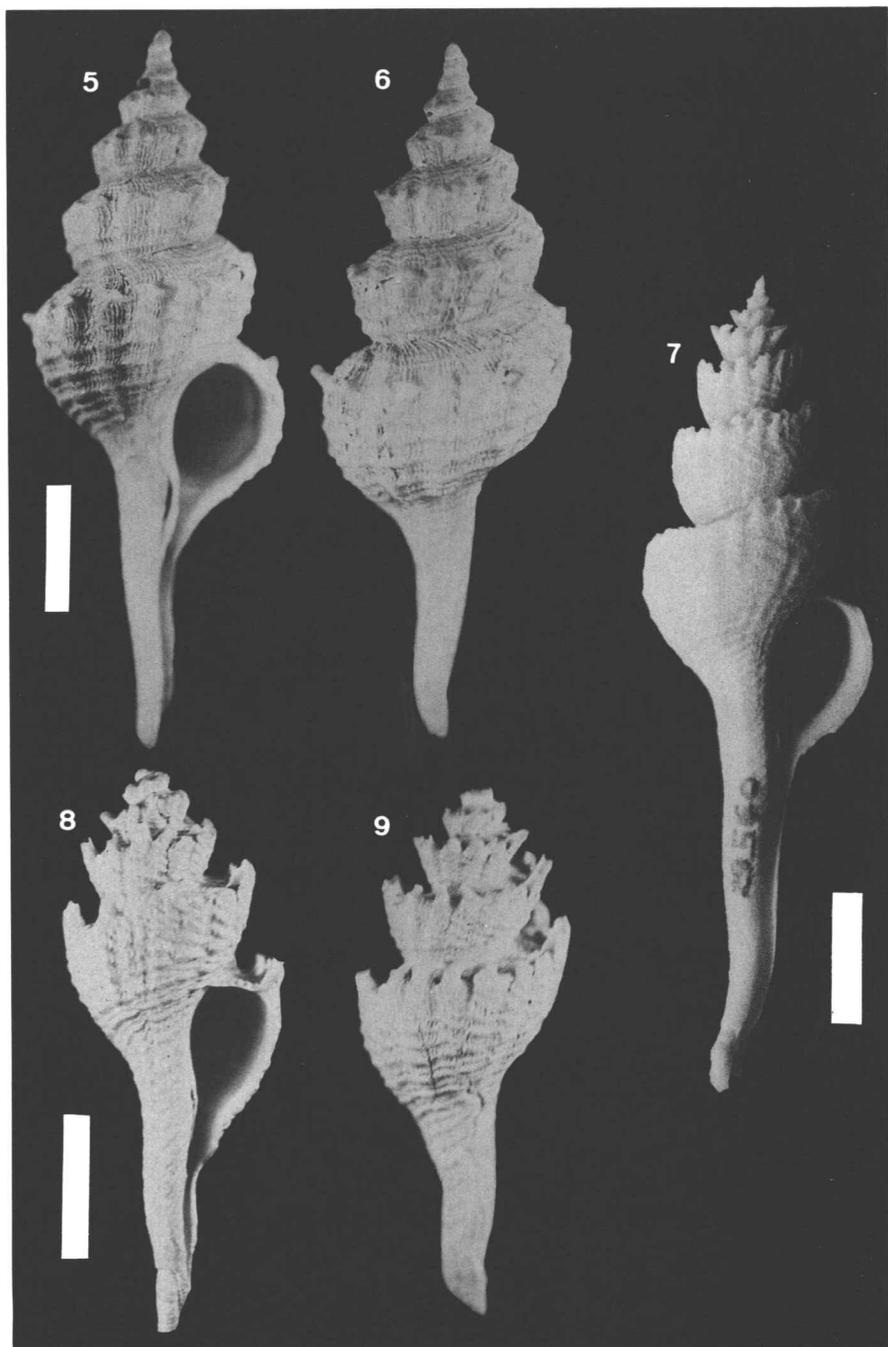
Coronium oblongum new species

Figures 1, 2, 5, 6, 10, 11, 12

Types.—Holotype: MZUSP 27895; Paratypes: MZUSP 27896, 1 specimen; MZUSP 27897, 1 specimen; MZUSP 27898, 1 specimen; MZUSP 27899, 1 specimen; MZUSP 27900, 1 specimen; MZUSP 27911, 1 specimen; MZUSP 27918, 4 young specimens; provenance of these: type locality. MZUSP 27901, specimen with soft parts, Station 5365, 24°25'S, 44°16'W, 320 m deep, Dec/1988; MZUSP 27902, 6 young specimens, Station 5364, 24°35'S, 44°12'W, 600 m deep, Dec/1988. MORG 24549, 1 specimen, off Rio Grande, RS, 300 m depth, A. SUL, Aug/86.

Type Locality.—Brazil, São Paulo, slope off Ubatuba, Station 5362, 24°52'S, 44°34'W, deep: 600 m, (Dec/1988).

Diagnosis.—Spire angulation of about 45°, area between keel and adjacent posterior suture convex and sculptured with opisthocline scales, sculpture between



Figures 5–9 shells. 5) frontal and 6) dorsal view of the holotype of *Coronium oblongum* (MZUSP 27895); 7) frontal view of holotype of *Coronium elegans* (MORG 29560); 8) dorsal and 9) frontal view of the paratype of *Coronium elegans* (MZUSP 27903). Scales = 10 mm.

keel and canal on body whorl a series of spiral cords, generally alternating between narrow and wide on posterior half of this whorl, and isometric spiral cords on anterior half of this whorl; spines of keel turned outward.

Description.—Shell (Figs. 5, 6) elongate, fusiform, convex whorls cut by low keel bearing small and separate triangular spines. Protoconch angulate (Figs. 1, 2), smooth, of 2.5 similar whorls. Spire angulation of about 45°. First and second teleoconch whorls with median nodulate keel. Keel more developed in other next whorls, becoming proportionally nearer adjacent posterior suture. Whorls present series of low, rounded axial ridges, about 15 in fourth whorl; each spine of keel situated on an axial ridge. Area between keel and adjacent posterior suture convex and sculptured with low, oblique, opisthoclinal scales and 2 or 3 low and narrow spire lines. Sculpture between keel and adjacent anterior suture or canal with series of strong spiral cords, and with series of regular and low scales between spiral cords; posterior half of body whorl generally with narrow and wide cords alternately. Aperture elliptical, inner lip covered with a thin curved, not plicate lamina; outer lip rounded and thick, without furrows. Canal long and slightly twisted. Color: homogeneous clear to homogeneous dark brown.

Operculum: ovate-unguiculate, corneous, terminal nucleus, externally lamellate (similar to Figs. 3, 4). Occupies entire aperture.

Pallial cavity organs: only partially observed, elongate and transverse gill, hypobranchial gland in right margin, rectum within this gland.

Head-foot: homogeneous pale beige in color, foot well developed without divisions (Fig. 10). Eye in median and outer region of each tentacle, proximal half of tentacle clearly wider than distal half.

Digestive system (Fig. 11): proboscis pleuroembolic, short and wide, odontophore at right and oesophagus at left within the buccal mass. Radular sac long, curved and narrow, projected outside from odontophore, radular nucleus in tip. Odontophore broad. Radula (Fig. 12) with rachidian tooth almost flat, with five sharp-pointed cusps, central cusp longest, intermediary cusps smallest. Lateral tooth with flattened base, single, very long, somewhat curved and sharp-pointed cusp. Anterior oesophagus "V" shaped, in mid region probably with ducts to small salivary gland or only fibrotic connection. Leiblein valve as elliptical bulb, its thick glandular walls consists of two different-staining regions as is normal in this structure. Oesophagus after valve is narrow thin-walled tube.

Measurements.—Holotype: MZUSP 27895, length 50.7 mm, width 17.3 mm. Paratypes: MZUSP 27896, 50.0 mm by 16.3 mm; MZUSP 27897, 39.6 mm by 16.1 mm; MZUSP 27898, 39.0 mm by 13.7 mm; MZUSP 27899, 40.3 mm by 14.5 mm; MZUSP 27900, 38.9 mm by 12.7 mm; MZUSP 27911, 30.2 mm by 14.3 mm.

Range.—Brazil, São Paulo to Rio Grande do Sul, upper continental slope.

Habitat.—muddy bottoms, 300 to 600 m deep.

Etymology.—of 3 known species this is the most elongate (*oblongum*) species.

Coronium elegans new species

Figures 7, 8, 9, 13, 14

Types.—Holotype MORG 29560 (from type locality); paratype: MZUSP 27903, 1 specimen, Brazil, São Paulo, off Ubatuba, Station 5183, 24°02'S, 44°34'W, 110 m deep.

Type Locality.—Brazil, São Paulo, off Peruibe, 24°30'S, 47°00'W, 130–140 m depth (Dec/1991).

Diagnosis.—Protoconch proportionally small; spire angulation of 55°, area between keel and adjacent posterior suture somewhat flat, perpendicular to axis of

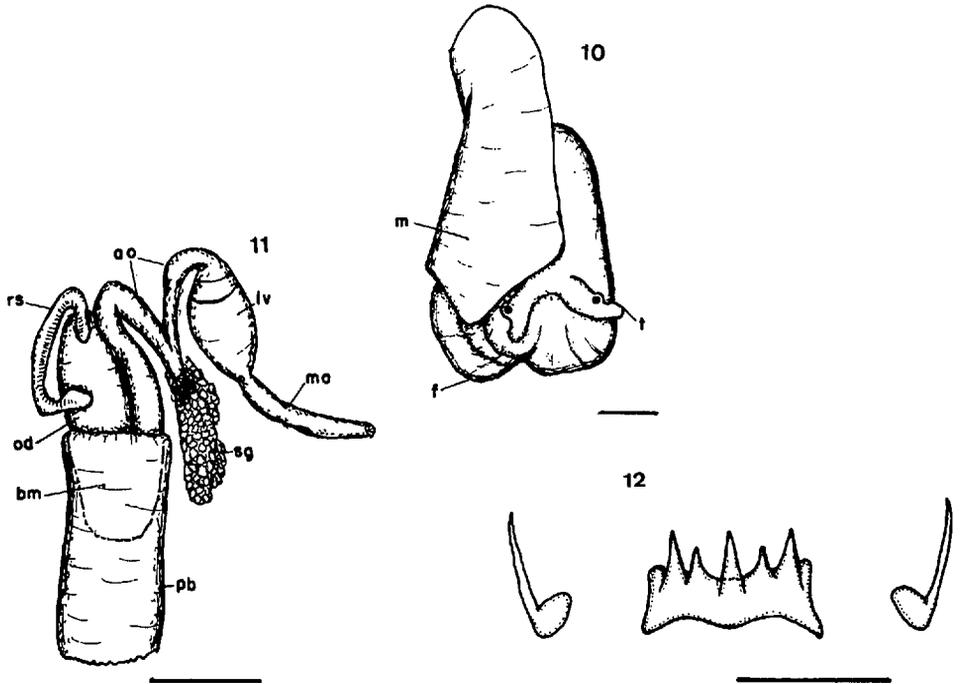
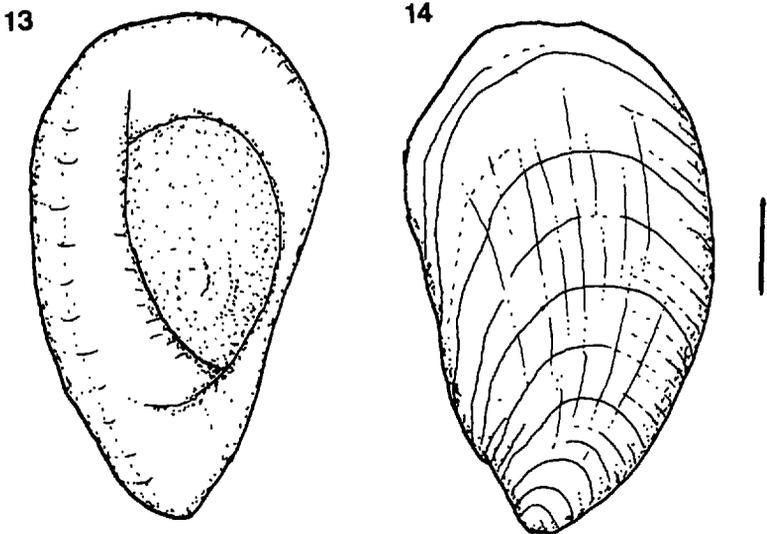


Figure 10. Dorsal view of head-foot of the *C. oblongum*. f: foot; t: tentacle; m: mantle. Scale = 1 mm.

Figure 11. Detail of proximal region of the digestive system in dorsal view. ao: anterior oesophagus; bm: buccal mass; lv: Leiblein valve; od: odontophore; pb: proboscis; mo: mid-oesophagus; rs: radular sac; sg: salivary glands. Scale = 0.5 mm.

Figure 12. A row of radular teeth of *C. oblongum*. Scale = 50 μ m.



Figures 13. (inner) and 14 (outer) view of the operculum of *C. elegans*. Scale = 2 mm.

shell coiling and sculptured with prosoclinal lirae and opisthocline scales; sculpture between keel and canal, a series of spiral cords on anterior half and gradually oblique prosoclinal cords on posterior half of this region, spines on keel turned to apex of the shell, close and numerous.

Description.—Shell elongate (Figs. 7–9), fusiform, convex whorls cut with angulate keel bearing small, close and triangular spines. Protoconch as for genus, but proportionally small. Spire angulation of about 55° . First and second teleoconch whorls with median nodulate keel, surface between keel and adjacent posterior suture approximately perpendicular to axis of shell, keel more developed on later whorls, becoming proportionally nearer to adjacent posterior suture. Region between keel and adjacent posterior suture somewhat flat and approximately perpendicular to axis of coiling of shell, and sculptured by low, prosoclinal and undulating chords, and opisthocline scales. Region between keel and adjacent anterior suture or canal (in body whorl) with series of low, rounded axial ridges, 20 on fourth whorl, and sculptured by series of cords, those near of keel oblique prosoclinal, gradually becoming spiral cords in anterior half of each whorl; between each chord series of small and regular scales. Keel is an angulation of posterior region of each whorl, bearing series of small and triangular close spines, numerous (20 on the fourth whorl) and turned to apex of shell; each spine of keel situated on axial ridge. Aperture elliptic, with discreet angulation adjacent to keel; inner lip covered with thin, curved, non-plicate lamina; outer lip rounded thick, without furrows. Canal long, slightly twisted. Color: homogeneous clear beige.

Operculum: ovate-unguiculate (Figs. 13, 14), corneous, terminal nucleus, externally lamellate and radially striate. Occupies entire aperture.

Measurements.—Holotype (Fig. 7) MORG 29560 length 70.7 mm, width 20.5 mm (6.25 teleoconch whorls); paratype (Figs. 8, 9) MZUSP 27903, length 35.2 mm, width 14.1 mm (4.25 teleoconch whorls).

Range.—Brazil, São Paulo coast, Upper continental slope.

Habitat.—muddy bottoms, 110 to 140 m deep.

Etymology.—the specific name refers to the “elegant” form of the shell.

SYSTEMATIC DISCUSSION OF THE SPECIES

The three species studied herein are distinguishable by the following characters: (1) approximate spire angulation: *C. oblongum* 45° , *C. elegans* 55° and *C. coronatum* 65° ; (2) spines of the keel: *C. elegans* has spines closer and turned to the apex of the shell, the other two species the spines are separate and turned externally; (3) number of spines and axial ribs on the fourth teleoconch whorl: *C. elegans* has 20 spines and axial ribs, *C. coronatum* in average 14 and *C. oblongum* in average 16; (4) sculpture between the keel and adjacent posterior suture: *C. coronatum* from orthocline to slightly opisthocline scales and spiral lines, *C. oblongum* with highly opisthocline scales and spiral lines, and *C. elegans* with prosocline chords and opisthocline scales; (5) sculpture between the keel and canal on body whorl: *C. coronatum* and *C. oblongum* have only spiral cords, in *C. elegans* the cords near of the keel are oblique prosocline; (6) characters of the shell surface in region between the keel and adjacent posterior suture: *C. elegans* has this area plane and somewhat perpendicular to the axis of the shell; *C. oblongum* has this area highly convex; *C. coronatum* is intermediary between both; (7) protoconch: that of *C. elegans* is proportionally smaller; (8) operculum: that of *C. elegans* has radial striae externally, in the other two species radial striae are

lacking; (9) bathymetry: *C. elegans* from 110 to 140 m deep, *C. coronatum* from 148 to 340 m deep and *C. oblongum* from 300 to 600 m deep.

Dr. E. G. Vokes, Tulane University (pers. comm.) suggested the possibility of other species which occur in the region of the *Coronium* species, such as *Trophon acanthodes* Watson, 1882, *T. pelseeneeri* Smith, 1915 and allies, could be included in this genus. This very probable possibility is being studied by me now.

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