

New records of *Opalia*-like mollusks (Gastropoda: Epitoniidae) from the Indo-Pacific, with the description of fourteen new species

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ABSTRACT. Twenty-one Indo-Pacific species of the epitoniid supraspecific taxa *Gregorioiscula* and *Opalia* are recorded, with range extensions for *Gregorioiscula burchorum* (DuShane, 1988), *G. nierstraszi* (Schepman, 1909), *Opalia alba* (de Boury, 1911), *O. bicarinata* (Sowerby, 1844), *O. pupipunctata* (de Boury, 1911), and *O. sumatrensis* (Thiele, 1925). Fourteen new species are described. These include five species in the genus *Gregorioiscula*: *G. barazeri*, *G. crosnieri*, *G. fredericqae*, *G. levismaculosa*, *G. xanthotaenia*; and nine species in the genus *Opalia* (s.l.): *O. dushaneae*, *O. felderi*, *O. longissima*, *O. megalodon*, *O. neocaledonica*, *O. thorsenae*, *O. turnerae*, *O. velumnuptialis*, and *O. wareni*.

INTRODUCTION

This study is a continuation of an earlier publication on new records of Indo-Pacific Epitoniidae (García, 2003), in which extensions of known geographical ranges of a number of epitoniid species and the description of nineteen new species were reported. The material used in both of these reports was obtained as a result of expeditions by the Institut de Recherche pour le Développement (IRD, Nouméa) and the Muséum National d'Histoire Naturelle (MNHN, Paris).

Background information on the expeditions, with narratives of the cruises, station lists, maps, etc. can be found in Forest (1981, 1986, 1989: Crosnier *et al.* (1997), Richer de Forges (1990, 1991, 1993) and Richer de Forges & Chevillon (1996), Richer de Forges & Menou (1993), Richer de Forges *et al.* (1996, 1999), and Bouchet *et al.* (2001).

This article deals with epitoniid species belonging to the genera *Opalia* and *Gregorioiscula*, distinguished from other epitoniid genera by the presence of an intritacalx, a chalky layer that covers the shell, and which is usually elaborately sculptured in the two genera included in this study. This layer is rather soft and wears off easily; it may also have a different sculpture from the hard surface below.

DuShane has stated (1990: 8) that the limits of the subgenera of *Opalia* have not been clearly defined. In dealing with the supraspecific taxa for this group, I have encountered problems similar to those in the first study: "variations on a theme" that make diagnosis of subgenera difficult. Although there

seems to be some validity in separating *Opalia* s.s. from species that have been placed in other subgenera, I have been unable to differentiate consistently between them; therefore, I have opted for the use of the genus *Opalia*, in the broad sense, for taxa that may have otherwise been placed in subgenera other than *Opalia* s.s.

Although the genus *Gregorioiscula* Cossmann, 1912 was originally erected for a fossil taxon, de Boury (1913: 27), Cossmann (1912), and Bouchet & Warén (1986: 544) have placed in this genus Recent deep-water epitoniid species with non-crenulated sutures, a relatively wide, concave basal disk with a strongly defined basal cord, and strong axial ribs, some of which may form varices. Most species that have been assigned to *Gregorioiscula* have a multispiral, conical protoconch, usually spirally or axially punctate, that is darkly colored or has a dark suture. These protoconch characters are shared by the *Opalia* s.l. species that I have examined. I have followed earlier workers in treating *Gregorioiscula* as a distinct genus from *Opalia*; however, the differences are nebulous, as no one character is unique to *Gregorioiscula*.

There is a group of species in the genus *Gregorioiscula* that resemble *Compressicala japonica* Masahito & Habe, 1976. They are distinguished by having unusually flaring varices and, where known, paucispiral white protoconchs. The protoconch of the type species of *Compressicala* is not known, but *Compressicala transkeiana* Kilburn, 1986 has a paucispiral protoconch of two globose whorls; *Gregorioiscula barazeri* n. sp. has a

white protoconch of about 1.5 whorls; and, although *Gregorioiscula crosnieri* n. sp. has a damaged protoconch, its remaining whorl is white and strongly convex.

Bouchet (1990) has argued that, at least in the Turridae, protoconch alone does not necessarily indicate monophyly, and that mode of larval development should not be used as a generic character. Although, arguably, there are strong differences between the multispiral, colored protoconchs and rounded varices of *Opalia* and *Gregorioiscula*, and the paucispiral, white protoconchs and flaring varices of the group just discussed, I am following Bouchet & Warén (1986: 544) in considering *Compressiscula* synonymous with *Gregorioiscula*, as there is not sufficient material at this time to make a definitive determination.

All of the material cited in this report, unless otherwise stated, is housed at the Muséum national d'Histoire naturelle, Paris.

Abbreviations of repository institutions

ANSP: The Academy of Natural Sciences, Philadelphia, U.S.A.

MNHN: Muséum national d'Histoire naturelle, Paris, France.

Other abbreviations

lv: collected alive

dd: dead taken

SYSTEMATICS

Superfamily EPITONIOIDEA

Family EPITONIIDAE S. S. Berry, 1910

Genus *Gregorioiscula* Cossmann, 1912

Type species: (by monotypy) *Scalaria romettensis* de Gregorio, 1890 (Miocene of Italy)

Gregorioiscula barazeri n. sp.

Figs 3-5

Type material. Holotype MNHN length 13.9 mm, width 3.5 mm; 6 paratypes MNHN, 1 paratype ANSP 410942.

Type locality. Southern New Caledonia, 23°18'S, 168°06' E, 400-402 m [SMIB 8, sta. DW189].

Material examined. Fiji. BORDAU 1: sta. DW1488, 19°01'S, 178°25'W, 500-516 m, 4 dd. MUSORSTOM 10: sta. DW1347, 17°30.7'S, 178°39.9'E, 344-349 m, 1 dd. Indonesia. Kai Islands. KARUBAR: sta. DW28, 05°31'S, 132°54'E, 448-467 m, 2 dd

New Caledonia. SMIB 8: sta. DW189, 23°18'S, 168°06' E, 400-402 m, 2 lv (holotype, 1 paratype MNHN). – Sta. DW200, 24°00'S, 168°21'E, 514-525 m, 1 dd.

VAUBAN : sta. 2, 22°17'S, 167°14'E, 425-430 m, 6 dd. (3 paratypes MNHN, 1 paratype ANSP). - Sta. 3, 22°17'S, 167°12 E, 390 m, 2 dd (2 paratypes MNHN).

Tonga. Southern Nomuka Group. BORDAU 2: sta. DW1553, 20°42'S, 174°54'W, 650-676 m, 1 dd.

Wallis Island. MUSORSTOM 7: sta. DW604, 13°21'S, 176°08'W, 415-420 m, 1 dd.

Distribution. New Caledonia, 400-402 m (live); Fiji, Indonesia, Tonga, and Wallis Island, 344- 676 m (shell only).

Description. Holotype 13.9 mm in length, solid, lanceolate (width/length ratio 0.25). Protoconch smooth, white, globose, translucent, of about 2 whorls (Fig. 5). Teleoconch of 13 slightly convex whorls. Axial sculpture of sinuous, round ribs; ribs almost as wide as interspaces, extending from suture to suture, becoming narrower and weaker adapically, slightly constricting before reaching abapical suture, creating a small node and shallow dimple between ribs; 12 or 13 ribs per whorl; first varicoid rib on sixth whorl; four thick, abapically reflected varices aligned from whorl to whorl on last three whorls. Intritacalx microsculpture of axial and spiral striae covering surface of shell, creating an axially-elongate reticulated pattern. Suture deep, adapically delineated by the slightly undulating basal ridge of earlier whorl; without crenulations. Base of shell with prominent basal ridge; ridge nodose at intersection with abrupt termination of axial ribs, ridge weakening ventrally. Basal disk concave, sculptured with axial wrinkles and earlier reticulated microsculpture. Aperture obliquely subcircular; peristome double; outer lip heavily thickened by labral varix; varix wide, radially and concentrically striated, truncated anteriorly; umbilical area of inner lip slightly thickened anteriorly, creating small lobe. Operculum yellow, with a central nucleus. Shell white.

Paratypes similar to holotype.

Remarks. All adult specimens studied have thick aligned varices on the last three whorls. The species has a tendency to form an auricle or lobe, to a greater or lesser degree, at the anterior end of the inner lip. Two of the specimens examined are slightly arcuate dorso-ventrally. *Gregorioiscula japonica* (Masahito & Habe, 1976), a Japanese species, also has the unusual characteristic of having thick, aligned varices on the last whorls; however, the latter has a proportionately wider shell (width/length 0.35); more angular teleoconch whorls; axial ribs, other than varices, that are continuous from whorl to

whorl; and a wider base. *Gregorioiscala transkeiana* (Kilburn, 1985), a South African species, is smaller, has fewer teleoconch whorls and does not have axially aligned varices.

Etymology. Named for Jean- François Barazer, captain of R/V *Alis* during many dredging expeditions in the South Pacific.

***Gregorioiscala burchorum* (DuShane, 1988)**

Figs 10- 11

Type locality. Hawaii, at 540 m.

Material examined. Fiji. MUSORSTOM 10: sta. DW1333, 16°50.4'S, 178°12.5'E, 200-215 m, 2 dd.

Marquesas Islands. MUSORSTOM 9: sta. DW1222, 9°44'S, 138°51'W, 340-352 m, 1 dd.

New Caledonia. BATHUS 1: sta. DE700, 20°57'S, 165°35'E, 160-222 m, 1 dd. Sta. DW654, 21°17'S, 165°57'E, 237-298 m, 1 dd (fig. 1).

SMIB 8: sta. DW146-147, 24°55'S, 168°22'E, 508-532 m, 1 dd.

Wallis Island. MUSORSTOM 7: sta. DW601, 13°19'S, 176°17'W, 350 m, 4 dd.

Distribution. Fiji, Hawaii, Marquesas Islands, New Caledonia, Wallis Island; in 160- 540 m (shell only).

Remarks. I have not studied the holotype of *Opalia burchorum*; however, the material studied, all empty shells, basically conforms to DuShane's description and figure of the holotype. Although their protoconchs are somewhat lighter in color than that of the holotype, they have the characteristic dark, glassy protoconch of four whorls (Fig. 11); and their axial and spiral sculpture also match that of *G. burchorum*. The shape of the teleoconch whorls of the specimens studied, as well as the strength of the basal cord, have slight degrees of variation from the holotype, but I have considered them to be of infraspecific value.

The new findings considerably extend the known geographical distribution of this taxon.

***Gregorioiscala crosnieri* n. sp.**

Figs 1-2

Type material . Holotype MNHN length 30.0 mm, width 7.0 mm.

Type locality. Vanuatu, 16°54'S, 168°20'E, 459- 488 m [MUSORSTOM 8, sta. DW1045].

Material examined. Known only from the holotype.

Distribution. Off Vanuatu, at 459- 488 m (shell only).

Description. Holotype 30 mm in length, light but solid, orthoconic (width/length ratio 0.23).

Protoconch missing. Teleoconch of 13 convex whorls. Axial sculpture of thick, well-defined ribs, 22 or 23 per whorl, extending from suture to suture, as wide as interspaces, some becoming varicoid; last four whorls with aligned varices. Spiral sculpture of narrow cords; cords crossing over axial ribs, about 33 on last whorl from suture to basal ridge; spirally pitted intritacalx filling spaces between spiral cords. Basal ridge well-delineated adapically, becoming part of basal disc abapically; ridge showing on teleoconch whorls as pre-sutural cord, creating a deep suture. Base wide, slightly concave, sculptured with same spiral pattern as whorls, and only a suggestion of early axial ribs. Aperture ovate-quadrangle. Lip thin, erect, re-enforced by pre-labral varix but not structured as a double peristome. Operculum unknown. Shell stained brown, presumably white.

Remarks. The structure of the aperture does not indicate the presence of the double peristome typical of many *Opalia*-like species, where the inner lip is relatively thick and "blends" with the labral varix. An apertural structure similar to that of the new species appears in *Gregorioiscala nevillei* Garcia, 2003, from Madagascar; however, the holotype of *G. nevillei* measures 46 mm in length, has only 9.5 whorls, and has fewer axial costae.

Etymology. Named for Dr. Alain Crosnier, one of the "founding fathers" of the MUSORSTOM expedition, editor of numerous expedition reports, and himself a specialist in decapod crustaceans.

***Gregorioiscala fredericqae* n. sp.**

Figs 15-16

Type material. Holotype MNHN length 4.8 mm, width 1.7 mm, 1 paratype MNHN.

Type locality. Reunion Island, 20°52'S, 55°38'E, 110 m [MD32 sta. DC126].

Material examined. Reunion Island. MD32: sta. DC56, 21°05'S, 55°12'E, 170-225 m, 1 dd. Sta. DC126, 20°52'S, 55°38'E, 110 m, 1 dd.

Distribution. Off Reunion Island, at 170-285 m (shell only).

Description. Holotype 4.8 mm in length, strong, acuminate (width/length ratio 0.35). Protoconch slightly eroded, with first whorl damaged; remaining three whorls yellowish, with darker suture. Teleoconch of 7.5 whorls; first whorls slightly convex, last two whorls angled at periphery. Axial sculpture of thick, rounded ribs; ribs extending from suture to suture, strongly peaked adapically; some peaks crossing over, but not appressed to, adapical suture; 10 such ribs on last whorl. Suture unusually

deep, giving the shell a turreted appearance. Spiral sculpture of relatively thick, pitted spiral cords; cords crossed over by narrow axial striae, creating small nodes on surface; about 27 such cords, from suture to basal ridge, on last whorl. Basal ridge strong, nodulose where meeting abrupt end of axial ribs. Basal disk concave, sculptured with only a suggestion of earlier axial ribs and same pattern of microsculpture as above basal ridge. Aperture circular. Peristome double; outer lip thickened by labral varix; varix truncate anteriorly. Operculum unknown. Shell white.

Paratype with same characters as holotype.

Remarks. The thick, adapically peaked axial ribs and unusually deep suture separate *Gregorioiscula fredericqae* from congeneric species.

Etymology. Named after Dr. Suzanne Fredericq, a colleague from the University of Louisiana at Lafayette, USA. Dr. Fredericq has made available to me the resources of her laboratory, without which this and earlier works could not have been accomplished.

***Gregorioiscula levismaculosa* n. sp.**

Figs 6-9

Type material. Holotype MNHN length 19.7 mm, width 4.8 mm.

Type locality. New Caledonia, 18°52'S, 163°24'E, 470- 502 m [BATHUS 4, sta. DW923].

Material examined. Known only from the holotype.

Distribution. Off New Caledonia, at 470- 502 m (collected alive).

Description. Holotype 19.7 mm in length, solid, lanceolate (width/ length ratio 0.24). Protoconch damaged, one remaining whorl thin, translucent, white, strongly convex, with pre-sutural carina (Fig. 8). Teleoconch of 13 convex whorls. Axial sculpture of angular ribs, extending from suture to suture; ribs narrower than interspaces, 16 on last whorl. Varices pronounced, randomly placed along teleoconch whorls: first varix on sixth whorl; two varices aligned on ninth and tenth whorls; last whorl with two varices. Spiral sculpture of well-defined, slightly undulating cords; cords crossing axial ribs, creating

small nodes at intersections, about 20 on last whorl from suture to basal ridge. Intritacalx eroded on top of axial ribs, sculptured with about three rows of minute spiral pitting between each spiral cord (Fig. 9). Basal ridge strong, slightly undulating, showing on earlier whorls as a pre-sutural cord, creating a deep suture. Basal disk slightly concave, sculptured with spiral pattern of teleoconch whorls and, adaperaturally only, with a suggestion of a few axial ribs. Aperture subcircular. Peristome double, outer lip thickened by slightly reflected labral varix. Operculum tan, with subcentral nucleus. Shell milky-white, with randomly placed, pale-tan blotches along periphery of teleoconch whorls.

Remarks. This new taxon is most similar to *Gregorioiscula barazeri* n. sp. (Figs. 3-5); however, the latter is a smaller species, has differently constructed and less numerous axial ribs, a more prominent basal ridge, and a more concave basal disk. *G. crosnieri* n. sp. is larger, has more numerous axial ribs, and different apertural and basal structures.

Etymology. Latin *levis* (adj., meaning insignificant); and *maculosus* (adj., meaning spotted); referring to the inconspicuous tan blotches of the species.

***Gregorioiscula nierstraszi* (Schepman, 1909)**

Figs 17-19

Type locality. Halmahera Sea, Indonesia, at 411 m.

Material examined. New Caledonia. SMIB 8: sta. DW190, 23°18'S, 168°05'E, 305-310 m, 2 dd.

Distribution. Indonesia and New Caledonia, 305-411 m (shell only).

Remarks. I have not examined the holotype of *Scala nierstraszi*; however, the specimens studied conform to the original description and type figure. The finding of this species in New Caledonia extends its distribution into the southwestern Pacific Ocean. The unusually wide, excavated shape of the base readily distinguishes this from similar *Gregorioiscula*. Although the protoconch of the holotype is missing, one of the two specimens collected shows a protoconch of 3.5 whorls, pale yellow with dark suture, and punctate, sinuous, axial scratches (Fig. 19).

Figures 1-9

1-2. *Gregorioiscula crosnieri* n. sp. Vanuatu, 16°54'S, 168°20'E, 459- 488 m [MUSORSTOM 8, sta. DW1045]. Holotype MNHN length 30.0 mm, width 7.0 mm. **3-5.** *Gregorioiscula barazeri* n. sp. Southern New Caledonia. 23°18'S, 168°06' E, 400-402 m [SMIB 8, sta. DW189]. Holotype(MNHN) length 13.9 mm, width 3.5 mm. **6-9.** *Gregorioiscula levismaculosa* n. sp. New Caledonia, 18°52'S, 163°24'E, 470- 502 m [BATHUS 4, sta. DW923]. Holotype MNHN length 19.7 mm, width 4.8 mm.



***Gregorioiscala xanthotaenia* n. sp.**

Figs 12- 14

Type material. Holotype MNHN length 4.8 mm, width 1.6 mm; 10 paratypes MNHN, 1 paratype ANSP 410944.

Type locality. Fiji, south of Viti Levu, 18°18.6'S, 178°05.1'E, 234- 361 m [MUSORSTOM 10, sta. CP1390].

Material examined. Fiji. MUSORSTOM 10: sta. CP1390, 18°18.6'S, 178°05.1'E, 234- 361 m, 31 lv., 21 dd. (holotype; 11 paratypes)
Reunion Island. MD32: sta. DC10, 21°13'S, 55°52'E, 930-980 m, 1 dd.

Distribution. South of Viti Levu, Fiji, at 234-361 m (collected alive); Reunion Island, 930- 980 m (shell only).

Description. Holotype 4.8 mm in length, strong, acuminate (width/length ratio 0.33). Protoconch with portion of first nepionic whorl slightly damaged; remaining three whorls yellowish, with darker suture. Teleoconch of 6.25 whorls; whorls strongly convex, shouldered; first teleoconch whorl smooth at beginning, followed by about 11 axial ribs; 12 or 13 strong, angular ribs on remaining whorls, extending from suture to suture, slightly narrower than interspaces. Varices absent except for labral varix. Spiral sculpture of well-defined cords, less so as they cross axial ribs. Spirally pitted intritacalx follows spiral cords. Suture deep, only slightly undulated by crest of axial ribs. Last whorl with strong basal ridge; ridge somewhat nodulose when meeting termination of axial ribs. Base slightly concave, sculptured with only a suggestion of earlier axial ribs and spiral cords. Aperture obliquely ovate. Peristome double, outer lip thickened by labral varix. Operculum thin, translucent, pale amber. Shell white, developing two yellow bands after third whorl; bands located pre- and sub-suturally; inner side of aperture showing coloration of outer band; basal disk white.

One paratype has a complete protoconch of 3.25

whorls (Fig. 14). Some specimens develop the labral varix after 4.5 whorls.

Remarks. The 52 specimens in the lot are consistent in most characters with the description of the holotype; however, about one third of the specimens, averaging about 3.1 mm in length, have a teleoconch of only 4.5 whorls and a labral varix. Only two of the specimens with a teleoconch of 6.25 whorls have a varix on the fourth whorl. Some of the smaller specimens, as well as a few of the larger ones, are devoid of the yellow bands.

The protoconch of the species is very fragile. Although 31 specimens were collected alive. Only one had an intact protoconch (Fig. 14). Also, the intritacalx seems to be deciduous, as only small areas of this layer remained preserved.

The small size and strongly convex whorls separate this species from most *Gregorioiscala* species. It is most similar to *G. burchorum* DuShane, 1988, from which it differs by having a lighter, less peg-like, more conical protoconch of only 3.25 whorls (*versus* 4 for *G. burchorum*), less crenulated sutures, and two yellow bands in most specimens.

Etymology. Greek *xanthos* (adj., meaning yellow), and Latin *taenia* (noun, meaning band); referring to the unusual yellow bands of most specimens.

Genus *Opalia* H. & A. Adams, 1853

Type species: *Scalaria australis* Lamarck, 1822 (SD de Boury, 1886)

***Opalia alba* (de Boury, 1911)**

Figs. 20-21

Type locality. Djibouti, Gulf of Aden.

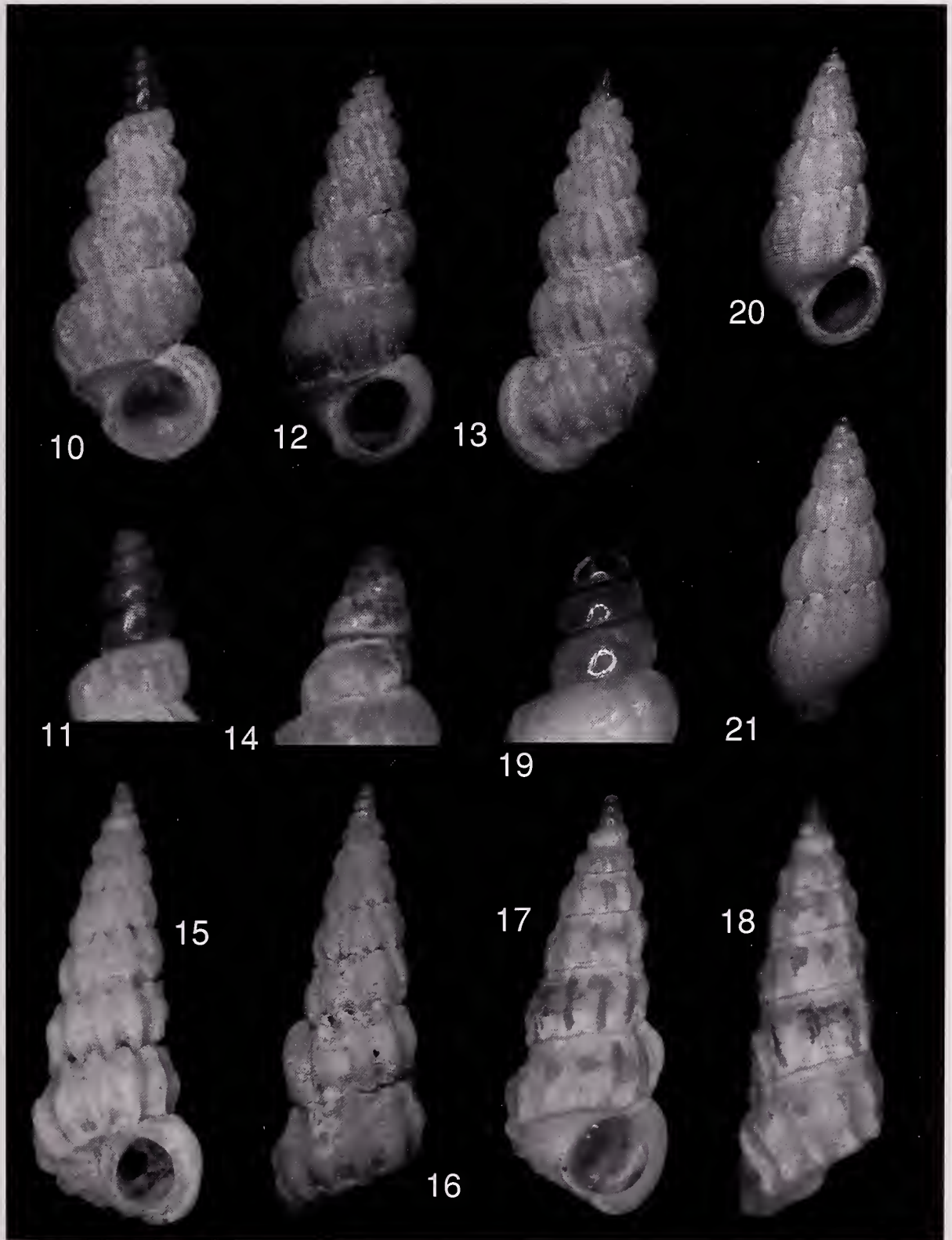
Material examined. Reunion Island. MD32: sta. DC56, 21°05'S, 55°12'E, 170-225 m, 1 dd.

Distribution. Red Sea, to Madagascar and Reunion Island; 170- 225 m (shell only). De Boury also reports a questionable eroded specimen from New Caledonia.

Figures 10-21

10-11. *Gregorioiscala burchorum* (DuShane, 1988) Eastern New Caledonia. 21°17'S, 165°57'E, 237-298 m [BATHUS 1, sta. DW654]. **12-14.** *Gregorioiscala xanthotaenia* n. sp. Fiji, south of Viti Levu, 18°18.6'S, 178°05.1'E, 234- 361 m [MUSORSTOM 10, sta. CP1390]. Holotype MNHN length 4.8 mm, width 1.6 mm.

15-16. *Gregorioiscala fredericqae* n. sp. Reunion Island. 20°52'S, 55°38'E, 110 m [MD12, sta. DC126]. Holotype (MNHN) length 4.8 mm, width 1.7 mm. **17-19.** *Gregorioiscala nierstraszi* (Schepman, 1909). New Caledonia. , 23°18'S, 168°05'E, 305-310 m [SMIB 8, sta. DW190]. **20-21.** *Opalia alba* (de Boury, 1911). Djibouti, Red Sea. 21°05'S, 55°12'E, 170-225 m [MD32, sta. DC56], length 5.1 mm.



Remarks. Kilburn (1985: 273) and Weil *et al.* (1999: 78) suggest that this species may be synonymous with *O. mammosa* (Melville & Standen, 1903). The authors of *O. mammosa* considered this species to be common (1903: 350); therefore, the 3 mm length of the holotype and its four, strongly convex teleoconch whorls, should be considered characters of an average adult specimen. Moreover, *O. mammosa* has rounded axial ribs, some varicoid. Mrs. Virginie Héros, of MNHN, informs me that the holotype of *O. alba* (MNHN) measures 4.2 mm in length, has non-varicoid axial ribs, and 5.45 whorls. The picture of the holotype (Weil *et al.*, 1999: 79) also shows less rounded whorls and sharper axial ribs than *O. mammosa*. The Reunion Island MNHN specimen of *O. alba* in my possession measures 5.1 mm in length and has 5 teleoconch whorls; otherwise matching the holotype characters. Unfortunately, both specimens have a damaged protoconch. The larger size, more numerous and less rounded whorls, sharper axial ribs, and lack of varices differentiate *O. alba* from *O. mammosa*.

***Opalia bicarinata* (Sowerby, 1844)**

Figs. 22-26

Type locality. Dumaguete, Isl. Negros [sic.], Philippines, at 14 m.

Material examined. Fiji. SUVA 2: sta. DW44, 17°51.7'S, 177°13.0'E, 33 m, 1 dd. – Sta. DW62, 17°47.9'S, 177°12.9'E, 32 m, 1 dd.

Loyalty Islands. Atelier LIFOU: sta. 1415, 20°47.1'S, 167°09.1'E, 3-7 m, 2 dd. – Sta. 1421, 20°52.4'S, 167°08.5'E, 4 m, 2 dd. – Sta. 1430, 20°47.5'S, 167°07.1'E, 20-25 m., 1 dd. – Sta. 1434, 20°52.5'S, 167°08.1'E, 5-20 m, 1 dd. (Figs. 24-25)

Marquesas Islands. Sta. 24bis, 8°53.6'S, 139°37'W, 20-34 m, 1 dd (Fig. 22).

New Caledonia. Expédition MONTROUZIER: sta. 1259, 20°44.6'S, 165°13.7'E, 15-35 m, 1 dd. – Sta. 1271, 20°52.7'S, 165°19.5'E, 5-25m, 1 lv. (Fig. 23). – Sta. 1275, 20°49'S, 165°17'E. 50-52 m, 1 dd.

Figures 22-36

22-26. *Opalia bicarinata* (Sowerby, 1844). **22.** Marquesas Islands, Ua Huka. 8°53.6'S, 139°37'W, 20-34 m [Sta. 24bis], length 9.0 mm. **23.** New Caledonia, sector de Touho. 20°52.7'S, 165°19.5'E, 5-25m [Expédition MONTROUZIER, sta. 1271], length 6.9 mm. **24-25.** Lifou, Loyalty Islands. 20°52.5'S, 167°08.1'E, 5-20 m [Atelier Lifou, sta. 1434], length 10.3 mm. **26.** Dorsal view of Sowerby's type figure (Fig. no. 114)

27-28. *Opalia crassilabrum* (Sowerby, 1844). **27.** Ventral view of Sowerby's Type figure (Fig. No. 115).

28. New Caledonia. 19°8'S, 163°23'E, 155 m [MUSORSTOM 4, sta. DW149], length 6.7 mm. **29-30.** *Opalia dushaneae* n. sp. Vanuatu. 15°05'S, 167°11'E, 281- 288 m [MUSORSTOM 8, sta. DW1097]. Holotype (MNHN) length 15.2 mm, width 5.3 mm. **31-32.** *Opalia longissima* n. sp. Loyalty Islands, Lifou, Baie du Santal. 20°46.8'E, 167°02.75'E, 5-10 m [Atelier LIFOU, sta. 1457]. Holotype (MNHN) length 3.8 mm, width 1.1 mm.

33-34. *Opalia felderi* n. sp. New Caledonia, Secteur de Touho, Lagon du Grand Récif Mengalia. 20°44.5'S, 165°15.9'E, 8 m [Expédition MONTROUZIER, sta. 1264]. Holotype (MNHN) length 5.8 mm, width 1.7 mm.

35-36. *Opalia megalodon* n. sp. New Caledonia. 22°47'S, 167°22'E, 390 m [MUSORSTOM 4, sta. DW226]. Holotype (MNHN) length 13.3 mm, width 5.0 mm.

VAUBAN: sta. 10, 22°17'S, 167°05'E, 80 m, 1 dd.

Distribution. Hawaii to eastern Transkei, South Africa, at 3- 80 m (shell only).

Remarks. There has been some confusion between *Scaloria bicarinata* Sowerby, 1844, *Cirsotrema attenuatum* Pease, 1860, and *Scaloria crassilabrum* Sowerby, 1844. Sowerby's type figures (plate 35, Figs. 113 – 116), which appear side by side in the original publication, show a significant difference in width/length ratio between *S. crassilabrum* and *S. bicarinata*, as well as in labral thickness (see Figs. 26 and 27). Kilburn's suggestion that *S. bicarinata* may have been based on a worn specimen of *S. crassilabrum* (1985: 269) does not seem justified. Although the holotype of *S. bicarinata* has been lost, Sowerby's type figure clearly shows the characteristically elongated shape of this taxon (Fig. 26). As Cernohorsky has pointed out (1978: 168), *Opalia bicarinata* is a very variable species, showing intergrades from an almost smooth to a heavily bicarinated last whorl, (see Figs. 22-25). I follow Cernohorsky (1978) and DuShane (1990: 7) in considering *Opalia attenuata* (Pease, 1860) a junior synonym of *O. bicarinata*.

***Opalia crassilabrum* (Sowerby, 1844)**

Figs. 27-28

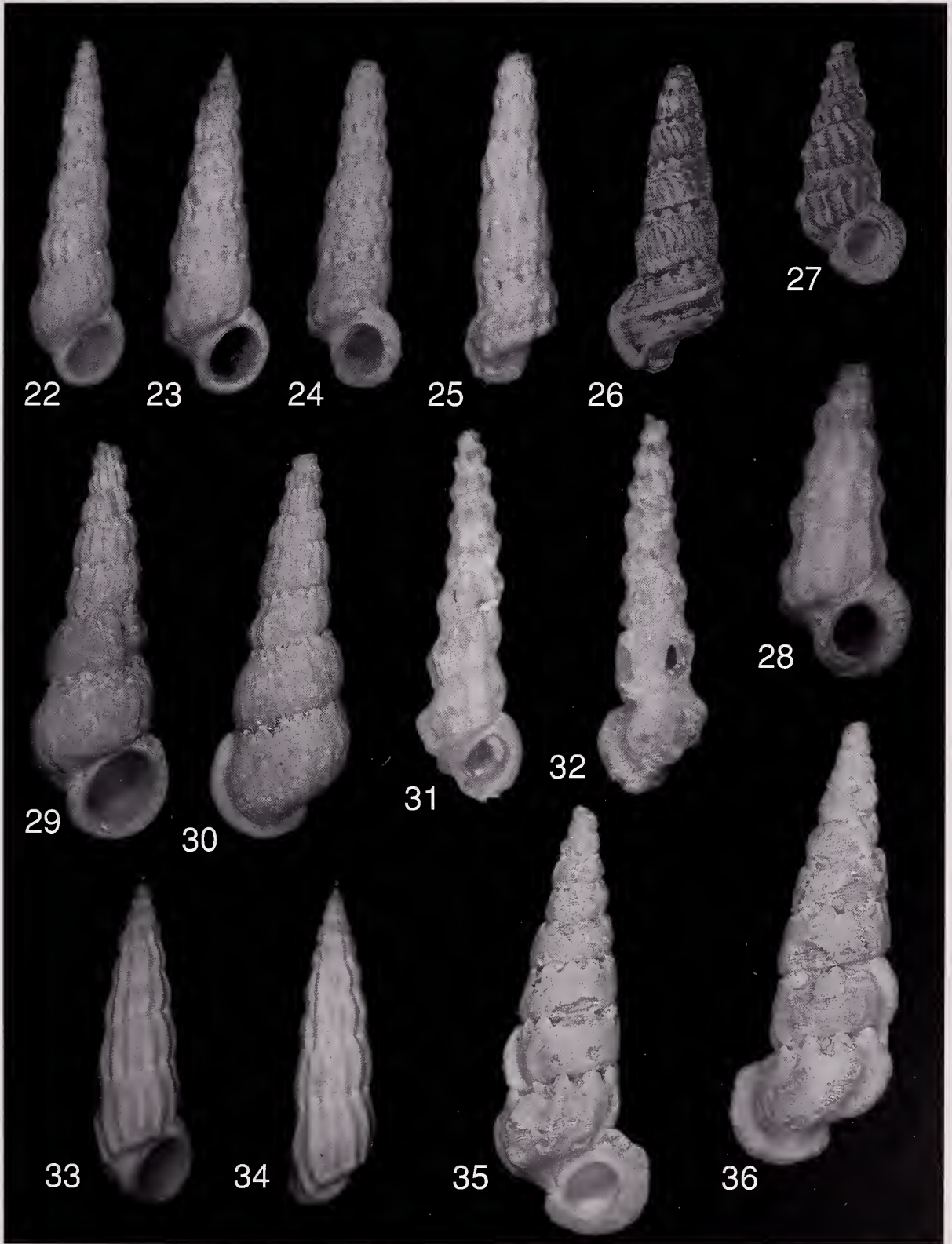
Type locality. Philippine Islands (Kilburn, 1985: 269).

Material examined. Coral Sea. CHALCAL 1984: sta. D7, 20°50.86'S, 161°36.99'E, 62 m, 1 dd.

New Caledonia. Expédition MONTROUZIER: sta. 1250, 20°46.7'S, 165°13.7'E, 3-6 m, 1 dd.

MUSORSTOM 4: sta. DW149, 19°08'S, 163°23'E, 155 m, 1 dd (Fig. 28).

Distribution. Philippines to Fiji, New Caledonia, the Red Sea and Natal, South Africa.



Remarks. The holotype of *Scalaria crassilabrum* has been lost (Kilburn, 185: 268). However, Sowerby's description and type figures (see Fig. 27) can be well-matched with actual specimens (Fig. 28). I have followed Kilburn (1985: 269) in his assessment of this taxon. Although the few specimens at my disposal show some variability, Sowerby attested to this trait in his original description. In spite of the differences in depth between the three available lots, I cannot detect any differences between the specimens.

***Opalia dushaneae* n. sp.**

Figs. 29-30

Type material. Holotype MNHN length 15.2 mm, width 5.3 mm.

Type locality. Vanuatu, 15°05'S, 167°11'E, 281- 288 m [MUSORSTOM 8, sta. DW1097]

Material examined. Known only from the holotype.

Distribution. Vanuatu, 281- 288 m (shell only).

Description. Holotype 15.2 mm in length, acuminate (width/ length ratio 0.35). Protoconch missing. Teleoconch of 7.75 convex whorls. Axial sculpture of about 16 low, rounded ribs per whorl, ribs diminishing in strength on later whorls, showing as inconspicuous nodes on last whorl; non-aligned varices on third and sixth whorls. Suture deep, crenulated, crenules formed by termination of axial ribs, separated by deep pitting. Spiral sculpture of crowded, evenly pitted spiral striae, creating a finely textured surface on shell. Base rounded, slightly concave at umbilical area; false umbilicus formed by erect wall of inner peristome on parietal area. Aperture ovate; peristome double; labral varix moderately thick, rounded. Operculum unknown. Shell off-white.

Remarks. The general proportions of the shell, its relatively large size, and heavily crenulated suture separate this species from other Indo-Pacific *Opalia* species. Only *Opalia megalodon* n. sp. has somewhat similar characters; however, the latter has flat-sided whorls, a much thicker intritalax, heavier sutural crenulations with deeper pitting, fewer axial ribs, and a wider labral varix. The eastern Pacific *Opalia spongiosa* Carpenter, 1866, and *O. infrequens* (C. B. Adams, 1852) also resemble *Opalia dushaneae*. *Opalia spongiosa* has a brownish shell, more prominent axial ribs, coarser spiral sculpture, and a more obvious basal disk. *Opalia infrequens* also has a brownish coloration, a narrower shell (width/ length ratio 0.31), weaker apical varices, and a heavier labral varix.

Etymology. Named after the late Mrs. Helen DuShane, one of the foremost American workers in the Epitoniidae.

***Opalia felderi* n. sp.**

Figs. 33-34

Type material. - Holotype MNHN length 5.8 mm, width 1.7 mm; 5 paratypes MNHN; 1 paratype ANSP 410943.

Type locality. New Caledonia, Secteur de Touho, Lagon du Grand Récif Mengalia, 20°44.5'S, 165°15.9'E, 8 m [Expédition MONTROUZIER, sta. 1264]

Material examined. New Caledonia. Expédition MONTROUZIER: sta. 1264, 20°44.5'S, 165°15.9'E, 8 m, 2 lv., 12 dd.

Distribution. New Caledonia, at 8 m (collected alive).

Description. Holotype 5.8 mm in length, lanceolate (width/ length ratio 0.29). Protoconch conical, of 3.25 whorls, translucent-white, with darker suture, sculptured with punctate spiral striae. Teleoconch of 7.75 whorls; first whorls convex, later whorls becoming decreasingly so, last two whorls almost flat-sided. Axial sculpture of sharp ribs; ribs as wide as interspaces on early whorls, becoming narrower than interspaces on later whorls; about 12 ribs per whorl, aligned from whorl to whorl. Suture deep, becoming increasingly crenulated after first three whorls; pitting between crenules becoming more pronounced. Spiral sculpture of heavily pitted spiral striae; pitting becoming obsolete on top of axial ribs. Base of shell defined by basal ridge; ridge conspicuously nodose at termination of axial ribs; base concave, sculptured with reticulated pattern where axial threads cross spiral striae. Aperture unevenly ovate; peristome double; labral varix thick.

Paratypes similar to holotype. Two specimens collected alive show a yellow operculum with a subcentral nucleus.

Remarks. This species was collected in a sandy-mud bottom, and seems to be very prolific in the proper habitat as 14 specimens were collected at the single station where it was found. *Opalia felderi* n. sp. is readily separated from other *Opalia* by its lanceolate shape, aligned axial ribs, and narrow, concave base.

Etymology. Named for Dr. Darryl L. Felder, Head of the Biology Department at the University of Louisiana at Lafayette. Dr. Felder has placed at my disposal all of the facilities of the Biology Department, without which present and past investigations could not have been accomplished.

***Opalia longissima* n. sp.**

Figs. 31-32

Type material. Holotype MNHN length 3.8 mm, width 1.1 mm; 1 paratype MNHN.

Type locality. Loyalty Islands, Lifou, Baie du Santal, in front of Ngoni, 20°46.8'S, 167°02.75'E, 5-10 m [Atelier LIFOU sta. 1457].

Material examined. Loyalty Islands. Atelier LIFOU: sta. 1457, 20°46.8'S, 167°02.75'E, 5-10 m, 1 dd (holotype).

New Caledonia. Expédition MONTROUZIER: sta. 1261, 20°46' - 20°47'S, 165°15' - 165°16'E, 45-56 m, 2 dd.

Distribution. New Caledonia and the Loyalty Islands, 5-56 m (shell only).

Description. Holotype 3.8 mm in length, narrowly acuminate (width/ length ratio 0.29). Protoconch damaged; fragment of protoconch spirally punctate, yellow. Teleoconch of 7.75 whorls; whorls shouldered, creating a sharp median angle. Axial sculpture of about 10 angular axial ribs on first whorls, diminishing in number and becoming increasingly nodulose on later whorls; six ribs on last whorl; non-aligned varicoid ribs on fourth, fifth and seventh whorl. Suture deep, without crenulations. Spiral sculpture of strong, pitted striae; pitting obvious on either side of axial ribs. Base concave, delineated by heavy nodes at termination of axial ribs. Aperture obliquely sub-circular; peristome double; labral varix wide, slightly reflected abaperturally. Operculum unknown. Shell white.

Paratype yellowish and slightly arcuate dorso-ventrally; otherwise similar to holotype.

Remarks. The narrowly acuminate shape, sharply angular whorls, and relatively large number of varices separate this species from other *Opalia*. Some forms of *O. bicarinata* (Sowerby, 1844) are somewhat similar; however, *O. longissima* is smaller, its labral varix is wider, and its suture is not crenulated.

Etymology. Latin *longus* (adjective, meaning long) and *-issimus* (a suffix meaning very), referring to the unusually elongated species.

***Opalia megalodon* n. sp.**

Figs. 35-36

Type material. Holotype MNHN length 13.3 mm; width 5.0 mm. 1 paratype MNHN.

Type locality. New Caledonia, 22°47'S, 167°22'E, 390 m [MUSORSTOM 4: sta. DW226]

Material examined. Coral Sea. MUSORSTOM 5: sta. 378, 19°54'S, 158°38'E, 355 m, 1 dd.
New Caledonia. MUSORSTOM 4: sta. DW226, 22°47'S, 167°22'E, 390 m, 1 dd (holotype).

Distribution. Coral Sea and New Caledonia, 355-390 m (shell only).

Description. Holotype 13.3 mm in length, acuminate (width/ length ratio 0.38). Protoconch missing. Teleoconch of about nine whorls; first eight whorls flat-sided, last convex, slightly concave at shoulder. Axial sculpture inconspicuous on first seven whorls, heavy varicoid rib appearing on about seventh whorl; eight sinuous, rounded ribs showing on last whorl, ribs becoming obsolete towards base. Suture deep, heavily crenulated, deeply pitted, giving impression of a turreted shell due to unusually thick layer of intritacalx. Spiral sculpture of strong, pitted striae. Base convex. Aperture obliquely ovate; peristome double; labral varix unusually expanded, about 1 mm in width, slightly reflected abaperturally. Operculum unknown. Shell off-white.

Remarks. This species differs from other *Opalia* species in the very unusual sutural structure, the heavy, sinuous axial ribs of the last whorl, and the unusually wide labral varix.

Etymology. Greek *megalo* (adjective, meaning large) and *odon* (noun, meaning tooth); referring to the large crenulations adorning the suture of this species.

***Opalia neocaledonica* n. sp.**

Figs. 37-39

Type material. Holotype MNHN length 11.5 mm, width 3.8 mm.

Type locality. Eastern New Caledonia, 21°17'S, 165°57'E, 237-298 m [BATHUS 1 sta. DW654].

Material examined. Known only from the holotype.

Distribution. Eastern New Caledonia, 237-298 m (shell only).

Description. Holotype 11.5 mm in length, acuminate (width/ length ratio 0.33). Protoconch missing. Teleoconch of about eight, slightly convex whorls. Axial sculpture of 14 strong, broad, somewhat flattened ribs; ribs wider than interspaces, extending from suture to suture; ribs on last whorl extending across base of shell; non-aligned varices forming on fourth, fifth, and sixth whorls. Suture deep, without crenulations. Spiral sculpture of densely-packed striae; striae conspicuously covering surface of axial rib; less eroded areas showing intritacalx with spiral pitting (Fig. 39). Base convex, becoming slightly concave at umbilical area. Aperture obliquely ovate;

peristome double; labral varix wide, slightly reflected abaperturally. Operculum unknown. Shell off-white.

Remarks. The South African *Opalia methoria* Kilburn, 1985 is similar, but has narrower and fewer axial ribs (7 to 11 versus 13 or 14), the ribs are weaker below the suture, the pitted microsculpture occurs only in the interspaces, and the basal area is more defined. *Opalia mammosa* (Melvill & Standen, 1903), from the Gulf of Oman and the Red Sea, is much smaller and has a crenulated suture.

Etymology. Named for the place of origin of the holotype.

***Opalia pupipunctata* (de Boury, 1911)**

Figs. 42-44

Material examined. New Caledonia. Expédition MONTROUZIER: sta. 1269, 20°35.1'S, 165°08.1'E, 15-20 m, 1 lv.

Distribution. The Red Sea and New Caledonia.

Remarks. The new record from New Caledonia greatly increases the known geographical range for this species. I have examined the holotype at MNHN and the live-collected specimen from New Caledonia matches it perfectly. The well-preserved specimen has a protoconch of four translucent whorls with a darker suture (Fig. 45), and is spirally punctate. The operculum is light yellow. It was collected at the exterior slope of Doiman Reef, Touho area, New Caledonia: length 4 mm, width 1.6 mm.

***Opalia sumatrensis* (Thiele, 1925)**

Figs. 40-41

Type locality. Padang, Sumatra.

Material examined. Fiji. BORDAU 1: stn. DW1435, 17°11'S, 178°45'W, 170-183 m, 1 dd. MUSORSTOM 10: sta. DW1334, 16° 51.4'S, 178°13.9'E, 251-257 m, 1 dd. Loyalty Ridge. MUSORSTOM 6: sta. DW442, 20°54'S, 167°17'E, 200 m, 1 dd. Marquesas Islands. MUSORSTOM 9: sta. DW1234, 9°42'S, 139°06'W, 408 m, 1 dd. New Caledonia. BATHUS 1: sta. DE700, 20°57'S, 165°35'E, 160-222 m, 4 lv, 13 dd (Figs. 40-41). Reunion Island. MD32: sta. DC128, 20°51'S, 55°36'E, 280-340 m, 1 dd.

FIGURES 37-46

37-39. *Opalia neocaledonica* n. sp. Eastern New Caledonia, 21°17'S, 165°57'E, 237-298 m [BATHUS 1, sta. DW654]. Holotype (MNHN) length 11.5 mm, width 3.8 mm. **40-41.** *Opalia sumatrensis* (Thiele, 1925). New Caledonia, 20°57'S, 165°35'E, 160-222 m [BATHUS 1, sta. DE700], length 3.9 mm. **42-44.** *Opalia pupipunctata* (de Boury, 1911). New Caledonia, 20°35.1'S, 165°08.1'E, 15-20 m [Expédition MONTROUZIER, sta. 1269]; length 4.0 mm. **45-46.** *Opalia thorsenae* n. sp. Northern New Caledonia, 18°57'S, 163°25'E, 325-330 m [BATHUS 4, sta. DW926]. Holotype (MNHN) length 12 mm, width 3.8 mm.

Distribution. Sumatra, Fiji, New Caledonia, and Reunion Island, at 160- 222 m (collected alive); 160-408 m (shell only).

Remarks. I have not examined the holotype of this species; however, the specimens examined match Thiele's well-drawn figure of *Scala sumatrensis*. The live-collected specimens show a light-yellow operculum with a central nucleus. The specimen figured (Fig. 40) has a spirally punctate protoconch of four whorls (Fig. 41); the protoconch is light yellow with darker suture. The specimens found in Reunion Island and the Marquesas Islands considerably expand the known geographical range of the species. The largest specimen measures 5.7 mm.

***Opalia thorsenae* n. sp.**

Figs. 45-46

Type material. Holotype MNHN length 12 mm, width 3.8 mm.

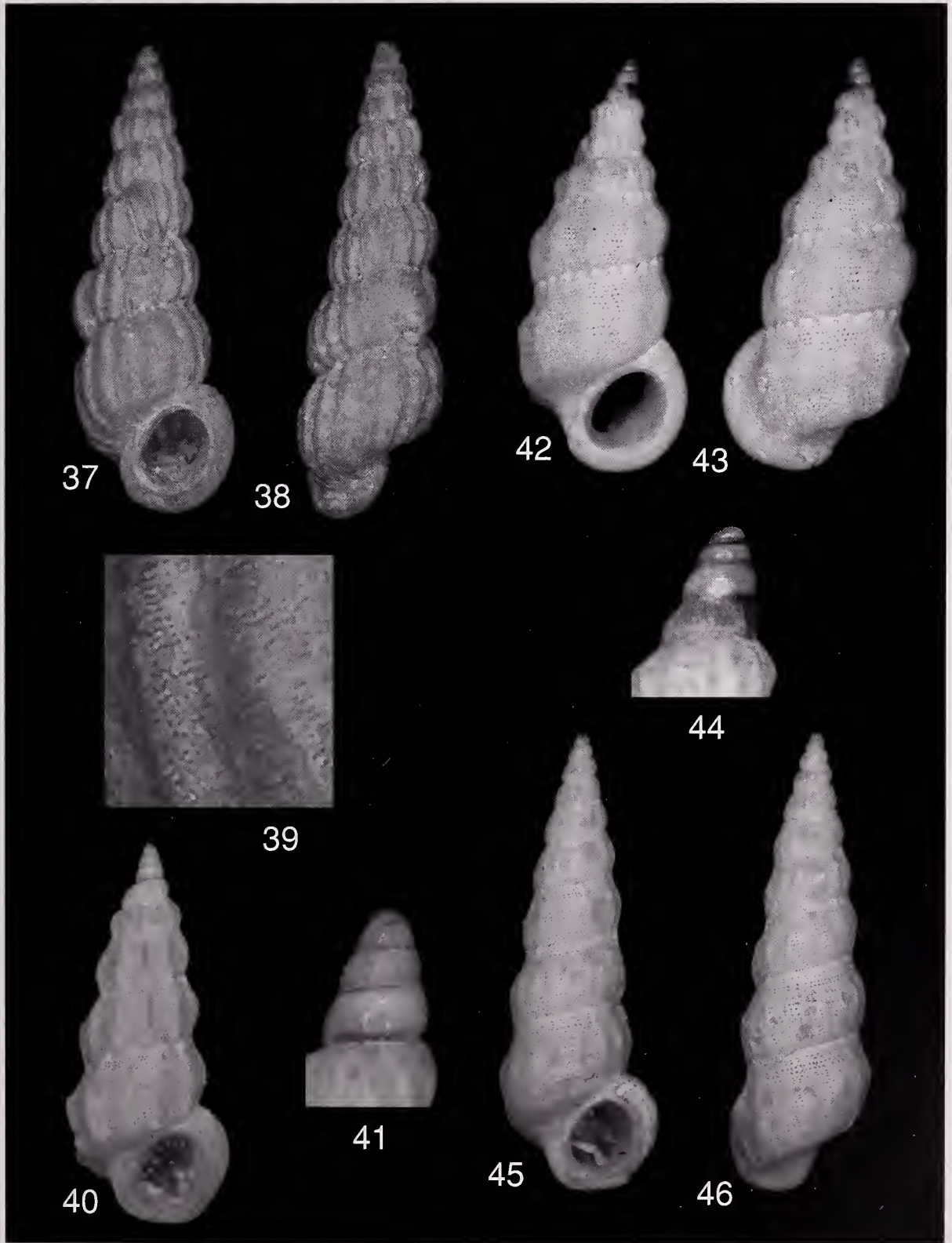
Type locality. Northern New Caledonia, 18°57'S, 163°25'E, 325-330 m [BATHUS 4, sta. DW926].

Material examined. Indonesia. KARUBAR: sta. DW15, 05°17'S, 132°41'E, 212- 221 m, 1 dd.- Sta. DW49, 08°00'S, 132°59'E, 206-210 m, 1 dd. New Caledonia. BATHUS 4: sta. DW926, 18°57'S, 163°25'E, 325-330 m, 1 dd (holotype).

Distribution. Indonesia and New Caledonia, 212-330 m (shell only).

Description. Holotype 12 mm in length, narrowly acuminate (width/ length ratio 0.32). Protoconch damaged. Teleoconch of about nine convex whorls, becoming concave posteriorly on last two whorls, creating median angle on whorls. Axial structure of 13 or 14 rounded ribs; ribs stretching from suture to suture on early whorls, decreasing in strength on later whorls, becoming almost obsolete on last whorl, showing mainly as nodes at periphery; one rib on about seventh whorl becoming varicoid. Suture deep, with obsolete, uneven crenulations. Spiral sculpture of unevenly pitted spiral striae, pitting becoming obsolete on top of axial ribs; about 40 striae on last whorl from suture to base of whorl. Base delineated by slight angle on last whorl, becoming concave at umbilical area. Aperture obliquely ovate; peristome double; labral varix thick. Shell white.

Paratype similar to holotype.



Remarks. The holotype, as well as the Indonesian specimen, show a varix on about the seventh whorl. *Opalia thorsenae* n. sp. is similar to *O. crassilabrum* (Sowerby, 1844); however, *O. crassilabrum* has more angular teleoconch whorls, more pronounced and less numerous axial ribs, more obvious crenulations at suture, a thicker labral varix, and a more concave base. Although a dead specimen of *O. crassilabrum* was collected at 155 m, it is normally collected at much shallower depths. *Opalia thorsenae* is found in 212-330 m.

Etymology. Named for Margaret "Thor" Thorsen, who unselfishly gave countless hours of her time to catalogue and computerize the library at The Bailey-Matthews Shell Museum in Sanibel Island, Florida, and after whom the library is named.

***Opalia turnerae* n. sp.**

Figs. 47-49

Type material. Holotype MNHN length 3.2 mm, width 1.1 mm; 3 paratypes MNHN.

Type locality. Baie du Santal, Lifou, Loyalty Islands, 20°47.3'S, 167°06.8'E, 10-21 m. [Atelier LIFOU, sta. 1451].

Material examined. Loyalty Islands. Atelier LIFOU: sta. 1451, 20°47.3'S, 167°06.8'E, 10-21 m, 1 dd (holotype). – Sta. 1456, 20°49.3'S, 167°10.4'E, 25-30 m, 1 dd (paratype).

New Caledonia. Expédition MONTRUZIER: sta. 1259, 20°44.6'S, 165°13.7'E, 15-35 m, 1 dd. - Sta. 1261, 20°46'-20°47'S, 165°15'-165°16.5'E, 45-56 m, 1 dd. - Sta. 1269, 20°35.1'S, 165°08.1'E, 15-20 m, 2 lv (paratypes).

Distribution. Loyalty Islands and New Caledonia, 15-20 m (collected alive); 21-56 m (shell only).

Description. Holotype 3.1 mm in length, acuminate (width/ length ratio 0.35). Protoconch conical, of four whorls, pale-yellow with darker suture, sculptured with punctate spiral striae (Fig. 49). Teleoconch of five whorls, first three convex, last two decreasingly so. Axial sculpture on first whorl about 16 low ribs; decreasing to 14 on second whorl, and 12 on later

whorls; ribs as wide as interspaces, some slightly varicoid. Spiral sculpture of conspicuous spiral striae with uneven pitting, pitting becoming obsolete as spiral striae cross axial ribs. Suture increasingly crenulated, crenulations slightly more numerous than ribs, irregular, forming shallow pitting. Basal ridge absent. Base angular, delineated by nodes formed by abrupt ending of axial ribs, concave at umbilical area. Aperture obliquely, unevenly ovate; peristome double; labrum modestly thickened. Shell milky-white.

Paratypes similar to holotype. Live-collected specimens show a yellow operculum with a sub-central nucleus.

Remarks. *Opalia turnerae* n. sp. is most similar to *Opalia crassilabrum* (Sowerby, 1844); however, its smaller size, the numerous axial ribs on early teleoconch whorls, the less angular teleoconch whorls, the uneven crenulations at the suture, and the thinner labrum differentiate it from the latter.

Etymology. Named for Dr. Ruth D. Turner for her many contributions to malacology, particularly to the Epitoniidae.

***Opalia velumnuptialis* n. sp.**

Figs. 50-51

Type material. Holotype MNHN length 13 mm, width 4.2 mm; 1 paratype MNHN.

Type locality. New Caledonia, 22°48'S, 167°26'E, 344-358 m [BATHUS 2, sta. DW724]

Material examined. Loyalty Ridge. MUSORSTOM 6: sta. DW410, 20°38'S, 167°07'E, 490 m, 1 dd.

New Caledonia. BATHUS 2: sta. DW724, 22°48'S, 167°26'E, 344-358 m, 1 dd (holotype, Fig. 50).

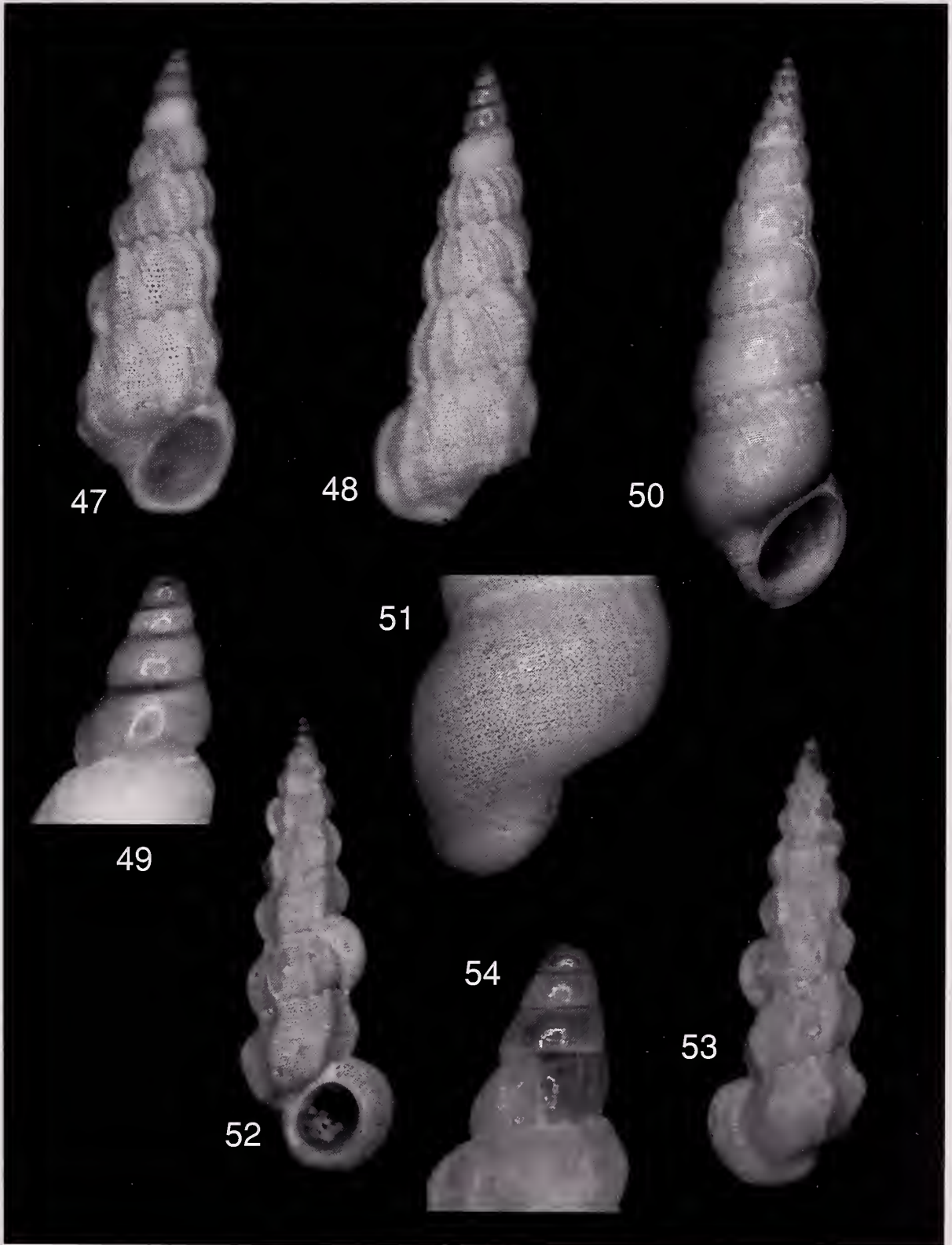
BATHUS 3: sta. DW818, 23°44'S, 168°16'E, 394-401 m, 1 lv (paratype, Fig. 51).

Tonga. BORDAU 2: sta. DW1549, 20°38'S, 175°00'W, 500 m, 1 dd.

Distribution. New Caledonia and Tonga; 394-401 m (collected alive); 344-500 m (shell only).

Figures 47-54

47-49. *Opalia turnerae* n. sp. Baie du Santal, Lifou, Loyalty Islands. 20°47.3'S, 167°06.8'E, 10-21 m [Atelier LIFOU, sta. 1451]. Holotype (MNHN) length 3.2 mm, width 1.1 mm. **50-51.** *Opalia velumnuptialis* n. sp. **50.** New Caledonia, 22°48'S, 167°26'E, 344-358 m [BATHUS 2, sta. DW724]. Holotype (MNHN) length 13 mm, width 4.2 mm. **51.** New Caledonia. 23°44'S, 168°16'E, 394-401 m [BATHUS 3, sta. DW818]. Paratype (MNHN), length 5.1 mm. **52-54.** *Opalia wareni* n. sp. Eastern coast of New Caledonia, 21°17'S, 165°57'E, 237-298 m [BATHUS 1, sta. DW654]. Holotype (MNHN) length 5.6 mm, width 1.7 mm.



Description. Holotype 13 mm in length, orthoconic (width/length ratio 0.32). Protoconch damaged. Teleoconch of 10 concave whorls. Axial sculpture of 10 to 12 ribs on first five whorls, ribs narrower than interspaces, becoming decreasingly obsolete on later whorls; seemingly eroded varices present on seventh and eighth teleoconch whorls. Suture moderately and unevenly crenulated, crenulations appressed to previous whorl, obsolete in portions of suture. Spiral sculpture of numerous, very fine, intricately designed, pitted spiral striae, about 80 on last whorl from suture to base. Base slightly concave. Aperture obliquely ovate; peristome double; labral varix moderately thick. Shell white; intritacalx heavy, rather shiny.

Paratype collected alive (BATHUS 3, sta. DW818, Fig. 51) shows dark yellow operculum with subcentral nucleus.

Remarks. Although the holotype has only an indication of eroded varices, the live-collected New Caledonia paratype (Fig. 51) does show a varix on fourth whorl. Since this specimen is only 5.1 mm in length and has only six whorls, it is presumed that the specimen is a sub-adult and that the labral varix will eventually become a second teleoconch varix. The Tonga specimen, which is almost identical to the holotype, shows only the labral varix.

Opalia velumnuptialis n. sp. differs from other Indian Ocean and western Pacific species of *Opalia* by the combination of evenly concave whorls, almost devoid of axial sculpture, convex base, and numerous, fine, intricately pitted axial striae (Fig. 51). The smoother form of the eastern Pacific *Opalia infrequens* (C. B. Adams, 1852) resembles this new species in general shape; however, it is brown in color, has 15 to 20, more defined, axial ribs, and its teleoconch whorls are less convex.

Etymology. Latin *velum* (noun, meaning veil) and *nuptialis* (adjective, pertaining to wedding); referring to the white, lacy appearance of the intritacalx of the species, like a wedding veil.

***Opalia wareni* n. sp.**

Figs. 52-54

Type material. Holotype MNHN length 5.6 mm, width 1.7 mm; 4 paratypes MNHN.

Type locality. Eastern coast of New Caledonia, 21°17'S, 165°57'E, 237-298 m [BATHUS 1, sta. DW654]

Material examined. New Caledonia. BATHUS 1: sta DE700, 20°57'S, 165°35'E, 160-222 m, 2 dd (paratypes). - Sta. DW654, 21°17'S, 165°57'E, 237-298 m, 1 lv (holotype), 3 dd (2 paratypes MNHN). BATHUS 2: sta. DW720, 22°52'S, 167°16'E, 530-541 m, 2 dd.

SMIB 8: sta. DW148, 24°56'S, 168°21'E, 510 m, 1 lv.- Sta DW166, 23°38'S, 167°43'E, 433-450m, 1 dd.

Distribution. New Caledonia, 237-510 m (collected alive); 160 m- 541 m (shell only).

Description. Holotype 5.6 mm in length, narrowly acuminate (width/ length ratio 0.30). Protoconch conical, multispiral, of 3.5 whorls, translucent white with darker suture, spirally punctate (Fig. 54). Teleoconch of 7.5 whorls; first whorls convex, later whorls peripherally angular. Axial sculpture of 8 or 9 rounded, sinuous ribs per whorl; ribs narrower than interspaces; a strong varix developing on about the sixth whorl. Spiral sculpture of even, deeply pitted striae; pitting becoming obsolete on top of axial ribs. Suture deep, conspicuously but unevenly crenulated. Base narrow, concave, defined by a sharp angle on last whorl near umbilical area; basal area without distinct axial sculpture. Aperture ovate; peristome double; labral varix wide, thick. Shell white, rather glossy.

Paratypes similar to holotype.

Remarks. The presence of a thick varix on about the sixth whorl seems to be diagnostic, as it appears in all paratypes. *Opalia wareni* n. sp. can be distinguished from similar species by the combination of its narrow shape, the relatively few, sinuous, well-defined axial ribs, and its narrow base.

Etymology. Named for Dr. Anders Warén (Naturhistoriska Riksmuseet, Stockholm), who designed the dredge that has been used for hundreds of hauls during the expeditions, and who took part in several of the expeditions.

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