

Colour orange to reddish or blackish brown. Last whorl pattern ranging from a few scattered white tents to 2 spiral tentmark zones, below centre and at base, and several axial groups of tents sometimes fusing into streaks. Darker spiral lines sparsely articulated with small white tents may occur within the dark zones. Basal part of columella white or orange-brown. Apex pink. Late sutural ramps matching last whorl in colour pattern. Aperture white.

Habitat and Habits: No reliable data.

Discussion: *C. echo*, previously considered a form (Maccà, 1988) or subspecies of *C. pennaceus* (Lauer, 1988), rather deserves recognition as a valid species (Maccà, 1991). *C. pennaceus* differs in its distinctly narrower larval shell (0.7-0.8 mm) and its usually domed early postnuclear whorls.

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Conus canonicus HWASS in BRUGUIÈRE, 1792

(Plate 65, Fig. 1-6; Plate 76, Fig. 67; Map 130)

1792 *Conus canonicus* Hwass in Bruguière, Encycl. Méth., 1: 749-750, no. 143

1864 *Conus rubescens* Bonnet, Rev. Mag. Zool., 16: 282, pl. 22 fig. 6

1866 *Conus condensus* Sowerby II, Thes. Conch., 3: 326-327, no. 417, pl. 26 fig. 622

Types: *C. canonicus*: Neotype (Kohn, 1968) in MHNG (53 x 28.5 mm); *C. rubescens*: Original figure 48 x 25 mm; *C. condensus*: Original figure 46 x 21 mm.

Type Localities: *C. canonicus*: "les mers des grandes Indes"; "Maldives" (Coomans et al., 1983); *C. rubescens*: "l'île d'Annam"; *C. condensus*: "Sandwich Islands."

Range: E. Africa to French Polynesia; absent from Marshall Is. and Hawaii.

Description: Medium-sized to moderately large, moderately solid to solid. Last whorl conoid-cylindrical, sometimes ventricosely conical, conical, or cylindrical; outline convex at adapical fourth, slightly convex to straight and parallel-sided below, with straightly tapering sides at basal third; left side constricted above base. Shoulder angulate to rounded. Spire of low to moderate height, outline straight to slightly concave or slightly sigmoid. Larval shell of about 2.75 whorls, maximum diameter 0.8-0.9 mm. First 4-5.5 postnuclear whorls tuberculate. Teleoconch sutural ramps slightly convex to slightly concave, with 0-1 increasing to 9-10 weak spiral grooves or more spiral striae. Last whorl with weak spiral ribs basally, sometimes extending beyond centre.

Ground colour white, often suffused with pink or blue. Last whorl with yellowish brown spots and flecks and with a network of fine brown lines edging tiny to moderately large, round to tentlike ground-colour markings. Similarly sized tents may be arranged in groups. Yellowish brown spots and flecks interspersed with broad, dark brown axial

lines, sometimes also with spiral lines, usually forming 2 interrupted spiral bands, within basal third and just above centre. Larval whorls pale pink. Early postnuclear sutural ramps pale pink. First 2-4 ramps immaculate, following ramps matching last whorl in colour pattern. Aperture pink, sometimes suffused with orange or violet.

C. canonicus Shell Morphometry

L	35 - 70 mm
RW	0.17 - 0.44 g/mm (L 35-60 mm)
RD	0.53 - 0.64
PMD	0.74 - 0.86
RSH	0.06 - 0.22

Periostracum yellowish grey, thin, translucent, smooth.

Dorsum of foot buff, radially streaked and mottled with brown, with a black spot beneath the operculum and with a dotted black pre-marginal band ending in a blotch anteriorly; anterior side bright red, adjacent zone paler red and with a central black blotch. Sole of foot cream to pinkish buff. Rostrum mottled white and buff. Tentacles white, tipped with red. Siphon white, grading to red distally, mottled with brown proximally, and with a rather broad black ring centrally (Chaberman, pers. comm., 1981; Kohn, unpubl. observ.) (Pl. 76, Fig. 67).

Radular teeth with 2 opposed barbs adapically; long serration ending in a cusp about 1/6 of the length from the base; basal spur absent (Troschel, 1868; Endean & Rudkin, 1965, referred to as "*C. tigrinus*").

Habitat and Habits: Intertidal and uppermost subtidal; on subtidal coral reef flats, in sand under coral rocks, in coral rubble with or without sand and on limestone pavement, often close to living corals (Kohn & Nybakken, 1975; Chaberman, pers. comm., 1981; Richards, pers. comm., 1989; Lorenz, pers. comm., 1993).

C. canonicus feeds on gastropods; venom toxic to molluscs but not to small mammals, fishes and polychaete worms (Endean & Rudkin, 1965; Kohn & Nybakken, 1975).

Spawn of about 50 egg capsules deposited on the underside of rocks in about 1 m or near the reef crest. Capsules of 11-20 x 8.5-15 mm affixed to the substratum as well as to previously laid capsules; each containing 500-1,500 eggs. Egg diameter of 230-260 µm predicting a minimum pelagic period of 21-18 days (Kohn, 1961b, listed there as "*C. textile*"; Perron & Kohn, 1985; Loch, pers. comm., 1987; Kohn & Perron, 1994).

Discussion: *C. canonicus* is similar to *C. abbas*, *C. textile*, *C. legatus*, and *C. aureus*; for comparison, see the Discussions of those species.

C. canonicus has often been referred to as *C. tigrinus*, a synonym of *C. textile*. *C. rubescens* is based on a convex-sided specimen, *C. condensus*, on an elongate specimen of *C. canonicus*.

***Conus abbas* HWASS in BRUGUIÈRE, 1792**

(Plate 65, Figures 7-9; Map 130)

1792 *Conus abbas* Hwass in Bruguière, Encycl. Méth., 1:750-751, no. 144**Type:** Neotype (Kohn, 1968) in MHNG (60.5 x 33 mm).**Type Locality:** "des mers des grandes Indes."**Range:** S. India and Sri Lanka to Indonesia (Java, Bali).

Description: Medium-sized to large, moderately solid to solid; relative weight of similarly sized specimens may vary by 40%. Last whorl ventricosely conical to ovate or slightly pyriform; outline convex at adapical third, less so below, and straight to slightly concave at base. Shoulder subangulate to angulate. Spire of low to moderate height, outline concave to nearly straight. Larval shell with a maximum diameter of 0.8-0.9 mm. First 3-6 postnuclear whorls tuberculate. Teleoconch sutural ramps flat to slightly concave, with 1-2 increasing to 6-12 (or more) weak spiral grooves. Last whorl with variably prominent spiral ribs near base; sometimes additional spiral striae from base to shoulder.

***C. abbas* Shell Morphometry**

L	40 - 84 mm
RW	0.16 - 0.50 g/mm (L 40-76 mm)
RD	0.56 - 0.68
PMD	0.72 - 0.85
RSH	0.11 - 0.15

Ground colour white to bluish grey, with axial blue streaks or flames on last whorl. Last whorl with a fine brown to violet-brown reticulate pattern, forming many small

rhomboid and tentlike ground-colour markings and sparse larger tents. Yellowish brown to brown blotches usually grouped in 2 or occasionally 3-4 spiral bands, interspersed with broad dark brown axial lines and sometimes also with finer spiral lines. Apex pinkish orange. Postnuclear sutural ramps matching last whorl in colour pattern; pattern often only of marginal dots in early whorls. Aperture white, occasionally bluish white or cream deep within.

Periostracum yellowish brown, thin, translucent, smooth.

Foot pale tan, sparsely mottled with brown; anterior side orangish pink. Siphon white, grading to red distally, with a rather broad black ring centrally (Kohn, unpubl. observ.).

Habitat and Habits: Shallow water to about 50 m; on coral reefs, often beneath coral boulders.

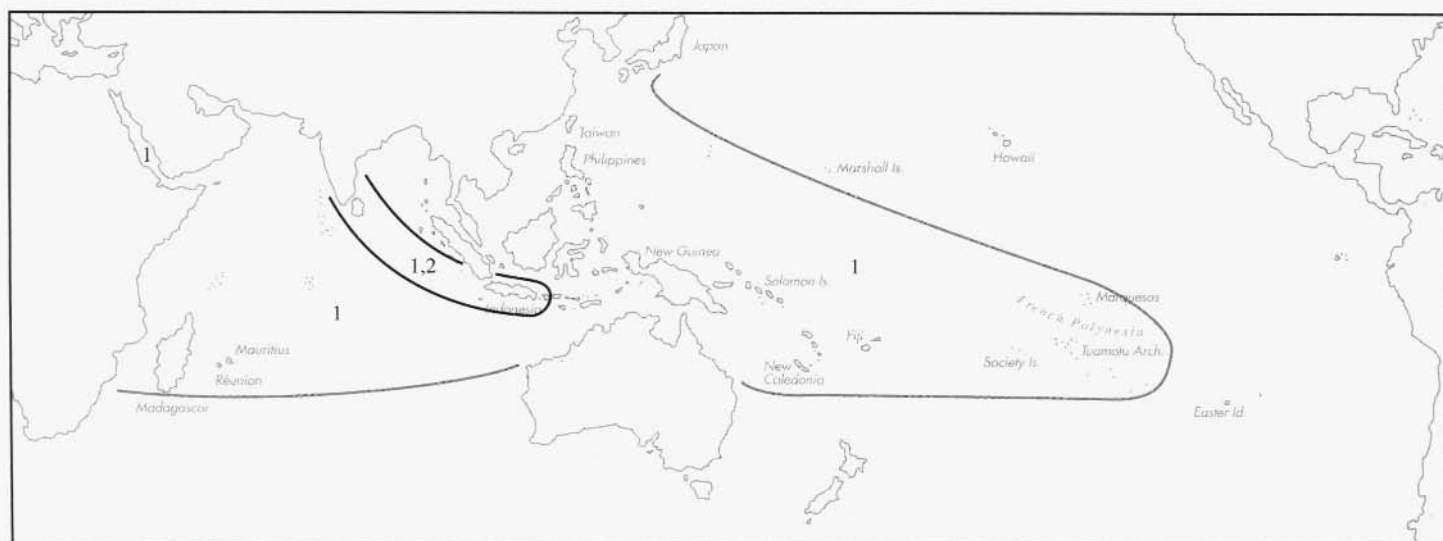
Discussion: *C. abbas* resembles *C. canonicus*, *C. textile*, and *C. dalli*. For comparison with *C. textile*, see the Discussion of that species; for the distinctions from *C. dalli*, see the Discussion of that species in Vol. 2. *C. canonicus* can be distinguished by its more straight-sided and usually conoid-cylindrical last whorl, its pink aperture, and by the small round instead of rhomboid markings of the last whorl pattern. In addition, *C. canonicus* lacks prominent marginal dots in its early postnuclear whorls.

***Conus victoriae* REEVE, 1843**

(Plate 65, Figures 10-17; Map 131)

1843 *Conus victoriae* Reeve, Proc. Zool. Soc. London, 11: 172; Conch. Icon., 1, *Conus*: Pl. 37 sp. 202, figs. a, b1864 *Conus nodulosus* Sowerby II, Descr. Three New Shells (London), unnumbered page and figure; 1866: Thes. Conch., 3: 328, pl. 7 (288) fig. 635 (non *C. nodulosus* Deshayes, 1865)

Map 130

1: *C. canonicus* 2: *C. abbas*

1866 *Conus complanatus* Sowerby II, Thes. Conch., 3, *Conus* suppl.: 330, no. 441, pl. 28 (289) figs. 650, 651

Types: *C. victoriae*: Original figures 37 x 19 and 40.5 x 19 mm; *C. nodulosus* (1866): Type in BMNH (51 x 26 mm); *C. complanatus*: 2 syntypes in BMNH (48 x 27; 52.5 x 30 mm).

Type Localities: *C. victoriae*: "Mouth of the Victoria River, New Holland" (Fig. 202b); *C. nodulosus* (1864): "Swan River"; *C. nodulosus* (1866): "Australia"; *C. complanatus*: "Australia."

Range: W. Australia; *C. v. victoriae*: Northern Territory to N. W. Cape; *C. v. nodulosus*: Shark Bay to Fremantle.

Description: Medium-sized to moderately large, moderately solid to solid; in *C. v. victoriae*, relative weight of similarly sized shells may vary by 50%. Last whorl ventricosely conical, also ovate or conoid-cylindrical in *C. v. victoriae*; outline convex, often less so to nearly straight below adapical third; left side concave to nearly straight at basal third. Shoulder angulate to sometimes subangulate. Spire of low to moderate height, outline usually concave to straight. Larval shell of 1.75-2 whorls, maximum diameter 1-1.1 mm. First 3.5-6.5 postnuclear whorls tuberculate. Teleoconch sutural ramps flat to slightly concave, with 1 increasing to 6-12 variably fine, weak to obsolete spiral grooves. Last whorl with variably spaced, distinct to obsolete spiral ribs basally; spiral sculpture generally less prominent in *C. v. nodulosus*.

C. victoriae Shell Morphometry

L

- *C. v. victoriae* 37 - 94 mm (usually to 65 mm)
- *C. v. nodulosus* 37 - 51 mm

RW 0.13 - 0.42 g/mm (L 37-63 mm)

RD

- *C. v. victoriae* 0.55 - 0.67
- *C. v. nodulosus* 0.59 - 0.65

PMD

- *C. v. victoriae* 0.68 - 0.83
- *C. v. nodulosus* 0.75 - 0.80

RSH

- *C. v. victoriae* 0.09 - 0.22
- *C. v. nodulosus* 0.14 - 0.22

C. v. victoriae (Pl. 65, Figs. 10-14): Ground colour white, often suffused with light blue and/or overlaid with yellowish or orangish brown. Colour pattern extremely variable: Last whorl in typical form with a network of fine light to blackish brown lines edging very small to medium-sized tents. Yellowish or orangish to blackish brown blotches arranged in 2-3 or more interrupted to continuous spiral bands and interspersed with coarse darker axial lines. Shells with typical pattern intergrade with shells with an axial pattern of bands and streaks to closely spaced fine wavy axial lines; pattern varies from completely white shells to shells heavily patterned on a brown or blue ground. Larval whorls and often also earliest postnuclear sutural ramps immaculate white. Following sutural ramps matching last

whorl in colour pattern. Aperture white to pink, pinkish violet, bluish violet or blue.

Periostracum yellow-grey, thin, translucent, smooth.

C. v. nodulosus (Pl. 65, Figs. 15-17): Ground colour white, sometimes suffused with pink and rarely shaded with blue. Colour pattern rather uniform: Last whorl with a network of fine yellow to brown lines forming very small to medium-sized tents. Yellow to yellowish brown, rarely dark brown flecks, spots, and spiral dashes arranged in 2-3 or more spiral rows and interspersed with coarse brown axial dots or dashes. Larval shell white. Teleoconch spire matching last whorl in colour pattern. Aperture bright pink, occasionally white.

Periostracum matching that of *C. v. victoriae*.

Radular teeth with a laterally inflated adapical barb opposite a larger second barb; serration long; basal spur absent (Nybakken, 1990).

Habitat and Habits: Intertidal to about 10 m; *C. v. victoriae* on mud and sand bottoms of coral reef, beneath and among rocks and in rock pools, exposed or buried in sand (Whitehead, 1967; Singleton, 1978); *C. v. nodulosus* on intertidal and shallow-subtidal reef flats, often beneath rocks.

C. v. victoriae is known to feed on worms within its natural habitat (Singleton, 1978), although its radular teeth morphology suggests molluscivory (see Nybakken, 1990).

Discussion: *C. victoriae* may be similar to *C. textile*, *C. canonicus*, and typical *C. telatus*. *C. canonicus* has a multi-spiral (2.75 whorls), narrower (0.8-0.9 mm), and pale pink larval shell; its last whorl is generally straighter in outline and often of conoid-cylindrical shape, while conoid-cylindrical last whorls are rarely seen in *C. v. victoriae* and absent in *C. v. nodulosus*. For comparison with *C. telatus* and *C. textile*, see the Discussions of those species.

With regard to the disjunct neighbouring ranges, the conchological differences between *C. victoriae* and *C. nodulosus* do not justify separation at the species level. Shells with intermediate colour patterns are known from both the southern and the northern part of the species range (Korn, 1993). We therefore consider these taxa to represent geographic subspecies of the same species. *C. complanatus* (Pl. 65, Fig. 14) refers to an individual variant of *C. v. victoriae* with a rather broad last whorl, a finely reticulate pattern, and a rather low spire.

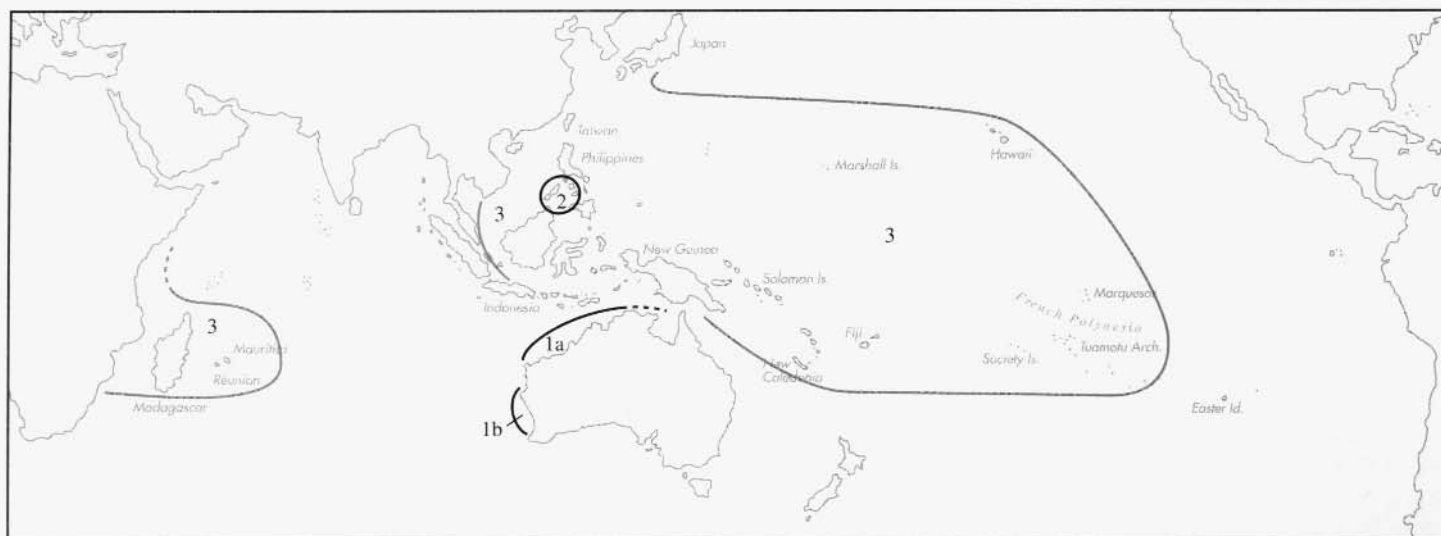
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Conus telatus REEVE, 1848

(Plate 65, Figures 18-22; Map 131)

- 1848 *Conus telatus* Reeve, Conch. Icon., 1, *Conus* suppl.: Pl. 1 sp. 270
- 1988 *Conus telatus* f. *rugosus* Lauer, Rossiniana, (38): 13-14, text fig. 39

Types: *C. telatus*: Holotype in BMNH (74.5 x 34.5 mm).



1a: *C. victoriae victoriae* 1b: *C. victoriae nodulosus* 2: *C. telatus* 3: *C. retifer*

Type Localities: Not given.

Range: Philippines (Balabac, Palawan and Calamian Group, Cuyo Is.).

Description: Medium-sized to large, moderately solid to solid. Last whorl ventricosely conical to conoid-cylindrical, also sometimes conical in typical ("smooth") form (Pl. 65, Figs. 18-20); outline convex to nearly straight, often more convex in strongly sculptured shells (form *rugosus*) (Pl. 65, Figs. 21, 22) than in typical shells; left side slightly concave at basal third in typical form, to strongly concave in form *rugosus*. Aperture somewhat wider at base than near shoulder. Shoulder angulate, smooth in typical form, weakly tuberculate in form *rugosus* except for large adults. Spire of moderate height; outline concave to nearly straight, usually less concave in typical form. Larval shell of about 2 whorls, maximum diameter 1-1.2 mm. In typical form, first 5-7 postnuclear whorls rather weakly tuberculate; in form *rugosus*, first 8-9.5 postnuclear whorls tuberculate. Teleoconch sutural ramps concave; in form *rugosus*, ramps with 0-1 increasing to 6-11 spiral grooves; in typical form, late ramps with 3-5 weak to obsolete spiral grooves (apex usually eroded). Last whorl with weak spiral ribs on basal third in typical form, with closely spaced and finely granulate ribs from base to shoulder in form *rugosus*.

Ground colour white. In typical form, last whorl with fine reticulated lines edging very small to medium-sized tents. On each side of centre, yellowish brown blotches forming a spiral band interrupted by larger tents; brown blotches interspersed with variable dark brown axial lines. Form *rugosus* with a similar pattern; reticulation light to dark brown, sometimes partially reduced. Larval whorls and a few adjacent postnuclear sutural ramps immaculate white. Following ramps matching last whorl in colour pattern. Aperture white, rarely suffused with cream.

C. telatus Shell Morphometry

L	48 - 100 mm
RW	0.15 - 0.40 g/mm (L 48-78 mm)
RD	0.50 - 0.56
PMD	
- typical form	0.78 - 0.87
- form <i>rugosus</i>	0.75 - 0.82
RSH	
- typical form	0.16 - 0.22
- form <i>rugosus</i>	0.12 - 0.21

Periostracum yellowish grey, thin, translucent, smooth.

Habitat and Habits: In 2-20 m; on coral reef, on sand substrate among rocks and coral blocks (see Old & D'Attilio, 1963).

Discussion: The typical form of *C. telatus* (Pl. 65, Figs. 18-20) resembles *C. victoriae* and typical *C. textile*, while form *rugosus* (Pl. 65, Figs. 21, 22) is similar to *C. aureus*. *C. victoriae* can be distinguished by its broader last whorl (RD 0.55-0.67); *C. v. victoriae* is more convex in outline and *C. v. nodulosus* has smaller yellowish brown markings on the last whorl. For comparison with *C. textile* and *C. aureus*, see the Discussions of those species.

The holotype of *C. telatus* is of the rather smooth variety (typical form) that seems restricted to Cuyo Is. The strongly sculptured variety (form *rugosus*) has a wider geographical range (Balabac northward to Calamian Group); its occurrence in Guimares Id. and in the Celebes Sea has to be verified. Although some reliable reports suggest an allopatric occurrence of both variants, we cannot unequivocally

exclude co-occurrence as affirmed in other reports. Therefore, we provisionally favour the status of forms rather than that of subspecies.

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Conus retifer MENKE, 1829

(Plate 65, Figures 23-26; Map 131)

- 1829 *Conus retifer* Menke, Verzeichn. Conch.-Samml. Malsburg: 68
 1834 *Conus textile* var. *sulcata* Sowerby I, Conch. Ill.: Pt. 56, fig. 76 (non *C. sulcatus* Hwass, 1792)
 1841 *Conus solidus* Sowerby II, Conch. Ill.: Index (nom. nov. for *C. textile* var. *sulcata* Sowerby I; non *C. solidus* Gmelin, 1791)

Types: *C. retifer*: No type exists; re-described by Sowerby II (1858: 43; see Kohn, 1988); original figure in Sowerby II (1858: Pl. 24 fig. 580) 45 x 27 mm; *C. t.* var. *sulcata*: Lectotype (Kohn, 1992) figured in Sowerby I (1834: Pt. 56, fig. 76) (28 x 16 mm).

Type Localities: *C. retifer*: "Philippines and Society Isl." (Sowerby II, 1858).

Range: Mozambique to Tanzania, to Hawaii and French Polynesia.

Description: Moderately small to moderately large, moderately solid to solid. Last whorl ventricosely conical to ovate or slightly pyriform; outline strongly convex adapically, straight to concave below, more concave on left side. Shoulder rounded to almost indistinct. Spire of low to moderate height, outline straight to convex or slightly sigmoid. Larval shell of about 3.25 whorls, maximum diameter about 0.8 mm. First 5-6 postnuclear whorls tuberculate. Teleoconch sutural ramps flat to slightly convex, with 1 increasing to 4-7 spiral grooves; additional spiral striae on latest ramps. Last whorl with prominent spiral ribs basally and weak to obsolete spiral ribs or ribbons above.

C. retifer Shell Morphometry

L	27 - 69 mm
RW	0.15 - 0.37 g/mm (L 35-54 mm)
RD	0.57 - 0.70
PMD	0.72 - 0.82
RSH	0.11 - 0.17

Ground colour white to pale pink. Last whorl usually with 2 broad yellowish brown spiral bands leaving 3 zones of reticulated fine brown lines, at centre, at base, and below shoulder. Brown areas interspersed with blackish brown axial lines and streaks. Shells with sparse tents and prominent blackish brown axial streaks intergrade with shells with fine reticulation and light brown spiral bands. Larval whorls and first 1-4 postnuclear sutural ramps immaculate pale pink. Following ramps matching last whorl in colour pattern. Aperture white, bluish white or light pink.

Periostracum pale yellow, thin, translucent, smooth.

Foot white, mottled with brown; dorsum with black markings laterally. Tentacles white, tipped with orange-red. Siphon white, tipped with orange-red to red, with a broad black ring centrally (Kohn, 1959a; Pearson, pers. comm., 1990).

Radular teeth with 2 opposed barbs adapically; long serration ending in a cusp about 1/4 of the length from the base (Kohn, unpubl. observ.).

Habitat and Habits: Intertidal to about 40 m, less frequent below 15 m; from intertidal benches to the outer side of coral reefs, inhabiting sand, rubble, algal turf, dead as well as living coral and caves (Kohn, 1959b; Cernohorsky, 1964; Kay, 1979; Kohn & Leviten, 1980; Estival, 1981; Tirard, pers. comm., 1989; Richards, pers. comm., 1989; Grosch, pers. comm., 1989).

Egg diameter of about 250 µm, predicting a minimum pelagic period of about 19 days (E. Indian Ocean; Perron & Kohn, 1985).

Discussion: *C. retifer* may be similar to *C. legatus* and *C. textile* form *verriculum*; for comparison, see the Discussions of the latter species.

Dead shells of *C. retifer* have been found in excavated material in Maldives; they appear to represent an extinct population.

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Conus aureus HWASS in BRUGUIÈRE, 1792

(Plate 66, Figures 1-7; Map 132)

- 1792 *Conus aureus* Hwass in Bruguière, Encycl. Méth., 1: 742, no. 135
 1810 *Conus auricomus* Lamarck, Ann. Mus. Hist. Nat. Paris, 15: 433, no. 165 (non *C. auricomus* Hwass, 1792)
 1877 *Conus paulucciae* Sowerby III, Proc. Zool. Soc. London, 1876: 752-753, pl. 75 fig. 3

Types: *C. aureus*: Neotype (Kohn, 1968) in MHNG (56.5 x 23 mm); *C. auricomus*: Lectotype (Kohn, 1981) figured in Tableau (1798: Pl. 346 fig. 4) (61 x 26 mm); *C. paulucciae*: Original figure 57 x 21 mm; holotype 60 x 20 mm acc. Sowerby.

Type Localities: *C. aureus*: "l'Océan indien, surtout les côtes de la Chine"; *C. auricomus*: "l'Océan indien, les côtes de la Chine"; *C. paulucciae*: "Mauritius."

Range: *C. a. paulucciae*: Mozambique, Mascarenes, Seychelles, Maldives, Chagos Is., W. Thailand, and N. W. Australia; *C. a. aureus*: Japan and Philippines to Queensland and New Caledonia and to Tuamotu Archipelago.

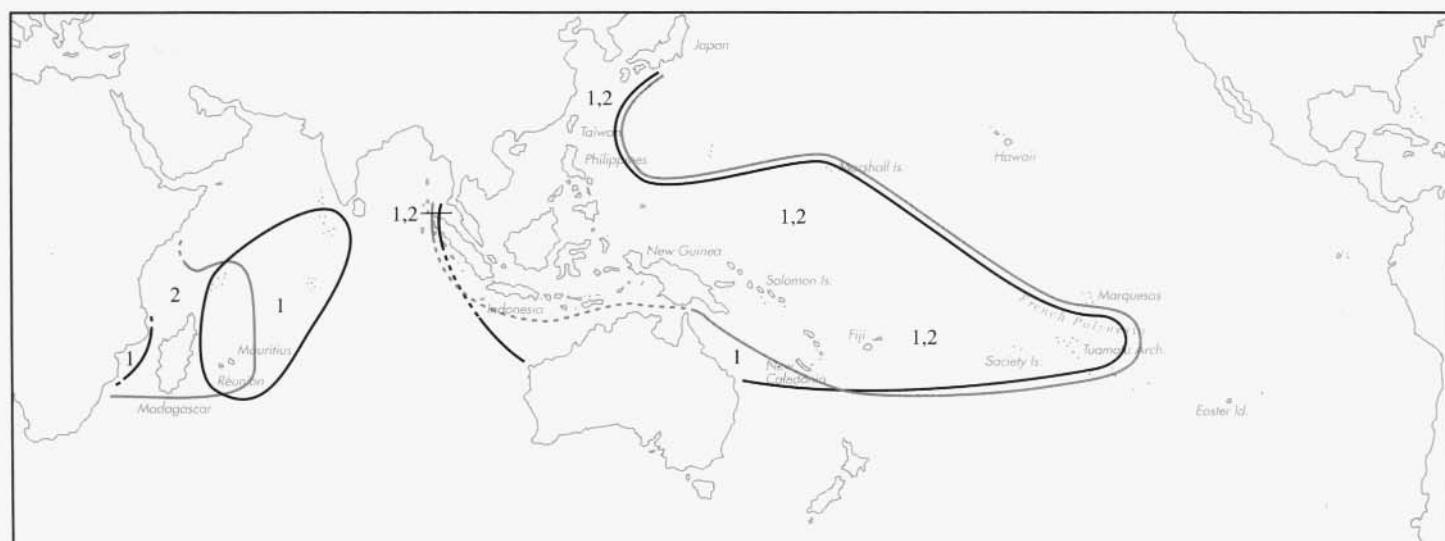
Description: Medium-sized to moderately large, moderately solid to solid. Last whorl usually narrowly conoid-cylindrical to conoid-cylindrical in *C. a. paulucciae* (Pl. 66, Figs. 4-7), also narrowly cylindrical to cylindrical, ventricosely conical or ovate in *C. a. aureus* (Pl. 66, Figs. 1-3). In *C. a. paulucciae*, outline of last whorl convex at adapical fourth, almost straight below; in *C. a. aureus*,

C. a. aureus (Pl. 66, Figs. 1-3) has a W. and Central Pacific distribution, while *C. a. paulucciae* (Pl. 66, Figs. 4-7) is restricted to the Indian Ocean. Intermediate specimens (shape, sculpture, apex colour) are known from the Indian Ocean and from Philippines. The conchological differences between *C. aureus* and *C. paulucciae* are often considered to justify separation at the species level (e.g. Richard, 1990). With regard to the generally disjunct geographical ranges, the different bathymetrical ranges, and to the intermediate shells, we favour the status of geographical subspecies.

L	40 - 80 mm
RW	0.13 - 0.36 g/mm
RD	0.46 - 0.53
PMD	
- <i>C. a. aureus</i>	0.70 - 0.81
- <i>C. a. paulucciae</i>	0.75 - 0.84
RSH	0.12 - 0.23

Ground colour white, often suffused with pink in *C. a. paulucciae*. Last whorl with a network of fine light to dark brown lines and yellowish brown blotches. Lines forming zones of many tiny to small and a few larger tents, arranged in 3-5 axial and 3 interrupted spiral bands, below shoulder

Map 132



1: *C. aureus* 2: *C. legatus*

***Conus legatus* LAMARCK, 1810**(Plate 66, Figures 8-10; Plate 76, Figure 68;
Map 132)1810 *Conus legatus* Lamarck, Ann. Mus. Hist. Nat. Paris, **15**: 437, no. 1751833 *Conus musivum* Sowerby I, Conch. Ill.: Pt. 25, fig. 12

Types: *C. legatus*: No type exists; the specimen depicted by Kiener in pl. 89 fig. 3 (42 x 19 mm) serves to fix the identity of the species (Kohn, 1981); *C. musivum*: Lectotype (Kohn, 1992) figured in Sowerby I (1933: Pt. 25 fig. 12) (31.5 x 17 mm).

Type Localities: *C. legatus*: "Mers des grandes Indes"; *C. musivum*: "ad Insulas Philippinas."

Range: Mozambique, Seychelles, Réunion, and W. Thailand to Okinawa, Marshall Is., and French Polynesia; absent from Australia and from Hawaii.

Description: Moderately small to moderately large, usually moderately solid to solid. Last whorl ventricosely conical to conoid-cylindrical; outline convex to nearly straight adapically, slightly concave (left side) and slightly convex to straight (right side) below. Shoulder rounded to nearly angulate. Spire of moderate height, outline straight to slightly convex. Larval shell of 2.5-3.5 whorls, maximum diameter 0.8-0.9 mm. First 1.5-4 postnuclear whorls tuberculate. Teleoconch sutural ramps flat to slightly concave, with 0-1 increasing to 2-3 weak spiral grooves usually replaced by many spiral striae in latest whorls. Last whorl with rather widely spaced, occasionally granulose spiral ribs basally.

***C. legatus* Shell Morphometry**

L	32 - 63 mm
RW	0.09 - 0.41 g/mm (L 32-60 mm)
RD	0.50 - 0.59
PMD	0.76 - 0.85
RSH	0.15 - 0.22

Ground colour white, tinged with rose. Last whorl with a network of fine brown lines and yellowish brown blotches. Lines forming zones of overlapping tiny to medium-sized ground-colour tents with irregularly scattered white tents; tentmark zones grouped in axial rows and bands as well as in 3 less prominent spiral bands, below shoulder, at centre and at base. Yellowish brown blotches predominantly axially arranged, but also in 2 broad spiral bands, interspersed with blackish brown axial streaks and flecks. Larval whorls brown, sometimes pinkish violet. First 2-3 postnuclear sutural ramps immaculate white or pinkish violet. Following ramps matching last whorl in colour pattern. Aperture white or pinkish violet.

Periostracum very thin, translucent, smooth.

Foot white to brownish cream. Dorsum of foot mottled with connected tan blotches marginally and tan to black

markings medially, with a dark brown pre-marginal line; anterior part edged with tan, with 3 black blotches in a clover-leaf arrangement; posterior part sometimes with a black spot beneath the operculum. Rostrum light brown, white distally. Tentacles white, tipped with red-brown. Siphon white, red distally, heavily mottled with brown proximally, and with a broad blackish brown ring centrally (Chaberman, pers. comm., 1981; Estival, unpubl. observ.; Pearson, unpubl. observ.) (Pl. 76, Fig. 68).

Habitat and Habits: In 3-50 m; on coral reef from the reef lagoon to the outer reef slope, in sand, coral rubble, caves and on dead coral (Estival, 1981; Chaberman, pers. comm., 1981; Richards, pers. comm., 1989).

Discussion: *C. legatus* is similar to *C. canonicus*, *C. aureus paulucciae* and sometimes also to *C. retifer*. *C. canonicus* differs in its more prominent spiral sculpture on the late sutural ramps and its white ground colour that is often tinged with blue. Its colour pattern lacks yellowish brown blotches overlaid with blackish brown streaks. *C. a. paulucciae* is generally larger, has a generally narrower last whorl (RD 0.46-0.53), a distinctly more prominent spiral sculpture on the late sutural ramps, and less prominent blackish brown axial markings within the yellowish brown blotches. *C. retifer* has a generally broader last whorl (RD 0.57-0.70) with a somewhat bulbous subshoulder area, a greater number of tuberculate postnuclear whorls (5-6), and prominent spiral sculpture on its late sutural ramps.

***Conus auricomus* HWASS in BRUGUIÈRE, 1792**(Plate 66, Figures 11-14; Plate 84, Third row,
right; Map 133)1792 *Conus auricomus* Hwass in Bruguière, Encycl. Méth., **1**: 742-743, no. 1361845 *Conus dactylosus* Kiener, Coq. Vivant., **2**: Pl. 97 fig. 2; 1849-1850: 306-3071943 *Conus debilis* Fenaux, Bull. Inst. Océan. (Monaco), **835**: 4, fig. 11 (non *C. debilis* Monterosato, 1917)

Types: *C. auricomus*: Lectotype (Kohn, 1968) in MHNG (56.5 x 21 mm); *C. dactylosus*: Original figure 39 x 14 mm; *C. debilis*: Original figure 34 x 13 mm.

Type Localities: *C. auricomus*: "des mers des grandes Indes"; "Sulu Sea" (Coomans et al., 1981); *C. debilis*: "Nouvelle-Guinée."

Range: E. Africa to Tuamotu Archipelago and Hawaii.

Description: Medium-sized to moderately large, moderately solid to solid. Last whorl narrowly ovate or narrowly cylindrical to narrowly conoid-cylindrical; outline slightly convex to straight and parallel-sided at adapical two-thirds, straight to slightly concave below. Aperture wider near base than at shoulder. Shoulder rounded to subangulate. Spire of moderate height, outline usually sig-

moid. Larval shell of about 3.25 whorls, maximum diameter about 0.8 mm. First 4-5 postnuclear whorls tuberculate. Teleoconch sutural ramps slightly concave to slightly convex within the same specimen, with 1 increasing to 3-5 spiral grooves, usually weaker or sometimes replaced by many spiral striae on latest ramps. Last whorl with fine, closely spaced spiral ribs from base to shoulder; sculpture sometimes weak.

C. auricomus Shell Morphometry

L	40 - 69 mm
RW	0.10 - 0.31 g/mm (L 40-65 mm)
RD	0.40 - 0.46
PMD	0.69 - 0.78
RSH	0.12 - 0.18

Ground colour white, suffused with rose in specimens from Tuamotu Archipelago. Last whorl overlaid with brown leaving numerous very small (Indian Ocean shells) to medium-sized (Pacific shells) ground-colour tents, edged with brown lines at frontal sides and arranged in 2-4 spiral bands. Brown zones usually with darker brown spiral lines sometimes articulated with ground-colour dots and tents. Larval whorls white to cream. First 3-4 postnuclear sutural ramps immaculate, white to cream or pale pink. Following sutural ramps matching last whorl in colour pattern. Aperture usually white.

Periostracum yellow-brown, thin, translucent, smooth.

Dorsum of foot white, mottled with brown, mottling denser and darker marginally; anterior part with 3 black blotches in a clover-leaf arrangement; posterior end with 2 lateral black blotches. Sole of foot white, sparsely dotted with brown. Rostrum white to brownish cream. Tentacles white, tipped with light and darker brown. Siphon white,

grading to reddish brown distally, with a broad black ring centrally, and mottled with brown proximally (Pearson, unpubl. observ.) (Pl. 84, Third row, right).

Habitat and Habits: In 3-40 m; on coral reefs, on sand slopes, in sand pockets and in caves.

Discussion: *C. auricomus* is similar to *C. aulicus* form *gracianus*, *C. auratinus*, and *C. aureus aureus*. *C. aulicus* form *gracianus* differs in its straight to slightly concave spire outline, less prominent spiral sculpture on the late sutural ramps and on the last whorl, and its more convex-sided last whorl. *C. auratinus* attains larger size and has a generally broader last whorl, the position of its maximum diameter is distinctly closer to the base (PMD 0.56-0.65), its spire outline is straight, and its spire sculpture is less prominent. *C. aureus aureus* can be distinguished by its broader last whorl (RD 0.46-0.53), straight-sided rather than domed early spire whorls, and by its last whorl pattern with broad, blackish brown axial lines.

Indian Ocean shells of *C. auricomus* have a finer reticulate pattern than Pacific shells. *C. dactylosus* and *C. debilis* refer to specimens with such fine networks.

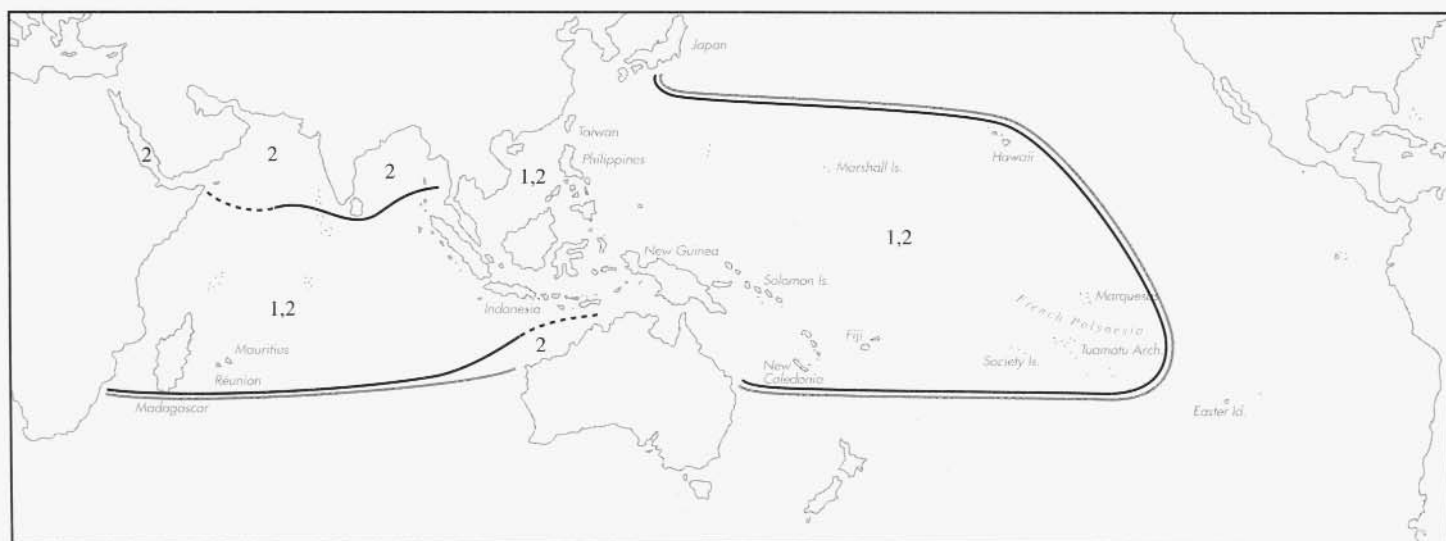
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Conus textile LINNÉ, 1758

(Plate 66, Figures 15-27, Plate 67, Figures 1-24, Plate 68, Figures 1-13; Plate 76, Figure 65; Plate 84, Fourth row, left; Map 133)

- 1758 *Conus textile* Linné, Syst. Nat., 10 ed., 1: 717, no. 278
- 1792 *Conus archiepiscopus* Hwass in Bruguière, Encycl. Méth., 1: 747-748, no. 141
- 1798 *Cucullus auriger* Röding, Mus. Bolten., 2: 49, no. 632/119

Map 133



1: *C. auricomus* 2: *C. textile*

- 1798 *Cucullus gloriamaris* Röding, Mus. Bolten., 2: 49, no. 633/120 (non *C. gloriamaris* Chemnitz, 1777)
- 1798 *Cucullus auratus* Röding, Mus. Bolten., 2: 50, no. 635/122 (non *C. auratus* Hwass in Bruguière, 1792)
- 1810 *Conus panniculus* Lamarck, Ann. Mus. Hist. Nat. Paris, 15: 435, no. 170
- 1810 *Conus pyramidalis* Lamarck, Ann. Mus. Hist. Nat. Paris, 15: 438, no. 177
- 1810 *Conus gloriamaris* Perry, Arcana: Pl. 16 (non *C. gloriamaris* Chemnitz, 1777; non *C. gloriamaris* (Röding, 1798))
- 1811 *Conus reteaureum* Perry, Conchology: Pl. 25 fig. 5
- 1840 *Conus (Textilia) communis* Swainson, Treat. Malacol.: 312
- 1843 *Conus verriculum* Reeve, Conch. Icon., 1, *Conus*: pl. 38 sp. 208a-b; Proc. Zool. Soc. London, 11: 173
- 1845 *Conus textilinus* Kiener, Coq. Vivant., 2: Pl. 103 fig. 5; 1849-1850: 333
- 1845 *Conus concatenatus* Kiener, Coq. Vivant., 2: Pl. 110 fig. 1; 1848: 362
- 1850 *Conus dilectus* Gould, Proc. Boston Nat. Hist., 3: 172; 1852: United States Expl. Exp., 12: 286, pl. 21 fig. 367a
- 1858 *Conus scriptus* Sowerby II, Thes. Conch., 3: 41, no. 357, pl. 23 (209) fig. 563
- 1858 *Conus tigrinus* Sowerby II, Thes. Conch., 3: 41, no. 355, pl. 23 (209) fig. 569
- 1858 *Conus corbula* Sowerby II, Thes. Conch., 3: 42, no. 365, pl. 23 (209) fig. 573
- 1882 *Conus textile* var. *euetrios* Sowerby III, Proc. Zool. Soc. London, 1882: 120-121, pl. 5 fig. 6
- 1900 *Conus cholmondeleyi* Melvill, J. Conchol. (London), 9: 308, text fig.
- 1926 *Conus eumitus* Tomlin, Ann. Natal Mus., 5 (3): 288-289, pl. 16 fig. 3
- 1931 *Darioconus textilis osullivani* Iredale, Rec. Australian Mus., 18: 224, pl. 25 fig. 13
- 1932 *Conus textile* var. *ponderosa* Dautzenberg, J. Conchyl. (Paris), 76: 16 (non *C. ponderosus* Brocchi, 1814, *Conus ponderosus* Grateloup, 1834, and *Conus ponderosus* Sowerby II, 1858)
- 1937 *Conus textile* var. *loman* Dautzenberg, Mém. Mus. Roy. Hist. Nat. Belgique, 2 (18): 257
- 1943 *Conus sirventi* Fenaux, Bull. Inst. Océan., (Monaco), 835: 4, fig. 10
- 1982 *Conus textile dahlakensis* da Motta, Publ. Ocas. Soc. Portuguesa Malac., 1: 5-6, pl. figs. 5a-b
- 1982 *Conus textile neovicarius* da Motta, Publ. Ocas. Soc. Portuguesa Malac., 1: 4-5, pl. figs. 4a-b
- 1987 *Conus cholmondeleyi* f. *fascifer* Lauer, Rossiniana, 36: 13, text figs.
- 1987 *Conus textile* f. *euetrios* var. *cyanosus* Lauer, Rossiniana, 36: 12, fig. 13c
- 1990 *Conus suzannae* van Rossum, La Conchiglia, 22 (250-252): 29-31, text figs.

Types: *C. textile*: Lectotype (Kohn, 1963) in LSL (67 x 33 mm); *C. archiepiscopus*: Lectotype (Kohn, 1968) in MHNG (68 x 36 mm); *C. auratus*: Lectotype (Kohn 1975) figured in Knorr (1764: Pl. 8 fig. 3) (60 x 31 mm); *C. auriger*: Lectotype (Kohn, 1975) figured in Martini (1773: Pl. 54 fig. 599) (58 x 34 mm); *C. gloriamaris*: Lectotype (Kohn, 1975) figured in Martini (1773: Pl. 54 fig. 598) (92 x 41 mm); *C. panniculus*: No type exists; specimen in Lamarck coll. in MHNG (63 x 31 mm); *C. pyramidalis*: Lectotype (Walls, [1979]) figured in Tableau (1798: Pl. 347 fig. 5) (56 x 19 mm); *C. gloriamaris* Perry: Holotype figured in

Perry (1810: Pl. 16) (104 x 49 mm); *C. reteaureum*: Holotype figured in Perry (1811: Pl. 25 fig. 5) (96 x 50 mm); *C. communis*: Lectotype (Coomans et al., 1985a) same as lectotype of *C. archiepiscopus* (68 x 35 mm); *C. verriculum*: Original figures 45 x 29; 51 x 29 mm; *C. textilinus*: Holotype in NMWC (38.5 x 21.5 mm); *C. concatenatus*: Original figure 34 x 17.5 mm; *C. dilectus*: Holotype in USNM (13 x 6 mm); *C. corbula*: Type in BMNH (69.5 x 34.5 mm); *C. scriptus*: 3 syntypes in BMNH (59 x 27; 54 x 22; 50 x 22 mm); *C. tigrinus*: Type in BMNH (43 x 19 mm); *C. t. var. euetrios*: Holotype in NMWC (49 x 24 mm); *C. cholmondeleyi*: Holotype in MM (43 x 18 mm); *C. eumitus*: Lectotype (Coomans et al., 1986) in BMNH (53 x 28 mm); *D. t. osullivani*: Holotype in AMS (42.5 x 20 mm); *C. t. var. ponderosa*: Specimen in IRSN (L 57 x 33.5 mm); *C. t. var. loman*: Specimen in IRSN; *C. sirventi*: Original figure 45 x 25 mm; *C. t. dahlakensis*: Holotype in MHNG (87 x 40 mm); *C. t. neovicarius*: Holotype in MHNG (76 x 45 mm); *C. suzannae*: Holotype in coll. van Rossum (39 x 17.5 mm).

Type Localities: *C. textile*: "Banda"; *C. archiepiscopus*: "aux mers des grandes Indes"; *C. panniculus*: "Mers des grandes Indes"; *C. pyramidalis*: "Indes orientales"; *C. gloriamaris* Perry: "South seas" (Conchology, 1811); *C. reteaureum*: "African seas"; *C. verriculum*: "Ceylon, etc."; *C. dilectus*: "Feejee Islands"; *C. tigrinus*: "Madagascar"; *C. eumitus*: "Scottburgh"; *D. t. osullivani*: "Black Rock, Richmond River, New South Wales"; *C. t. var. ponderosa*: "Ste. Marie"; *C. t. var. loman*: "de l'île Maurice et de l'île Cargados"; *C. sirventi*: "Madagascar"; *C. t. dahlakensis*: "in the area of Dahlak Archipelago, off Massawa in the Red Sea"; *C. t. neovicarius*: "in Sharem-el-Shech, Gulf of Aqueba"; *C. c. f. fascifer*: "Mozambique, Tanzania, southeast Africa"; *C. t. f. euetrios* var. *cyanosus*: "La Réunion"; *C. suzannae*: "Malindi, coasts of Kenya, Indian Ocean."

Range: Entire Indo-Pacific.

Description: Medium-sized to large, moderately solid to heavy; in similarly sized specimens, relative weight may vary by 80% between different forms and by 40% within the same form. Shells smaller in populations from the W. Indian Ocean; lightest forms also from this area. Last whorl ventricosely conical to ovate or conoid-cylindrical, sometimes also cylindrical, conical or broadly ovate; outline strongly convex to nearly straight; left side straight to strongly concave near base. Aperture variably wider at base than near shoulder. Shoulder angulate to rounded, often within the same population. Spire generally of moderate height, outline usually straight to concave. Larval shell usually of 3-3.5 whorls, of 2-2.5 whorls in some forms from the W. Indian Ocean; maximum diameter 0.7-0.9 mm. First 3-5 postnuclear whorls tuberculate. Teleoconch sutural ramps flat to slightly concave, with 0-2 increasing to 7-15 fine spiral grooves; sculpture distinct to obsolete on latest ramps. Last whorl with variably weak spiral ribs near base, occasionally followed by spiral striae to shoulder.

C. textile Shell Morphometry

L	40 - 150 mm
RW	0.10 - 1.30 g/mm (L 35-120 mm)
RD	0.50 - 0.72
PMD	0.67 - 0.86
RSH	0.11 - 0.20

Ground-colour white, sometimes suffused with blue, beige, violet, orange, or pink. Last whorl generally with a network of light to dark brown lines edging tiny to moderately large tents, sometimes also small quadrangular to round markings. Yellowish brown flecks and blotches arranged in 2-3 interrupted to solid spiral bands, on both sides of centre and often below shoulder; bands interspersed with broad, dark brown, straight to wavy axial lines. Occasionally, 1-2 additional similar but narrower spiral bands present basally. In the W. Indian Ocean, pattern varying from the typical arrangement to a delicate network with or without spiral bands or to a fine axially lineate pattern without any tentmarks. Larval whorls coloured with shades of red, sometimes white; colour slightly variable within the same population. In Hawaii, larval whorls changing colour from yellow to red during metamorphosis (Perron, 1980). First 2-4 postnuclear sutural ramps usually similar in colour to larval whorls, immaculate in first 1-2.5 whorls, with marginal brown dots in remaining whorls. Following sutural ramps matching last whorl in colour pattern. Aperture usually white to bluish white, or rarely suffused with pink.

Periostracum grey to yellow, thin, translucent, smooth.

Foot and rostrum white to pale yellow or pinkish cream. Dorsum of foot mottled and netted with light to blackish brown, with a pre-marginal band of black spots ending in a lateral black blotch anteriorly; anterior part edged with orange-brown to red, with a central black blotch, sometimes also posterior end edged with red. Sole of foot mottled and transversely streaked with brown. Rostrum washed and mottled with pale brown, immaculate distally. Proboscis pale red, darker at tip. Tentacles white, lightly mottled with brown at base and tipped with red. Siphon white, tipped with red and mottled with brown at base, with a broad black ring about 1/3 of the length from the tip (Bergh, 1895; Kohn, 1959a; Walls, [1979]; Chaberman, pers. comm., 1981; Pearson, unpubl. observ.; Fainzilber et al., 1992) (Pl. 76, Fig. 65; Pl 84, Fourth row, left).

Radular teeth comparatively long (tooth/shell length-ratio 0.11 (Kohn, 1963) to 0.29 (James, 1980)) and slender, with 2 opposed barbs adapically; long but weak to obsolete serration ending in a weak cusp about 1/7 of the length from the base; basal spur absent (Troschel, 1868; Bergh, 1895; Shaw, 1914; Peile, 1939; James, 1980; Bandel, 1984; Kohn, unpubl. observ.; Rolán, 1993).

Habitat and Habits: Intertidal to about 50 m; on coral reef from the reef crest to deeper water inside the lagoon and sometimes also on flats of mainland coasts, in sand bottoms without or with sea-weed, in coral rubble, on slabs of rock, on pinnacles of dead coral and muddy substrate, often hidden beneath rocks and coral boulders. In Mozambique, populations rather typical in colour and pattern on sand and reef substrate, while populations with shells of dark ground-colour (incl. form *cholmondeleyi*, see below) on bottoms of silt or muddy sand. Magnetite and manganese components of the latter substrates are supposed to be responsible for the darker colour of the shells (Cernohorsky, 1964; Kohn, 1959a, 1960, 1968b; Kohn & Nybakken, 1975; Huish, 1978; Kay, 1979; Kilburn & Rippey, 1982; Sharabati, 1984; Reichelt & Kohn, 1985; Tirard, pers. comm.,

1989; Grosch, pers. comm., 1989; Lorenz, pers. comm., 1993).

C. textile preys on many different species of prosobranch gastropods (Conidae, incl. dangerous molluscivorous or piscivorous species as *C. pennaceus* or *C. striatus*, Terebridae, Mitridae, Nassariidae, Muricidae, Thaididae, Coralliophilidae, Vermetidae, Siliquariidae, Cypraeidae, Turbinidae, Trochidae) and practices cannibalism after a long time of starving (Cruz, Corpuz & Olivera, 1978). Juveniles of *C. textile* also feed on gastropods. The radular tooth of *C. textile* is released immediately after injection into the foot of its prey and the proboscis is withdrawn; the stinging process may be repeated up to six times. The rostrum is then applied to the prey's aperture and the ingestion process needs about 20 minutes. However, *C. textile* also feeds on small fishes, worms, dead cephalopods and peeled shrimps (Kohn, 1959b, 1968b, 1983; Kohn & Nybakken, 1975; Reichelt & Kohn, 1985; Schoenberg, 1971; Cruz, Corpuz & Olivera, 1978; Perron, 1981b; Collins, 1987; Loch, pers. comm., 1987; Tirard, pers. comm., 1989; Grosch, pers. comm., 1989). The venom of *C. textile* is toxic to polychaetes, gastropods, fishes and mice; the species is reported to have caused human fatalities. However, the results of studies on the toxicity to mammals are somewhat contradictory: Kohn, Saunders & Wiener (1960) report lethal effects in mice after intraperitoneal and intravenous injection, whereas Endean & Rudkin (1963) did not observe lethal effects in mice. According to Cruz, Corpuz & Olivera (1976), mice always recover from an intraperitoneal injection but die after an intracisternal injection.

At the western side of Wheeler Reef (Townsville, Queensland), egg capsules have been collected in 18 m beneath a coral plate among brain corals. These capsules measure 31-33 x 21-26 mm each containing about 1.300 eggs, while the mean capsule size in Hawaii is 21 x 17 mm. Egg diameters of 230-270 µm (E. Indian Ocean, Philippines, Palau, Queensland, Hawaii) suggest minimum pelagic periods of 21-17 days (Huish, 1978; Perron, 1980, 1981a, b; Perron & Kohn, 1985).

Discussion: *C. textile* is similar to *C. canonicus*, *C. abbas*, typical *C. telatus*, *C. victoriae*, *C. gloriamaris*, and *C. dalli*. *C. canonicus* is separable from some *C. textile* variants only with difficulty. It generally has a more cylindrical last whorl with straighter sides, and its last whorl pattern is usually finer. Forms of *C. textile* from the W. Indian Ocean with a similarly fine reticulate pattern lack the pink aperture, while form *textilinus* (see below), sometimes similar in colour pattern and aperture colour, is distinguished by its ventricosely conical last whorl. *C. abbas* differs in having an orange rather than red or white apex and rhomboid ground-colour markings on its last whorl. Form *textilinus*, more similar to *C. abbas* than other forms of *C. textile*, can also be separated by its pinkish violet aperture. Only the typical form of *C. telatus* may be confused with *C. textile*. The former is generally less convex in outline and has more tuberculate postnuclear whorls (5-7 vs. 3-5), a weaker spiral sculpture on the late teleoconch sutural ramps, and finer reticulated lines. *C. victoriae* is dissimilar in size, shape and colour pattern from the sympatric typical form of

C. textile. It differs in having smaller mean size, a broader, paucispiral larval shell, and finer reticulated lines. For comparison with *C. gloriamaris* and *C. dalli* (Vol. 2), see the Discussions of those species.

C. textile is rather uniform in shape and colour pattern between and within the populations from the Central Indian Ocean to Hawaii and French Polynesia but very variable between and within the populations from the W. Indian Ocean. The vagility of the larval stage may be responsible for a pronounced intergradation between the different forms from the latter area. The variability has led to the introduction of many nominal taxa, most of which likely refer to forms, and only a few to local races or geographical subspecies. Whether some of the forms are valid sibling species of *C. textile* requires much further study on the soft parts and genetic analysis. Distinguishing these variants from one another, former authors mainly emphasized differences in colour pattern that, however, did not prove to be constant. Data on ecology, zoogeography and morphology of soft parts of the western populations are largely lacking, precluding any strong taxonomic hypothesis.

The nominal taxa:

- *C. archiepiscopus* (Pl. 68, Figs. 1, 4, 6): Last whorl ventricosely conical to ovate, with a fine reticulate pattern and distinct spiral colour bands. Ground colour white, sometimes suffused with blue. Known from different localities within the W. Indian Ocean. We consider it a form of *C. textile* very similar to form *euetrios* (see below). In Madagascar it intergrades with sympatric conoid-cylindrical variants of *C. textile*. Shells similar in shape and colour pattern sometimes occur in Melanesia. *C. communis* is a synonym (Coomans et al., 1985a).

- *C. auriger* (Pl. 67, Fig. 6): Last whorl ovate, with a rather widely meshed pattern and a few yellowish brown blotches arranged in a spiral row on each side of centre. We consider *C. auriger* a form of *C. textile* hardly separable from form *verriculum* and intergrading with form *ponderosa* (see below). Richard (1990) regards *C. auriger* as a valid species and *C. verriculum* as a synonym.

- *C. cholmondeleyi* (Pl. 67, Figs. 18-24): Last whorl conoid-cylindrical to ventricosely conical, rarely ovate; shoulder usually subangulate to rounded. Ground-colour white to brownish beige or pale violet, streaked or suffused with blue on the last whorl. Pattern consisting of 2-3 obsolete to distinct spiral colour bands and variably fine, dark brown axial lines, usually undulating but often partially reticulated. Known from Kenya to Madagascar and Natal. *C. eumitus* is a synonym. *C. eumitus* of authors (Pl. 67, Figs. 23, 24) refers to a more solid variant from Natal and Mozambique with an angulate to subangulate shoulder, a more conical and often broader last whorl, and 3 prominent spiral colour bands; the aperture may be suffused with pink. Lauer (1987) named the latter variant *C. cholmondeleyi* form *fascifer*; he emphasized differences in colouration and pattern but disregarded morphological differences. In Zanzibar, Mozambique, and Natal, *C. cholmondeleyi* intergrades with sympatric typically patterned forms of *C. textile* (Kilburn & Rippey, 1982; Grosch, pers. comm., 1989). We

therefore consider *C. cholmondeleyi* a form of *C. textile* rather than a valid sibling species.

- *C. communis*: A synonym of *C. t.* form *archiepiscopus*.

- *C. concatenatus* (Pl. 67, Fig. 5): Likely a form of *C. textile* with a very reduced reticulate pattern.

- *C. corbula* (Pl. 68, Fig. 5): A form of *C. textile* similar to form *archiepiscopus*.

- *C. textile* f. *euetrios* var. *cyanosus*: See *C. textile* var. *euetrios*.

- *C. textile dahlakensis* (Pl. 67, Fig. 8): Last whorl conoid-cylindrical to ventricosely conical, with a rather typical *C. textile* pattern. Originally described as a local race from the Dahlak Archipelago, Red Sea. Shells matching these specimens from Dahlak Archipelago also occur from the Gulf of Aqaba. We consider it a form of *C. textile* intergrading with typical *C. textile* and form *neovicarius* (see below).

- *C. textile* var. *euetrios* (Pl. 68, Figs. 2, 3): Last whorl ventricosely conical to ovate, rather narrow (RD 0.53-0.61); spire comparatively high (RSH 0.14-0.20). Ground-colour white, suffused with brownish beige, violet and/or blue. Colour pattern (may be faded in the holotype) close to that of *C. t. suzannae* and *C. t.* form *archiepiscopus*. Shells from Réunion with a blue ground have been referred to as *C. t.* form *euetrios* var. *cyanosus* (Lauer, 1987) (Pl. 68, Fig. 3). Form *euetrios* is reported from various localities in the W. Indian Ocean. Exact data on its distribution are missing on account of confusion with form *archiepiscopus*. The holotype of var. *euetrios* has a slightly narrower last whorl than the lectotype of *C. archiepiscopus*.

- *C. eumitus* (Pl. 67, Fig. 19): See *C. cholmondeleyi*.

- *C. cholmondeleyi* f. *fascifer*: See *C. cholmondeleyi*.

- *C. t. neovicarius*: (Pl. 67, Fig. 7): Shell rather solid with a usually ventricosely conical last whorl and a rather typical *C. textile* pattern. Known from the Red Sea and the Gulf of Aden. A form of *C. textile* intergrading with typical *C. textile* and form *dahlakensis* in different localities of its geographical range.

- *C. textile* var. *ponderosa*: "Form très courte, obèse et lourde" (Dautzenberg). A synonym of form *auriger* or form *verriculum*.

- *C. pyramidalis* (Pl. 67, Figs. 12-15): Last whorl rather narrow (RD 0.60 or less) and conoid-cylindrical to ventricosely conical, with a rather widely meshed pattern; spire comparatively high (RSH 0.13-0.19). Known from Kenya and Madagascar. A form of *C. textile* intergrading with more typically patterned sympatric variants that may also have cylindrical or ovate last whorls. The lectotype (Pl. 67, Fig. 12) may have an aberrantly high spire.

- *C. scriptus* (Pl. 67, Figs. 9-11): Lighter than other forms of *C. textile* (see Shell Morphometry). Last whorl ventricosely conical or conoid-cylindrical, sometimes approaching ovate or cylindrical (RD 0.55-0.63; PMD 0.74-0.77). Larval shell of about 2 white whorls; spire comparatively high (RSH 0.13-0.18). Spiral colour bands reduced to rows

of spots and flecks. Known from St. Brandon, Indian Ocean; we consider it a local race of *C. textile*.

- *C. sirventi*: A form of *C. textile* with a ventricosely conical last whorl and a reduced pattern.

- *C. suzannae* (Pl. 67, Figs. 16, 17): Smaller than other forms of *C. textile* (see Shell Morphometry). Last whorl rather narrow, conoid-cylindrical to ventricosely conical (RD 0.52-0.60; PMD 0.75-0.80); spire rather high (RSH 0.13-0.19). Ground colour white to yellowish orange, often suffused with violet. Pattern consisting of reddish brown reticulated lines and 2-3 overlying weak and interrupted spiral colour bands; within bands, lines often not reticulated but axially undulating and sparsely fusing into broad axial lines. Spiral banding may be emphasized by pale violet background shades underlying only the strongly reticulated spiral zones. Known from Malindi and Robinson Id., Kenya. We consider *C. suzannae* a local race of *C. textile* most similar in colour pattern to *C. t.* form *euetrios* (see below), also resembling forms *archiepiscopus* and *cholmondeleyi*.

- *C. textilinus* (Pl. 68, Figs. 9-13): This taxon seems to refer to the local form of *C. textile* from the Marquesas. Shells of this population have ventricosely conical last whorls (RD 0.57-0.65; PMD 0.76-0.84) with narrowly reticulated spiral zones alternating with bands of yellowish brown blotches and intermittent groups of larger white tents. The aperture is pinkish violet, distinguishing them from typical *C. textile* that is otherwise not unequivocally separable. Its radular tooth morphology matches that of typical *C. textile*. Because shells matching those from the Marquesas Is. are known from Tahiti, Tuamotu Archipelago, W. Samoa, Vanuatu, and some W. Indian Ocean localities, *C. textilinus* must either be regarded as a valid species (Richard, 1990) or a form of *C. textile*. We consider the conchological differences not to justify separation at the species level.

- *C. verriculum* (Pl. 67, Figs. 1-4): Shell rather solid, with a ventricosely conical or ovate to broadly ovate last whorl (RD 0.59-0.72 vs. 0.50-0.67 in other forms of *C. textile*; PMD 0.73-0.78). Larval shell of about 2 pinkish red whorls, maximum diameter 0.7 mm. Colour pattern of rather typical *C. textile* arrangement. Known from Mauritius, Mozambique, Madagascar and Sri Lanka. The original figures of *C. verriculum* (see Pl. 67, Fig. 1) are slightly stouter than the lectotype of form *auriger*. We consider *C. verriculum* a form of *C. textile* intergrading with forms *auriger* and *ponderosa*.

We consider the following nominal species-group taxa mere synonyms rather than forms of *C. textile*:

- *C. auratus*
- *C. dilectus* (juvenile specimen)
- *C. gloriamaris* (Röding)
- *C. gloriamaris* Perry
- *D. t. osullivan*
- *C. panniculus* (Pl. 68, Fig. 8)

- *C. reteaureum*

- *C. tigrinus* (often erroneously synonymized with *C. canonicus*).

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Conus gloriamaris CHEMNITZ, 1777

(Plate 68, Figures 14-17; Plate 76, Figure 66; Plate 84, Fourth row, right; Map 134)

1777 *Conus gloriamaris*, Chemnitz, Besch. Berliner Ges. Naturf. Fr., 3: 321-331, pl. 8 fig. A

1801 *Conus gloria* Bosc, Hist. Nat. Coq., 5: 153

Types: *C. gloriamaris*: Holotype in ZMUC (92 x 35 mm); *C. gloria*: Lectotype (Kohn, 1981) same as holotype of *C. gloriamaris*.

Type Localities: *C. gloria*: "Sea of the Indies."

Range: Philippines, Papua New Guinea, Solomon Is., Samoa, and Fiji; also recorded from E. Indonesia.

Description: Moderately large to large, solid to moderately heavy. Last whorl narrowly conoid-cylindrical to narrowly conical; outline convex near shoulder, straight below. Depth of exhalant notch about 1/3 of maximum diameter. Shoulder subangulate to rounded. Spire usually of moderate height, stepped; outline slightly concave to slightly convex. Larval shell of about 3.5 whorls, maximum diameter about 1 mm. First 5-6 postnuclear whorls tuberculate. Teleoconch sutural ramps concave, with 1 increasing to 5-10 fine spiral grooves; sculpture very weak in latest whorls. Last whorl with weak spiral ribs basally and distinct spiral striae above.

C. gloriamaris Shell Morphometry

L	75 - 162 mm
RW	0.35 - 0.83 g/mm (L 75-147 mm)
RD	0.45 - 0.50
PMD	0.79 - 0.86
RSH	0.18 - 0.24

Ground colour white; edges of late postnuclear whorls may be tinged with blue and last whorl may have blue axial streaks; blue shading most prominent in shells from Solomon Is. (Pl. 68, Fig. 15). Last whorl with a network of fine orangish brown to brown lines producing tiny to small tents and with usually 3 spiral rows or bands of yellowish brown blotches, below shoulder, just above centre, and within basal third. Brown zones with broad dark brown axial lines and dotted to solid spiral lines variably articulated with white dots and tents. Larval whorls orange to pink. First 3-4.5 postnuclear sutural ramps pink, immaculate in first 0.5-3 whorls and with brown marginal dots in remaining whorls. Following sutural ramps matching last whorl in colour pattern. Aperture white.

Periostracum yellowish to brownish grey, thin, translucent, smooth.

Dorsum of foot white mottled with brown, with a dotted dark brown pre-marginal line; anterior part broadly edged with orange and with a central black spot; latero-posterior zones densely marked with brown. Sole of foot mottled brown and beige. Rostrum white, or brown with dark brown transverse stripes and grading to immaculate white distally. Tentacles matching rostrum in colouration; tip with a dark brown outer side. Siphon cream with transverse brown mottling, grading to immaculate red distally and with a broad black ring centrally (Wilson & Gillett, 1971; Chaberman, pers. comm., 1981; Richards, pers. comm., 1989).

Radular teeth with a laterally inflated adapical barb opposite a larger second barb; serration long; basal spur absent (Nybakken, 1990).

Habitat and Habits: In 10-300 m, on sand and mud bottoms. *C. gloriamaris* is known to prey on molluscs.

Discussion: *C. gloriamaris* resembles *C. textile* and *C. bengalensis*. *C. textile* differs in its broader last whorl (RD 0.50-0.72) with a less straight outline and in its lower spire (RSH 0.11-0.20); its aperture is relatively wider at base and its exhalent notch not so deep. For comparison with *C. bengalensis*, see the Discussion of that species.

A specimen from Cuyo Is., Philippines (Pl. 68, Fig. 17) corresponds closely with *C. gloriamaris* in its conchological characters except for a broader last whorl (RD ca. 0.55) and a slightly lower spire (RSH 0.17). We provisionally assign it to *C. gloriamaris*.

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Conus bengalensis (OKUTANI, 1968)

(Plate 69, Figures 1-4; Map 134)

1968 *Darioconus bengalensis* Okutani, *Venus*, 26 (3/4): 66-69, pl. 7 fig. 2

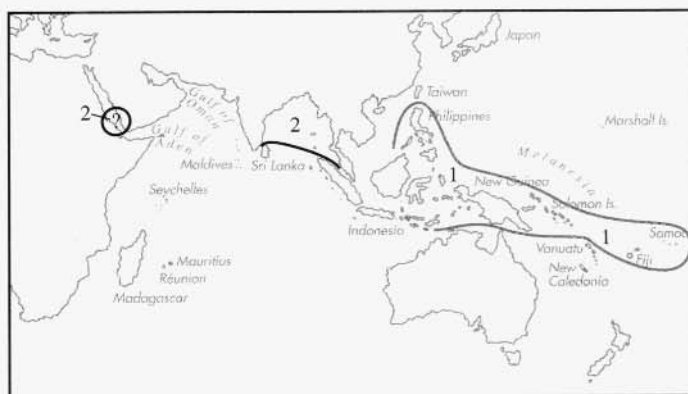
Type: Holotype in NSMT (97 x 31 mm).

Type Locality: "The Bay of Bengal."

Range: Andaman Sea, Bay of Bengal, S.E. India; ?Red Sea.

Description: Large, usually solid. Last whorl narrowly conoid-cylindrical to narrowly conical; outline almost straight, often slightly concave centrally. Aperture wider at base than near shoulder; exhalent notch about 1/3 of maximum diameter. Shoulder subangulate to angulate. Spire usually of moderate height, stepped; outline almost straight. Larval shell of about 3 whorls, maximum diameter 0.9-1.1 mm. First 4-7 postnuclear whorls tuberculate. Teleoconch sutural ramps slightly concave, with 0-2 increasing to 2-6 fine spiral grooves, generally with obsolete spiral striae in late whorls. Last whorl with very weak spiral ribs or ribbons at base.

Map 134



1: *C. gloriamaris* 2: *C. bengalensis*

C. bengalensis Shell Morphometry

L	85 - 132 mm
RW	0.25 - 0.65 g/mm
RD	0.36 - 0.44
- India	0.46 - 0.47
PMD	0.80 - 0.96
RSH	0.16 - 0.24

Ground colour white. Last whorl with fine light to dark brown reticulated lines and yellowish brown flecks and blotches. Blotches grouped in spiral rows, interspersed with broad brown axial and fine to coarse spiral lines. Lines producing very small to medium-sized tents arranged in 3 spiral bands, below shoulder and centre and at base. Larger tents concentrated between or near brown zones. Larval whorls beige to pinkish violet. First 2-3 postnuclear sutural ramps pale pink or white, immaculate. Following sutural ramps matching last whorl in colour pattern. Aperture white.

Periostracum yellowish grey, thin, translucent, smooth.

Animal similar in colour pattern to that of *C. textile* (Wee, 1972); however, foot not edged with orange-brown or red at ends, and tip of siphon orange rather than red (Roussy, pers. comm., 1994).

Radular teeth long and slender, with 2 opposed barbs adapically; long serration ending in cusp about 1/5 of the length from the base (Rolán, 1993).

Habitat And Habits: In 50-130 m, on mud and sand bottoms. *C. bengalensis* was observed to feed on gastropods (Wee, 1972).

Discussion: *C. bengalensis* is similar to *C. gloriamaris* and *C. milneedwardsi*. *C. gloriamaris* can be distinguished by its broader last whorl (RD 0.45-0.50), less angulate shoulder, more convex outline below shoulder, and by its finer pattern with smaller tents and 3 rather than 2 broad spiral bands of yellowish brown blotches on the last whorl.

For comparison with *C. milneedwardsi*, see the Discussion of that species.

Shells from S. E. India (Pl. 69, Fig. 3) differ from typical *C. bengalensis* in having a broader last whorl (RD 0.46-0.47). Specimens from the Red Sea (Pl. 69, Fig. 4) are so close to *C. bengalensis*, that we tentatively assign them to this species. The adult shell is smaller (L 65 mm) than typical *C. bengalensis*, has a broader last whorl (RD 0.48) and a more angulate shoulder; its colour pattern rather resembles that of *C. milneedwardsi* in its widely meshed arrangement and the absence of broad axial lines from the yellow-brown blotches.

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Conus milneedwardsi JOUSSEAUME, 1894

(Plate 69, Figures 5-13; Map 135)

- 1894 *Conus milneedwardsi* Jousseaume, Bull. Soc. Philom., Paris, 6 (8): 99
- 1899 *Conus (Cylinder) clytospira* Melvill & Standen, Ann. Mag. Nat. Hist., (7) 4: 461-463; figd. in Proc. Zool. Soc. London, 1901: Pl. 21 fig. 12
- 1962 *Leptoconus kawamurai* Habe, Colored Ill. of the Shells of Japan, 2: 117, pl. 37 fig. 15; 1964: Shells of the Western Pacific in Color, 2: 117, pl. 37 fig. 15
- 1989 *Conus lemuriensis* Wils & Delsaerd, Gloria Maris, 28 (6): 105-110, text figs. 1-3, 7, 12

Types: *C. milneedwardsi*: Holotype in MNHN (46 x 14 mm); *C. clytospira*: Lectotype (Coomans et al., 1985a) in BMNH (107 x 32 mm); *L. kawamurai*: Holotype in NSMT (80.5 x 33.5 mm); *C. lemuriensis*: Holotype in KBIN (110.5 x 35.5 mm).

Type Localities: *C. milneedwardsi*: "Aden"; *C. clytospira*: "Arabian Sea, about 125 miles WSW of Bombay, long. 71° 30' to 71° 45'E., lat. 18° 43'N."; *L. kawamurai*: "Amami and Ryukyu Islands"; *C. lemuriensis*: "Réunion Island, «La Souris Chaude»."

Range: *C. m. milneedwardsi*: Natal to Red Sea; *C. m. clytospira*: Pakistan to India and Sri Lanka; *C. m. lemuriensis*: Réunion and Mauritius; *C. m. kawamurai*: Ryukyu Is.

Description: Moderately large to large, moderately solid to solid; specimens smallest in *C. m. kawamurai*, largest in *C. m. milneedwardsi*. Last whorl narrowly conical, also conical in *C. m. kawamurai* and *C. m. lemuriensis*; outline nearly straight. Depth of exhalant notch about 1/3 to about 2/5 of maximum diameter. Shoulder angulate to sharply angulate. Spire stepped and usually high, also of moderate height in *C. m. kawamurai* and *C. m. lemuriensis*; outline generally straight, also variably concave in *C. m. kawamurai*. Maximum diameter of larval shell about 0.9 mm. First 6-10 postnuclear whorls tuberculate. Teleoconch sutural ramps slightly concave to concave, often less so in *C. m. kawamurai*, with 0-1 increasing to 4-7 spiral grooves; spiral sculpture may be very weak in latest whorls. Last whorl with variably weak, axially striate spiral grooves near base, separated by ribs at anterior end and by ribbons above; spiral grooves weak or obsolete in *C. m. lemuriensis*, some-

times extending to shoulder in *C. m. milneedwardsi* and *C. m. clytospira*.

C. milneedwardsi Shell Morphometry

L	60 - 174 mm
RW	0.15 - 0.53 g/mm (L 60-110 mm)
RD	
– <i>C. m. milneedwardsi</i> and	
<i>C. m. clytospira</i>	0.42 - 0.46
– <i>C. m. kawamurai</i> and	
<i>C. m. lemuriensis</i>	0.46 - 0.54
PMD	0.86 - 0.94
RSH	
– <i>C. m. milneedwardsi</i> and	
<i>C. m. clytospira</i>	0.28 - 0.33
– <i>C. m. kawamurai</i>	0.20 - 0.31
– <i>C. m. lemuriensis</i>	0.20 - 0.36

Ground colour white, generally with 2 pink spiral bands on last whorl, just above centre and within basal third; bands most prominent in *C. m. clytospira*, often weak in *C. m. kawamurai*; latest sutural ramps sometimes suffused with pink in *C. m. milneedwardsi*. Last whorl generally with reddish brown reticulated lines forming small to large triangular, quadrangular and round markings, and with similarly coloured triangular spots to variably shaped blotches concentrated in 2-3 spiral bands, within basal third, just above centre and sometimes somewhat below shoulder. Larval shell white to grey. Teleoconch spire matching last whorl in colour pattern. Aperture pink to orangish pink deep within, white to cream in *C. m. kawamurai*.

Periostracum yellowish grey, thin, translucent, smooth.

C. m. milneedwardsi: Dorsum of foot white, mottled with brown, with a dotted black pre-marginal line latero-posteriorly; brown markings larger and more densely set marginally. Tentacles white. Siphon white, mottled with brown except for distal zone, with a very weak to prominent black ring about 1/4 of the length from the tip; brown mottling may be restricted to the dorso-lateral zones (Liltved & Millard, 1989).

Radular teeth long and slender, with an adapical barb opposite a pronounced blade; long serration ending in a cusp about 1/5 the length from the base; weak basal spur present (Mozambique; Rolán, 1993).

Habitat and Habits: In 50-180 m; *C. m. kawamurai* known from rocky substrate in about 50 m, *C. m. lemuriensis* from sand bottoms in 50-60 m.

Discussion: *C. milneedwardsi* may be similar to *C. bengalensis*. The latter species has a generally narrower and often narrowly conoid-cylindrical last whorl (RD 0.36-0.46; PMD 0.80-0.96), a less angulate shoulder, a usually lower spire (RSH 0.16-0.24) with fewer tuberculate whorls (4-5 vs. 6-10), and broad axial brown lines within the yellowish brown areas of last whorl and spire. For compari-

son with the superficially similar *C. primus*, see the Discussion of that species.

The nominal species-group taxa *C. milneedwardsi*, *C. clytospira*, *C. kawamurai* and *C. lemuriensis* may be regarded as geographical forms or subspecies of the same species:

C. m. milneedwardsi (Pl. 69, Figs. 5, 6) is the largest form (L 80-174 mm). *C. m. clytospira* (Pl. 69, Figs. 7, 8) is morphologically very close to the former subspecies, differing in its smaller size (L 65-110 mm) and usually more prominent pink background bands around the last whorl. *C. m. lemuriensis* (Pl. 69, Fig. 13) is similar in size to *C. m. clytospira*; it is distinguished from *C. m. milneedwardsi* and *C. m. clytospira* by its broader last whorl and its more uniformly reticulated pattern with less numerous and larger white markings, mainly below shoulder. *C. m. kawamurai* (Pl. 69, Figs. 9-12) is the smallest form (L 60-81 mm), otherwise not separable by shell morphometry from *C. m. lemuriensis*, and intergrading with *C. m. milneedwardsi* and *C. m. clytospira* in shell shape and sculpture except for the broader last whorl. Its last whorl pattern varies from densely to widely meshed and includes sparse brown spots to prominent axially fused spiral colour bands. Pattern varieties of *C. m. milneedwardsi*, *C. m. clytospira* and *C. m. lemuriensis* fall within the range of variation observed in *C. m. kawamurai*.

Whether the recent populations of *C. m. kawamurai* and the Pleistocene *C. aratispira* Pilsbry, 1905 from Kikai, Osumi (Japan) are the same species, as considered by Matsukuma, Okutani & Habe, 1991, cannot be unequivocally determined (Walls, [1979], Yoshida, 1990); similarities in shape are not sufficient to justify such a hypothesis.

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Conus primus RÖCKEL & KORN, 1990

(Plate 69, Figures 14-17; Map 135)

1990 *Conus primus* Röckel & Korn, Acta Conchyl., 2: 45-47 (text figs.), 49, pl. 10, row 1 figs. 1-5

Type: Holotype in SMNS (85 x 27.5 mm).

Type Locality: "Banka Saya de Malha, 11°41'S-59°33'W (Mascarene Ridge)."

Range: Banka Saya de Malha, Indian Ocean; reports from Amirante Is. have to be confirmed.

Description: Moderately large to large, moderately solid to solid. Last whorl narrowly conoid-cylindrical; outline somewhat convex adapically, straight (right side) or slightly concave (left side) below. Aperture somewhat wider at base than near shoulder; depth of exhalant notch about 1/4 of maximum diameter. Shoulder angulate. Spire of moderate height to high, outline straight to slightly concave. Maximum diameter of larval shell about 0.9 mm. First

7-8 postnuclear whorls tuberculate. Teleoconch sutural ramps flat to slightly concave, with 2 increasing to 5 spiral grooves; last ramp may bear 4 grooves and a few spiral striae. Last whorl with spiral ribs from base to shoulder, restricted to basal third and weak in large specimens.

C. primus Shell Morphometry

L	60 - 103 mm
RW	0.26 g/mm (L 85 mm)
RD	0.39 - 0.43
PMD	0.76 - 0.81
RSH	0.18 - 0.25

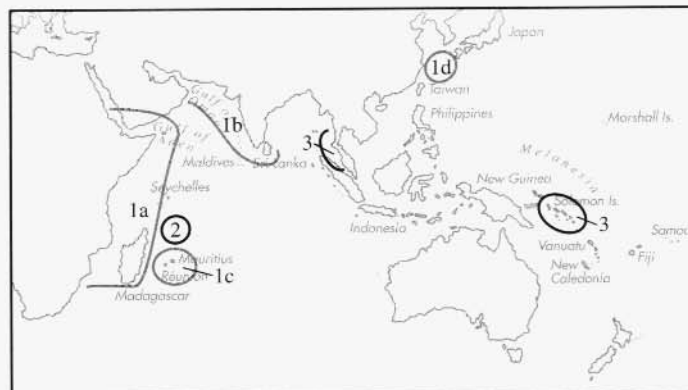
Ground colour white. Last whorl overlaid with light brown to orange leaving 4 spiral rows of white tents and blotches to almost solid white bands, just below shoulder and centre and within adapical as well as basal third. Intervening spiral colour bands may contain scattered white tents. Spiral rows of brown dots and dashes extending from base to shoulder, containing intermittent bright white dashes within the ground-colour zones. In a colour pattern variant from the type locality, last whorl light brown except for sparse white markings centrally, with wavy axial lines at centre and within adapical third. Larval whorls white. Postnuclear sutural ramps matching last whorl in colour pattern. Aperture white, or pale pink deep within.

Periostracum yellowish grey, thin, translucent, smooth.

Habitat and Habits: In 80-100 m.

Discussion: *C. primus* cannot be confused with any of its Indo-Pacific congeners. *C. milneedwardsi* may be superficially similar, but is distinguished by its broader and more conical last whorl (RD 0.42-0.54; PMD 0.86-0.94), generally higher spire (RSH 0.20-0.36), relatively deeper exhalant notch, and by its colour pattern including prominently reticulated lines but lacking dotted to dashed spiral lines.

Map 135



1a: *C. milneedwardsii milneedwardsii* 1b: *C. milneedwardsii clytospira*
1c: *C. milneedwardsii lemuriensis* 1d: *C. milneedwardsii kawamurai*
2: *C. primus* 3: *C. ranonganus*

***Conus ranonganus* DA MOTTA, 1978**

(Plate 69, Figures 18-20; Map 135)

1978 *Conus ranonganus* da Motta, Centre Thai Nat. Study: 4, 2 (figs.), Addenda**Type:** Holotype in MHNG (78.5 x 26 mm).**Type Locality:** "off the coastal waters from Ranong S.W. Thailand into the Bay of Bengal, Indian Ocean."**Range:** Andaman Sea to Birma; Solomon Is.

Description: Moderately large to large, moderately solid to solid. Last whorl narrowly conoid-cylindrical; outline slightly convex at adapical third, almost straight below. Aperture somewhat wider at base than near shoulder; siphonal fasciole prominent. Shoulder subangulate. Spire of moderate height, outline straight to slightly concave. Larval shell of about 3.25 whorls, maximum diameter 0.7-0.8 mm. About first 4 postnuclear whorls tuberculate. Teleoconch sutural ramps flat, with 1 increasing to 5-8 spiral grooves. Last whorl with widely spaced spiral grooves on basal half; intervening ribbons rather weak, with or without a median groove; spiral sculpture less prominent in shells from Solomon Is.

***C. ranonganus* Shell Morphometry**

L	75 - 95 mm
RW	0.16 - 0.35 g/mm
RD	0.40 - 0.44
PMD	0.77 - 0.80
RSH	0.15 - 0.22

Ground colour white to cream, often partially suffused with pink or tan. In Andaman Sea shells, last whorl with closely set spiral rows of brown to reddish brown axial dashes following spiral ribbons basally; lineate pattern extending on shoulder ramp. Paler brown spots and flecks forming 3 interrupted spiral bands, below shoulder, just above centre and within basal third. Solomon Is. shells with rather broad, straight to wavy, continuous axial lines from shoulder ramp to base. Siphonal fasciole and notch white in shells from Solomon Is., white to cream or pink in shells from Andaman Sea. Apex immaculate white. Late sutural ramps with brown radial lines. Aperture white to pale pink, pink in subadults.

Habitat and Habits: In 70-150 m.

Discussion: *C. ranonganus* may be similar to *C. australis* and *C. armadillo*. The latter species are heavier (*C. australis* of 80 mm: RW 0.50 g/mm; *C. armadillo* of 70 mm: RW 0.40 g/mm) and have broader last whorls (RD 0.44-0.56 in *C. australis*, 0.51-0.57 in *C. armadillo*). *C. australis* differs additionally in its more prominent and often granulose spiral sculpture of the last whorl including spiral ribs, *C. armadillo* in its ventricosely conical last whorl with

spiral ribbons from base to shoulder that are usually granulose basally.

***Conus korni* G. RAYBAUDI MASSILIA, 1993**

(Plate 73, Figures 25-26; Plate 3, Figure 20; Map 136)

1993 *Conus (Leptoconus) korni* G. Raybaudi Massilia, La Conchiglia, 25 (267): 24-28, text figs. 1-5, 14-16, 19**Type:** Holotype in SMNS (11 x 6 mm).**Type Locality:** "Aden Gulf, off Northern Somalia."**Range:** Gulf of Aden to Mogadishu.

Description: Very small and light. Last whorl usually conical to broadly conical; outline convex adapically, straight (right side) or concave (left side) below. Shoulder sharply angulate to carinate. Spire usually of moderate height, stepped; outline concave. Larval shell of 2.25-2.5 whorls, with fine radial ridges more prominent toward teleoconch; maximum diameter 0.8-1 mm. Teleoconch sutural ramps concave, often with 1-3 spiral grooves in early whorls; spiral sculpture obsolete in late whorls. Last whorl with spiral ribs on basal third and 1-2 weak spiral grooves just below shoulder.

***C. korni* Shell Morphometry**

L	9 - 13 mm
RW	0.01 - 0.02 g/mm
RD	0.63 - 0.77
PMD	0.82 - 0.93
RSH	0.13 - 0.24

Ground colour white. Last whorl with a broad, interrupted to solid, orangish to blackish brown spiral band on each side of centre, sometimes reduced or absent. Central ground-colour band with an indistinct meshwork of grey background shades, often edged with dark brown to black spots. Closely spaced dashed to solid brown spiral lines extending from base to shoulder, partially articulated with white dashes. Larval shell bicoloured: Initial part with a beige to light brown median zone and dark brown sutural areas, remaining part grading to completely dark brown. Postnuclear sutural ramps with dark brown radial streaks and blotches crossing outer margins. Aperture showing exterior colour pattern.

Periostracum yellowish grey, thin, translucent, smooth, slightly thicker and with axial ridges toward outer lip, with distinct radial ridges on the late sutural ramps.

Radular teeth long, narrow and slightly curved, with 2 opposite adapical barbs and a larger third barb posteriorly; serration and basal spur absent. Teeth similar but not com-

pletely congruent with those of piscivorous species. Radular sac contains about 150 teeth, while small vermivorous species have about 80-90 teeth and piscivorous species even less (Rolán & G. Raybaudi Massilia, in press).

Habitat and Habits: In 50-150 m (G. Raybaudi Massilia, in press).

Discussion: *C. korni* is very similar to *C. biraghii* and *C. boschorum*. *C. biraghii biraghii* often has a more ventricose last whorl (PMD 0.77-0.91), its spire outline is straight rather than concave, and its early teleoconch sutural ramps lack distinct spiral sculpture; the final part of its larval shell is light coloured. *C. biraghii omanensis* differs in its higher spire (RSH 0.23-0.30), angulate rather than sharply angulate to carinate shoulder, and the distinct spiral grooves on its flat rather than concave late sutural ramps; its larval shell is more contrastingly bicoloured. *C. biraghii congruens* also has a higher spire (RSH 0.24-0.30) and a more contrastingly bicoloured larval shell; its shoulder is often undulate due to traces of axial subshoulder costae. We provisionally accept the status as valid species. For comparison between *C. korni* and *C. boschorum*, see the Discussion of the latter species. For the distinctions from the holotype of *C. traillii* and the relationship to *C. locumtenens*, see the Discussion of *C. biraghii*.

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Conus boschorum

MOOLENBEEK & COOMANS, 1993

(Plate 73, Figures 27, 28; Map 136)

1993 *Conus boschorum* Moolenbeek & Coomans, Apex, 8 (1-2): 20-21, 22, 23 (figs. 1-6, 17)

Type: Holotype in ZMA (11 x 6 mm).

Type Locality: "Sultanate of Oman, Masirah Island, Sur/Umm Rasas."

Range: Masirah Id., Oman.

Description: Very small and light. Last whorl usually broadly conical, outline convex; left side concave basally. Shoulder angulate to carinate. Spire of moderate height to high, stepped; outline straight to slightly concave. Larval shell of 1.75-2 whorls, maximum diameter 0.9-1 mm. Teleoconch sutural ramps concave, with 1 increasing to 3 obsolete spiral grooves in early whorls, spiral sculpture not traceable in late whorls. Last whorl with spiral ribs on basal third.

Ground colour white. Last whorl with an interrupted to solid, yellowish to blackish brown or olive spiral band at base and within adapical third; colour zones sometimes also axially arranged. Light subcentral band with a meshwork of pale grey background shades, edged with yellowish to dark brown spots; sometimes spirally aligned dark spots extending from base to shoulder. Dotted to dashed brown spiral lines from basal third to subshoulder area or restricted to subcentral area, partially with intermittent white dashes.

Larval shell bicoloured: Initial part white, with a yellowish brown pre-sutural zone; remaining part grading to solid yellowish brown. Postnuclear sutural ramps with light to dark brown radial blotches crossing outer margins. Aperture showing exterior pattern.

C. boschorum Shell Morphometry

L	9 - 13 mm
RW	0.02 g/mm (10-11 mm)
RD	0.70 - 0.77
PMD	0.84 - 0.93
RSH	0.22 - 0.28

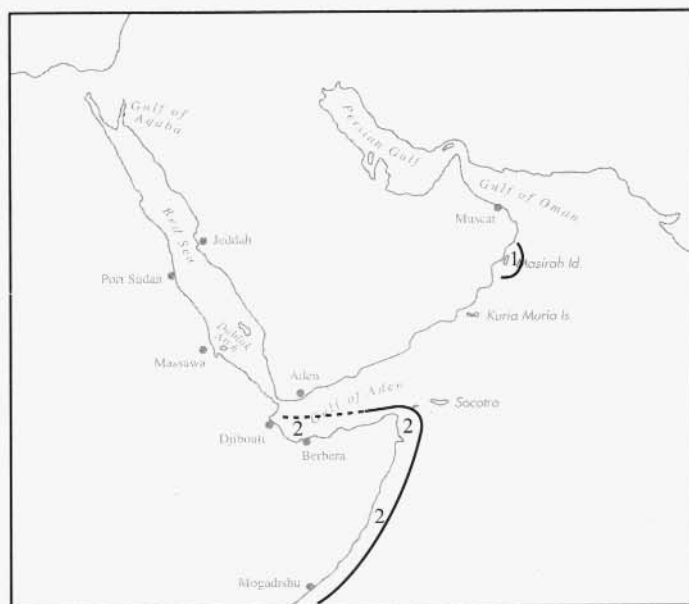
Periostracum thin, translucent, with fine fringes on shoulder.

Animal dark grey; rostrum white distally, tentacles white (alcohol preserved material; Moolenbeek & Coomans, 1993).

Radular teeth stout basally and narrow adapically, mostly not enrolled except for base where the margins of the chitin sheet are overlapping. Adapical part rounded at tip and of spongy surface-structure, with 3 barbs that are broadening and membranous proximally; anterior barb bar-shaped and blunt, posterior barb triangular and pointed, middle barb intermediate in shape. Serration and basal spur absent (Rolán & G. Raybaudi, in press). Function of such a tooth aberrant in shape within the genus *Conus* (open canal instead of enrolled tube) requires new hypotheses.

Habitat and Habits: From 0.1 m below low tide level to about 6 m.

Map 136



1: *C. boschorum* 2: *C. korni*

Discussion: *C. boschorum* is very similar to *C. biraghii* and *C. korni*. *C. biraghii biraghii* differs in its lower spire (RSH 0.12-0.19) and its often more ventricose last whorl (PMD 0.77-0.91); the weak spiral grooves below the shoulder of *C. biraghii biraghii* are absent in adult specimens of *C. boschorum*. *C. biraghii omanensis* has an often narrower last whorl (RD 0.61-0.74) with 1-2 spiral grooves below shoulder, a narrower (0.8 vs. 0.9-1) and more contrastingly bicoloured larval shell with fine radial ridges, and flat rather than concave teleoconch sutural ramps with distinct spiral grooves also in late whorls. *C. biraghii congruens* is distinguished by its narrower (0.8 mm) larval shell

with distinct fine radial ridges and more strongly contrasting colours, its 1-2 spiral grooves below shoulder, and the prominent spiral sculpture on its early teleoconch sutural ramps. *C. korni* has more larval whorls (2.25-2.5) with fine radial ridges, a lower spire (RSH 0.13-0.24), pronounced spiral grooves on the early teleoconch sutural ramps, and 1-2 weak spiral grooves below shoulder. For the distinctions from the holotype of *C. traillii*, see the Discussion of *C. biraghii*. The juvenile stages of the sympatric larger species *C. boschi* and *C. ardisiaceus* cannot be confused with *C. boschorum* (Moolenbeek & Coomans, 1993).

Appendix 1: Nominal species of uncertain validity

1.

Conus rarimaculatus SOWERBY III, 1870

(Plate 70, Figures 8, 9)

1870 *Conus rarimaculatus* Sowerby III, Proc. Zool. Soc. London, 1870: 257, pl. 22 fig. 4

Type: 2 syntypes in BMNH (20.5 x 11; 20 x 8 mm).

Type Locality: "China Sea."

Habitat and Habits: No information.

Discussion: The type specimens of *C. rarimaculatus* are usually considered to represent a juvenile stage of *C. sieboldii* (Wagner & Abbott, 1978; Walls, [1979]; Richard, 1990). However, the latter species differs in its tuberculate first 5-6 postnuclear whorls and the absence of distinct spiral grooves on its teleoconch sutural ramps.

2.

Conus submarginatus SOWERBY III, 1870

(Plate 70, Figures 10, 11)

1870 *Conus submarginatus* Sowerby III, Proc. Zool. Soc. London, 1870: 255, pl. 22 fig. 6.

Type: Holotype in NMWC (20 x 10 mm).

Type Locality: Not given.

Habitat and Habits: No information.

Discussion: The holotype of *C. submarginatus* may be a subadult specimen. Its white colour suggests assignment to the variable *C. furvus*. However, *C. submarginatus* differs from the latter species in its less conical last whorl with strong spiral grooves and ribs below centre, subangulate to rounded shoulder, paucispiral larval shell, and the absence of tubercles on its teleoconch whorls.

3.

Conus visseri DELSAERDT, 1990

(Plate 70, Figures 12-14)

1990 *Conus visseri* Delsaerd, Gloria Maris, 29 (1): 1-4, figs. 1-4.

Type: Holotype in ZMA (8.5 x 5.5 mm).

Type Locality: "Ka Lhim Beach, in the Patong Bay, Phuket Island, Thailand."

Habitat and Habits: No information.

Discussion: These small shells (holotype and 4 paratypes of 7-9 mm) (Pl. 70, Figs. 8-10) may be juveniles of a known species (*C. coffeae*? see Weinkauff's illustration of *C. scabriusculus* (1873: Pl. 26 figs. 14, 15)).

4.

Conus vividus SOWERBY III, 1914

(Plate 70, Figure 15)

1914 *Conus vividus* Sowerby III, Ann. Mag. Nat. Hist., 14: 476.

Type: Holotype in BMNH (4.5 x 2.5 mm).

Type Locality: "New Caledonia."

Habitat and Habits: No information.

Discussion: The extremely small type specimen, blue with a white shoulder band, seems to be a juvenile.

5.

Conus wilmeri SOWERBY III, 1883

(Plate 70, Figures 16, 17)

1883 *Conus wilmeri* Sowerby III, Proc. Zool. Soc. London, 1882: 118, pl. 5 fig. 5.

Type: Holotype in NMWC (21 x 8 mm).

Type Locality: "Port Blair, Andaman Is."

Habitat and Habits: No information.

Discussion: The holotype of *C. wilmeri* resembles *C. praecellens*, but differs in its uniformly brown colour, broadly carinate shoulder, and different sculpture of the teleoconch sutural ramps (prominent subsutural ridge and 4 spiral grooves; adaxial groove deeply incised). It can be distinguished from the similar *C. acutangulus* by its colour and its non-tuberculate teleoconch whorls.

6.

Conus superstes HEDLEY 1911

(Plate 70, Figure 18)

1911 *Conus superstes* Hedley, Zool. Results Endeavour, 1: 111, pl. 20 figs. 35, 36.

Type: Numerous very small syntypes (L about 8.5 mm) in SAM.

Type Locality: "Off Cape Wiles, South Australia."

Habitat and Habits: "100 f."

Discussion: These extremely small specimens seem to be juveniles.

7.

Conus tenuisulcatus SOWERBY III, 1870

(Plate 70, Figures 19, 20)

1870 *Conus tenuisulcatus* Sowerby III, Proc. Zool. Soc. London, 1870: 256, pl. 22 fig. 10. (Non *C. tenuisulcatus* Sowerby III, 1873).

Type: Holotype in BMNH (17 x 8.5 mm).

Type Locality: Not given.

Habitat and Habits: No information.

Discussion: The holotype of *C. tenuisulcatus* may be a subadult stage and we cannot assign it to a known *Conus* species. It differs from similar pyriform shells from the W. Atlantic in its 2-3 distinct spiral grooves on the teleoconch sutural ramps and its slightly tuberculate early postnuclear whorls.

8.

Conus albospira E. A. SMITH, 1880

(Plate 70, Figures 21, 22)

1880 *Conus albospira* E.A. Smith, Proc. Zool. Soc. London, 1880: 480, pl. 48 fig. 4.

Type: Holotype in BMNH (27.5 x 14.5 mm).

Type Locality: Not given.

Habitat And Habits: No information.

Discussion: The holotype, possibly a subadult specimen, cannot be assigned to a known species. Coomans et al. (1979) and Richard (1990) considered it conspecific with *C. collisus*. However, it differs from *C. collisus* in its immaculate white spire and broader last whorl (RD 0.68).

9.

Conus hypochlorus TOMLIN, 1937

(Plate 70, Figures 23, 24)

1937 *Conus hypochlorus* Tomlin, Proc. Malac. Soc. London (nom. nov. for *C. croceus* E.A. Smith, 1877)

Type: Holotype in BMNH (25 x 9 mm).

Type Locality: Not given.

Habitat and Habits: No information.

Discussion: The holotype belongs to the so-called "needle cones" but cannot be assigned to any of its conchological allies. It differs from them in its uniform brown colouration and strong ribs grading to ribbons on its last whorl and one broad spiral groove on sutural ramps. Walls ([1979]) misidentified *C. hypochlorus* as a variety of *C. insculptus* (Pl. 56, Figs. 32, 33). Richard (1990) considered it valid.

10.

Conus undatus KIENER, 1845

(Plate 70, Figure 25)

1845 *Conus undatus* Kiener, Coq. Vivant., 2: Pl. 94 fig. 1; 1848: 210-211.

Type: Original figure 32 x 16 mm.

Type Locality: "l'océan indien."

Habitat and Habits: No information

Discussion: The specimen figured by Kiener is not assignable to a known species. Kiener himself compared it to the sometimes similarly shaped *C. sinensis* Sowerby I (= *C. praecellens*); however, *C. undatus* differs in having axial streaks ("flammules longitudinales") on the last whorl; *C. cingulatus* from the W. Atlantic, synonymized with *C. undatus* by Walls, [1979], has a strongly sculptured last whorl with straighter sides and also a different pattern.

11.

Conus borneensis ADAMS & REEVE, 1848

(Plate 70, Figure 26)

1848 *Conus borneensis* Adams & Reeve, Zool. Voy. Samarang, Moll., 1:18, pl. 5 figs. 8a-d.

Type: Lectotype (Coomans et al. 1982) in BMNH (42 x 20 mm).

Type Locality: "North-east coast of Borneo."

Habitat and Habits: "in ten fathoms, sandy and stony bottom."

Discussion: *C. borneensis* is considered a valid species by Richard (1990), a synonym of *C. arcuatus* by Walls, ([1979]), and a synonym of *C. boholensis* by Coomans et al. 1982). The lectotype (no other type specimen is present) differs from *C. arcuatus* by its broadly carinate shoulder and late postnuclear whorls, less concave spire outline and broader last whorl (RD 0.67 vs. about 0.60); moreover, there is no reason to doubt the locality of *C. borneensis*, while *C. arcuatus* is restricted to the Panamic Province. *C. boholensis* differs in its narrower last whorl (0.57- 0.64),

almost straight spire outline and in having distinct tubercles in the first 6-8 postnuclear whorls.

12.

Conus kashiwajimensis SHIKAMA, 1971

(Plate 70, Figures 27, 28)

1971 *Conus kashiwajimensis* Shikama, Sci. Rep. Yokohama Natl. Univ., (2) 18: 32-33, pl. 3 figs. 23-24.

Type: The present whereabouts of the holotype (33 x 16.5 mm) are unknown.

Type Locality: "Kashiwajima Island, southwestern Kochi Prefecture."

Habitat and Habits: No information.

Discussion: Based on material from the Ryukyu Is. (Pl. 12, Fig. 12; Pl. 70, Fig. 28), Röckel (1991) concluded that *C. kashiwajimensis* could be a colour form of *C. kiicumulus*, differing in the absence of pattern elements. However, as the holotype of *C. kashiwajimensis* is not available at present, a conclusive comparison with *C. kiicumulus* cannot be made.

13.

Conus boivini KIENER, 1845

(Plate 71, Figures 1, 2)

1845 *Conus boivini* Kiener, Coq. Vivant., 2: Pl. 64 fig. 2; 1849-1850: 282.

Type: Holotype in MNHN (61 x 30 mm).

Type Locality: Not given.

Habitat and Habits: No information.

Discussion: The holotype of *C. boivini* resembles *C. gubernator* and was therefore considered to represent an aberrant variant of the latter species by Coomans et al. (1982). As it differs from *C. gubernator* in having 10 spiral grooves below the shoulder and a very low spire, Walls [1979] and Richard (1990) regarded it as a valid species.

14.

Conus incarnatus REEVE, 1843

(Plate 71, Figures 3-5)

1843 *Conus incarnatus* Reeve, Proc. Zool. Soc. London, 11: 174; 1844: Conch. Icon., 1, *Conus*: Pl. 41 sp. 221.

Type: 3 syntypes in BMNH (62 x 35; 47.5 x 27.5; 47 x 26.5 mm).

Type Locality: "Malacca."

Habitat and Habits: On the "mud-banks."

Discussion: The 3 syntypes cannot be assigned to any known species. The smaller syntypes resemble *C. hyaena*, although their white ground colour with 2 broad flesh-coloured spiral bands on the last whorl does not correspond with the pattern of this species. The large syntype (Pl. 71, Fig. 5) differs from *C. hyaena* in its more conical shape. *C. suturatus*, synonymized with *C. incarnatus* by Walls ([1979]), is distinguished by its smaller size and different colour pattern. *C. incarnatus* may be a valid species as concluded by Richard (1990).

15.

Conus (Chelyconus) worcesteri BRAZIER, 1891

(Plate 71, Figures 6, 7)

1891 *Conus (Chelyconus) worcesteri* Brazier, Proc. Linn. Soc. New South Wales, 6: 276, pl. 19 fig. 4

Type: Holotype in SAM (47.5 x 24.5 mm).

Type Locality: "Island of Mauritius."

Habitat and Habits: No information.

Discussion: *C. worcesteri*, known only from the holotype, is similar to *C. magus* in shape. Richard (1985) suggested an assignment to *C. frauenfeldi* (considered a valid species by Richard, a form of *C. magus* by us); Walls ([1979]) synonymized *C. worcesteri* with *C. magus*. However, *C. worcesteri* differs from *C. magus* by the absence of spiral sculpture on its sutural ramps and the immaculate white spire.

16.

Conus tristis REEVE, 1844

(Plate 71, Figures 8, 9)

1844 *Conus tristis* Reeve, Conch. Icon., 1, *Conus*: Pl. 45 sp. 252.

Type: Type in BMNH (26.5 x 14 mm).

Type Locality: Not given.

Habitat and Habits: No information.

Discussion: *C. tristis* is considered valid (Richard, 1990), dubious (Walls, [1979]), or a synonym of *C. magus* (Sage, pers. comm.). Its stout shape, straight spire outline, and mainly its immaculate white colour distinguishes it from *C. magus*, although it may be an albinistic specimen of aberrant shape of this species.

17.

***Conus traillii* A. ADAMS, 1855**

(Plate 71, Figures 13, 14)

1855 *Conus traillii* A. Adams, Proc. Zool. Soc. London, 1855: 121.

Type: Holotype in BMNH (7 x 4 mm).

Type Locality: "Malacca."

Habitat and Habits: No information.

Discussion: The tiny type specimen may be a juvenile of some *Conus* species or perhaps not a *Conus* at all. The colour pattern of its last whorl resembles *C. biraghii*, but shape and sculpture of the last whorl are very different from the former species.

18.

***Conus sutoreanus* WEINKAUFF, 1875**

(Plate 71, Figure 10)

1875 *Conus sutoreanus* Weinkauff, Syst. Conch. Cab. Martini Chemnitz, 4 (2), 1, *Conus*, 311-312, pl. 56 figs 5, 6.

Type: Holotype in ZMB (17 x 8.5 mm).

Type Locality: "Mauritius."

Habitat and Habits: No information.

Discussion: The shell is described as wax-coloured with a rose aperture and with a tuberculate, spirally grooved spire

with 2 larval whorls (Weinkauff, 1875). The holotype, recently rediscovered by Kiliyas (ZMB; pers. comm., 1994), is an apparently dead collected, faded shell that probably represents the juvenile stage of a known species.

19.

***Conus papalis* WEINKAUFF, 1875**

(Plate 71, Figures 11, 12)

1849 *Conus coronatus* Reeve, Conch. Icon., 1, *Conus* suppl.: Pl. 7 sp. 263 (non *C. coronatus* Gmelin, 1791).

1875 *Conus papalis* Weinkauff, Syst. Conch. Cab. Martini Chemnitz, 4 (2), 1, *Conus*: 359, pl. 66 figs. 10 (nom. nov. for *C. coronatus* Reeve, 1849).

Types: 3 syntypes in BMNH (9 x 4.5; 9 x 4 mm).

Type Locality: "Island of Ticao, Philippines."

Habitat and Habits: No information.

Discussion: Shell very small, with a remarkably high spire (RSH 0.39-0.42). Larval shell bicoloured: Initial part white with brown sutural line, final part light brown with darker brown sutural line (see *C. biraghii* and allied species). Postnuclear sutural ramps with tubercles continued as axial costae and brown sutural line. Whether *C. papalis* belongs to the Conidae or not, cannot be unequivocally determined. Recent findings of *Conus* species with similar larval shells between Mozambique and Oman favour its assignment to the Conidae.

Appendix 2: Specimens, not assignable to any known *Conus* species

Conus species no. 1

(Plate 71, Figures 15, 16)

Material: 2 specimens in coll. Darkin (38 x 20.5; 27.5 x 14 mm), 1 in coll. Bondarev (43 x 23.5 mm).

Locality: Gulf of Aden.

Habitat: In 55-60 m.

Notes: Resembles *C. pennaceus* (in pattern) as well as *C. nobilis* (in shape). Description in preparation.

Conus species no. 2

(Plate 71, Figures 17, 18)

Material: 1 specimen in coll. Röckel, SMNS (39 x 17.5 mm).

Locality: Philippines.

Habitat: No information.

Notes: Differs from similar species as *C. collisus* or *C. subulatus* in tuberculate early postnuclear whorls and in shape and pattern of last whorl.

Conus species no. 3

(Plate 71, Figures 19, 20)

Material: 1 specimen in coll. Schlüter (65 x 31 mm).

Locality: Philippines.

Habitat: No information.

Notes: Somewhat similar to *C. magus*, but with a different pattern and without spiral grooves on its sutural ramps.

Conus species no. 4

(Plate 71, Figures 21, 22)

Material: 1 specimen in coll. da Motta, SMNS (48 x 24.5 mm).

Locality: Mauritius.

Habitat: No information.

Notes: The specimen labelled as *C. janus* differs from this species in its broader last whorl (RD 0.61 vs. 0.53-0.58), angulate shoulder, straight spire outline, and its pattern.

Conus species no. 5

(Plate 71, Figures 23, 24)

Material: 1 specimen in coll. Bondarev (61.5 x 27.5 mm)

Locality: Pacific (?)

Habitat: No information.

Notes: Similar to *C. martensi* from the Indian Ocean, but differs in its tuberculate spire whorls.

Conus species no. 6

(Plate 71, Figure 25)

Material: 1 specimen in coll. Singleton (27 x 12 mm).

Locality: Moreton Bay, Australia.

Habitat: Dredged in deep water.

Conus species no. 7

(Plate 71, Figures 26, 27)

Material: 1 specimen in SMF (36.5 x 22 mm).

Locality: Unknown.

Habitat: No information.

Notes: The specimen was labelled by Jaeckel as "*C. fulgurans* Reeve" and is actually similar to Reeve's illustration of *C. fulgurans* Hwass (suppl. pl. 1 sp. 271), a *nomen dubium* (Kohn, 1981).

Conus species no. 8

(Plate 72, Figure 1)

Material: 1 specimen in coll. da Motta, SMNS (33 x 13 mm).

Locality: Cebu.

Habitat: No information.

Notes: Similar to *C. longurionis* and *C. comatosa*. *C. longurionis* has a narrower last whorl and a different sculpture on last whorl and spire. *C. comatosa* has a weaker last whorl sculpture, carinate and concave teleoconch sutural ramps, and 2 brown spiral bands on the last whorl. Similar to the specimen figured in Reeve pl. 44, sp. 240a as "*C. aculeiformis*."

***Conus* species no. 9**

(Plate 72, Figures 2, 3)

Material: 1 specimen in coll. Haksal (52 x 21 mm).

Locality: Nicobar Is.

Habitat: No information.

***Conus* species no. 10**

(Plate 72, Figure 4)

Material: 1 specimen in MNHN (43 x 18.5 mm).

Locality: New Caledonia.

Habitat: Dredged in 575-595 m.

***Conus* species no. 11**

(Plate 72, Figures 5, 6)

Material: 1 specimen in coll. Bondarev (44 x 13.5 mm).

Locality: Saya de Malha Bank, Mascarenes.

Habitat: Dredged in deep water.

Notes: This colourful "needle cone" resembles *C. longurionis* in shape, but differs strikingly in its colour pattern.

***Conus* species no. 12**

(Plate 72, Figure 7)

Material: 1 specimen in MNHN (29.5 x 15.5 mm).

Locality: Coral Sea.

Habitat: Dredged in 240 m.

Notes: Slightly similar to *C. hamamotoi*, but differs in its elevated spire and its colour pattern.

***Conus* species no. 13**

(Plate 72, Figures 8, 9)

Material: 2 specimens in coll. Bondarev (20 x 9.5; 15.5 x 7.5 mm), 1 specimen in coll. Danila (19 x 9.5 mm).

Locality: Saya de Malha Bank, Mascarenes.

Habitat: In 130 m; on sandy silt and limestone debris.

***Conus* species no. 14**

(Plate 72, Figures 10, 11)

Material: Several specimens in coll. Huber (L 15-28 mm).

Locality: Sri Lanka.

Habitat: Deep water.

Notes: Resembles *C. pagodus*, but has a broader last whorl (RD about 0.75) and lacks distinct spiral grooves on sutural ramps.

***Conus* species no. 15**

(Plate 72, Figures 12, 13)

Material: 19 specimens in MNHN (L 18-28 mm).

Locality: S. New Caledonia.

Habitat: Dredged in 170-290 m.

Notes: Similar to *C. granarius* Kiener from E. Panama

***Conus* species no. 16**

(Plate 72, Figures 14, 15)

Material: 1 specimen in coll. Röckel, SMNS (18 x 9.5 mm).

Locality: At Pilot Point near Apia, Samoa.

Habitat: Found after hurricane.

Notes: Resembles *C. exiguus*, but is distinguished by its low spire and the pinkish colour of its aperture.

Live specimens recently found in W. Samoa suggest assignment to *C. exiguus*.

***Conus* species no. 17**

(Plate 72, Figures 16, 17)

Material: 2 specimens in coll. Bondarev (22 x 11 mm) and coll. Danila (29 x 15 mm).

Locality: Gulf of Aden.

Habitat: Dredged.

Notes: Resembles sympatric *C. hamanni* and *C. inscriptus*, but differs in having an ovate shape, and a different pattern; additionally distinguished from *C. inscriptus* by its thin shell and non-tuberculate early postnuclear whorls.

***Conus* species no. 18**

(Plate 72, Figures 18-20)

Material: 6 specimens in coll. da Motta, SMNS (17.5 x 8 - 27 x 13 mm).

Locality: Amirante Group, Seychelles.

Habitat: Deep water.

Notes: Most similar to *C. anemone* in shape, sculpture and colour.

***Conus* species no. 19**

(Plate 72, Figures 21, 22)

Material: 1 specimen in MNHN (22.5 x 13 mm).

Locality: S. New Caledonia.

Habitat: Dredged in 260 m.

***Conus* species no. 20**

(Plate 72, Figure 23)

Material: 1 specimens in coll. G. Raybaudi Massilia (31 x 18 mm).

Locality: Cape Ras Hafun, N. Somalia.

Habitat: from 50-150 m.

Notes: Similar to *C. sukhadwalai* and *C. voluminalis*, but differs mainly in its strong spire sculpture.

***Conus* species no. 21**

(Plate 72, Figures 24, 25)

Material: 1 specimen in coll. Röckel, SMNS (16 x 7 mm), another one depicted in HSN (April 1981: 10).

Localities: Bohol, Philippines; "Laing Is., near Bogia, Papua New Guinea" (Hawaiian Shell News, 1981).

Habitat: Philippines: 100-200 m; Papua New Guinea: "in sand and coralline algae on a reef slope."

Notes: Röckel (1989) compared the shells with juvenile *C. varius* and denied conspecificity on account of differences in sculpture, pattern and spire outline.

***Conus* species no. 22**

(Plate 72, Figures 26, 27)

Material: 8 specimens in MNHN (L 8-12.5 mm).

Locality: Coral Sea.

Habitat: Dredged in 370-400 m.

Notes: Similar to *C. kanakinus* in colour pattern, but differs mainly in carinate postnuclear whorls, low spire, and 4-5 regular spiral grooves on teleoconch sutural ramps. Description in preparation.

***Conus* species no. 23**

(Plate 72, Figures 28)

Material: 1 specimen in MNHN (27.5 x 12.5 mm).

Locality: West Thailand.

Habitat: No information.

Notes: A "needle cone".

***Conus* species no. 24**

(Plate 72, Figures 29, 30)

Material: 1 specimen in coll. Bondarev (32.5 x 15 mm).

Locality: Unknown.

Habitat: No information.

Notes: Resembles subadult *C. tulipa* in shape of last whorl, but its pattern, paucispiral larval shell and the shape and sculpture of its spire exclude conspecificity.

***Conus* species no. 25**

(Plate 73, Figures 1-3)

Material: 2 specimens in coll. Limpus (19 x 11; 22.5 x 13.5 mm).

Locality: Horse Shoe Reef and Central Reef, Swain Reefs, Queensland.

Habitat: Intertidal.

Notes: Resembles *C. miliaris*, but differs in its almost uniform dark red colour.

***Conus* species no. 26**

(Plate 73, Figures 4, 5)

Material: 1 specimen in coll. Ramalho (29.5 x 15 mm).

Locality: Uimbe, Porto Amelia, Mozambique.

Habitat: No information.

Notes: Slightly similar to *C. tinianus*, but distinguished by its concave sutural ramps with 2 distinct spiral grooves, its subangulate shoulder and pronounced well separate spiral grooves on the basal third of its last whorl.

***Conus* species no. 27**

(Plate 73, Figure 6)

Material: 1 specimen in coll. da Motta, SMNS (30 x 18.5 mm).

Locality: Miyakjimi Is., 180 km S.E. Tokyo, Japan.

Habitat: No information.

Notes: Slightly similar to *C. tinianus*, but differs in a broad last whorl and strong spiral grooves on the sutural ramps.

***Conus* species no. 28**

(Plate 73, Figures 7, 8)

Material: 1 specimen in coll. Filmer (30 x 13 mm).

Locality: Aru Is., Moluccas.

Habitat: In 30 m in mud.

Notes: Resembles *C. generalis* in shape, but differs in its slightly undulate shoulder, distinct spiral grooves on the sutural ramps, and in its colour pattern.

***Conus* species no. 29**

(Plate 73, Figures 9, 10)

Material: 1 specimen in coll. da Motta, SMNS (33 x 12.5 mm)

Locality: Balangka, Samar, Philippines.

Habitat: No information.

Notes: Similar to *C. ochroleucus*, *C. magus*, and *C. subulatus*, but distinguished by its narrower last whorl (RD 0.45) and different pattern.

***Conus* species no. 30**

(Plate 73, Figures 11-13)

Material: 2 adult specimens in coll. Röckel, SMNS (36.5 x 19 mm) and coll. Korn (37 x 18.5 mm); juveniles (?) in coll. Baer.

Locality: Philippines (juveniles: Samar, Philippines).

Habitat: No information.

Notes: May be a local form of *C. pauperculus*, but differs in white ground colour, light brown apex, higher weight (RW 0.13), and conical last whorl.

***Conus* species no. 31**

(Plate 73, Figures 14-16)

Material: Several specimens in SAM (Pitcairn Is.) and in MNHN (New Caledonia) (L 23-33 mm).

Localities: New Caledonia and Pitcairn Is.

Habitat: Deep water.

Notes: Resembles *C. otohimeae* in colour pattern, but differs in a narrower last whorl (RD 0.52-0.57), higher spire

(RSH 0.09- 0.15), angulate to rounded shoulder, and dark violet base. Description in preparation.

***Conus* species no. 32**

(Plate 73, Figures 17, 18)

Material: 1 specimen in coll. Bondarev (50 x 23 mm), 2 specimens in coll. D. Dan (L 87; 75 mm).

Locality: Nasca Ridge, S.E. Pacific (25°30'S-85°40'W).

Habitat: Dredged in deep water.

Notes: Similar to *C. profubdorum*. Their relatedness to this species needs further research.

***Conus* species no. 33**

(Plate 73, Figures 19-21)

Material: About 10 specimens known (coll's. Peled, Monteiro, Nicolay, G. Raybaudi Massilia, Filmer, Röckel); from 37 mm (subadult) to 53 mm.

Localities: Dahlak Archipelago and Gulf of Aqaba.

Habitat: No information.

Notes: These shells were provisionally considered a local form of *C. jickelii* Weinkauff by Röckel & Moolenbeek (1992), but differ from the lectotype of *C. jickelii* from the same area in a narrower last whorl (RD 0.52-0.56 vs. 0.58) and in the presence of weak tubercles in the first postnuclear whorls. Two colour forms (dark brown and orange pattern) are known.

***Conus* species no. 34**

(Plate 73, Figures 29, 30)

Material: 17 specimens in coll. G. Raybaudi Massilia and Korn, 2 specimens in Natal Museum.

Localities: Somalia (17 specimens), N. Mozambique (2 specimens).

Habitat: No information.

Notes: Shells very small; similar in colour pattern to juvenile *C. articulatus* and juvenile *C. lischkeanus*, but differing in spire characters. Bicoloured and radially sculptured larval shell and small size suggest close relationship to *C. biraghii*, *C. boschorum* and *C. korni*. Description in preparation.

Plates 1-84

Plates 1-73	Shells	328
Plates 74-76	Colouration of Bodies	474
Plates 77-84	Living Animals	480