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A REVISION OF AUSTRALIAN CANCELLARIIDAE
(GASTROPODA: MOLLUSCA)

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SUMMARY

A description is given and comparisons made, with both Recent and some Tertiary fossil species, of all known Recent species in the family Cancellariidae from Australian waters. Two species (1 new subsp., *Cancellaria (Merica) melanostoma westralis*) are included in *Cancellaria (Merica)*, 1 in *C. (Nevia)*, 8 (1 new, *Cancellaria (Sydaphera) panamuna*) in *C. (Sydaphera)*, 3 (1 new, *Fusiaphera dampierensis*) in *Fusiaphera*, 13 (3 new, *Trigonostoma diamantina*, *Trigonostoma iota* and *Trigonostoma tessella*) in *Trigonostoma*, 1 in *Admetula*, 3 (1 new, *Gergovia haswelli*) in *Gergovia*, 3 (1 new, *Inglisella nympa*) in *Inglisella*, 2 in *Pepta*, 1 in *Vercomaris* (new), 1 in *Bonellitia*, and 1 (new, *Zeadmete kulanda*) in *Zeadmete*.

INTRODUCTION

Order NEOGASTROPODA

The origin and evolution of the Neogastropoda has been well covered by Ponder (1973), who assigns to the superfamily Cancellariacea (Synonym Nematoglossa Olsson, 1970) the families Cancellariidae and Paladmetidae, an extinct group lacking columella folds.

Family CANCELLARIIDAE

The family Cancellariidae falls within the order Neogastropoda in most respects, the main anatomical difference being in the radula, which as Olsson (1970) states is unique, and differs fundamentally from those of other named taxa. The cancellariids have a single row of elongated blade-like teeth (Barnard, 1958: Graham, 1966) each an aggregate of "rectangular tubes which form a canal system which transverses the whole length of the radular filaments" (Olsson, 1970).

It is not known how the Cancellariidae feed, although Olsson suggests that they may feed on micro-organisms, these being transported down the minute tubes that make up each tooth.

All species possess columella plaits in common with several other families included in the order, except some classified by Cossmann (1899) in a subfamily Admetinae. Most of these are from deep to very deep water, lacking in colour, and devoid of plaits or showing only one or two vestigial remains.

Records of the Australian Museum, 1975, 30, 1-62, figures 1-5

As many species exist on submerged rocky or coral reefs, few are brought up alive by dredging, even at night. It has therefore proved difficult to find long series of first-class specimens for study in many cases, even in extensive Museum collections. This revision has been compiled for the purpose of placing on record, by descriptions and illustrations, all species so far known to live in Australian waters and is not a complete revision of the family; the collections of all State Museums have been studied.

Taxonomic references have been confined to the original authors, those containing references to illustrations, and also any references by Australian authors. Brief diagnostic features are described under each genus.

FOSSIL SPECIES

A list of southern Australian Tertiary fossils with a few brief particulars is included towards the end of this revision for reference purposes. Descriptions and illustrations have been omitted as they are the subject of study at the present time by Mr Thomas A. Darragh, Deputy Director of the National Museum of Victoria, for later publication.

ORDER OF PRINTING

The type for each genus is printed first if it occurs in Australian waters, otherwise all are in alphabetical order. An index to species is at rear of the revision. Genera are dealt with in the order shown below.

SUMMARY OF GENERA AND SUBGENERA

dealt with in this revision

Cancellaria (Merica) H. and A. Adams, 1854.

(*Nevia*) Jousseume, 1887.

(*Sydaphera*) Iredale, 1929.

Fusiaphera Habe, 1961.

Admetula Cossmann, 1889.

Trigonostoma Blainville, 1827.

Bonellitia Jousseume, 1887.

Gergovia Cossmann, 1899.

Inglisella Finlay, 1924.

Pepta Iredale, 1925.

Vercomaris Garrard, nov.

Zeadmete Finlay, 1927.

ABBREVIATIONS USED

- A.M. Australian Museum, Sydney, New South Wales.
 B.M.N.H. British Museum (Natural History) London, England.
 N.M.V. National Museum of Victoria, Melbourne, Victoria.
 Q.M. Queensland Museum, Brisbane, Queensland.
 Q.V.M. Queen Victoria Museum, Launceston, Tasmania.
 S.A.M. South Australian Museum, Adelaide, South Australia.
 T.M. Tasmanian Museum, Hobart, Tasmania.
 W.A.M. Western Australian Museum, Perth, Western Australia.

SYSTEMATIC SECTION

Genus *CANCELLARIA* Lamarck, 1799

Type species by original designation *Cancellaria reticulata* Linnaeus

Subgenus *Merica* H. and A. Adams, 1854: 277. Type species by subsequent designation (Cossmann, 1899: 13) *Cancellaria (Merica) melanostoma* Sowerby, 1848.

References: Adams, H. and A., 1854: 277; Chenu, J. C., 1859: 277; Jousseume, F., 1887: 29; Cossmann, M., 1899: 13; Tryon, G. W. 1885: 65; Schepman, M. M., 1911: 263; Kuroda, Habe and Oyama, 1971: 309.

Synonyms: *Contortia* Sacco, 1894. (Wenz, 1938-44: 1357). *Momoebora* Kuroda, Habe and Oyama, 1971. Type species *Cancellaria (Momoebora) sinensis* Reeve. (Deviated protoconch is only difference).

Diagnosis: Large, heavy and solid, ovate, whorls decussated, aperture widely oblong, inner-lip calloused, outer-lip acute, lirate internally, columella straight with 3 oblique plaits; differs from *Cancellaria* s.s. by cancellate in place of reticulate sculpture, and columella plaits are decidedly smaller than the gross plaits of *Cancellaria reticulata* Linnaeus.

Cancellaria (Merica) elegans, Sowerby, 1822

Figure 1 (1)

Cancellaria elegans Sowerby, 1822, pl. 218, fig. 3; Sowerby, 1849: 446, pl. 93, fig. 36, pl. 96, fig. 104; Reeve, 1856, pl. 3, fig. 12.

Cancellaria reeveana Crosse, 1861: 237 (new name for *C. elegans* Sowerby, non Deshayes, 1824. Invalid name change); Loebbecke, 1885: 12, pl. 2, figs 1, 2, 4-6.

Merica reeveana; Kira, 1962: 91, pl. 32, fig. 21.

Description: *Protoconch* $1\frac{1}{2}$ to 2 smooth, shining, slightly deviated whorls, merging gradually into main whorls, nucleus submerged. *Teleoconch* 5 convex whorls, roundly shouldered, slightly constricted at base. *Sutures* deeply impressed at base of shallow canal. *Sculpture* of fine, sharp, oblique ribs, up to 32 on body-whorl and 22 on penultimate, crossed by fine sharp transverse striae, 15 on body-whorl and 5 on penultimate; between these striae are from 4 to 7 fine threads, central the strongest, finely granulated by intersecting microscopic growth lines; between main striation on top of shoulder and suture are 5 to 8 microscopic striae. *Umbilicus* a fine narrow aperture behind inner-lip callus. *Aperture* widely elongate, contracted either end, a short narrow open siphonal canal; columella arched towards outer-lip anteriorly, one strong plait in centre, slightly oblique, posterior plait weaker and more oblique, a third fold at anterior end forms edge of canal; inner-lip strongly calloused on to body-whorl and over umbilical opening, granulose anteriorly; outer-lip thick but sharply edged, crenulate, depressed inwards posteriorly, flared outwards anteriorly, 10–12 strong lirae extend well into aperture. *Colour* off-white, with 3 broad light or dark brown bands on body-whorl, 2 on penultimate, leaving 2 narrow white bands between; aperture inside outer-lip, also base of inner-lip, frequently marked with similar brown.

Type locality. None given.

Dimensions. Holotype unknown. Average size, length 32 mm, breadth 18 mm. Largest specimen examined, length 35 mm, breadth 23 mm.

Location of type. B.M.N.H. Not located at present.

Distribution. From Sweers Island, Gulf of Carpentaria ($17^{\circ} 05' S.$, $139^{\circ} 37' E.$), round Cape York Peninsula, southwards along Queensland coast to Toogoom Beach, north of Hervey Bay, Queensland ($25^{\circ} 10' S.$, $152^{\circ} 35' E.$) Subtidal down to 49 metres.

Material. Sweers Island as above, 1 specimen, A.M. No. C. 75249. Toogoom Beach as above, 1 specimen, A.M. No. C. 89754. Greatest depth as above, 49 metres off Island Head, 91 km N. of Yeppoon, Q. ($22^{\circ} 38' S.$, $160^{\circ} 20' E.$), 4 specimens ex T. A. Garrard coll., A.M. No. C. 89756. A.M. 57 specimens (19 lots), N.M.V. 28 specimens (11 lots), others from Q.M., S.A.M. and W.A.M. Total 95 specimens (36 lots), all throughout the above range.

Discussion. Sherborn (1894: 370–1) shows the date of parts 1–9 of the *Genera of Recent and Fossil Shells* to have been issued in 1822, the part covering Cancellariidae being No. 5. (The Index in B.M.N.H. has pencilled 1821 for part 5, also a further note in front mentioning 1821, these notes being Sherborn's). Sykes (1906: 191) gives date of part 1 as 31/12/1821, parts 3–13 as various dates in 1822, part 5 being 30/4/1822. As both Sherborn and Sykes published the date 1822 this has been adopted.

The holotype at B.M.N.H., used for Sowerby's illustration, was "a specimen in Mrs Mawe's collection", but is unable to be located at present. Queensland specimens have been checked with an enlarged photograph of a specimen from an old lot in B.M.N.H., with "*Cancellaria elegans*" printed on the back of a board to which they are glued, but there is no evidence to show that these specimens were Sowerby's. Queensland specimens agree perfectly with this photograph, and in turn match Sowerby's original figure as closely as it is possible to determine.

Deshayes (1843: 402) referred *Cancellaria elegans* to his *Cancellaria asperella*, not stating whether he was aware that the name *C. elegans* was supposedly pre-occupied, but Reeve stated (1856: pl. 3, sp. 12) that "This fine species (*C. elegans*)

differs from *C. asperella*, to which M. Deshayes refers it, in being of a more fusiform growth . . . and not being excavately channeled at the suture." The name *C. elegans* was then replaced unnecessarily in 1861 by Crosse with his new name *Cancellaria reeveana*. In spite of this confusion, and whether or not the species known as *C. asperella* Deshayes later proves to be synonymous with *C. elegans*, this need not concern us so far as Australian species are concerned, the identity of the Queensland species as *C. elegans* having been established with very little doubt.

Apart from the coarser axial ribbing in this species compared with *Cancellaria (Merica) melanostoma westralis* nov., the allied species occurring in Western Australia, *C. (M.) elegans* also has 4–7 fine threads between the main transverse striae, whereas *C. (M.) melanostoma westralis* has only 3, central the strongest, in all specimens examined.

Cancellaria (Merica) melanostoma westralis subsp. nov.

Figure 1 (2) and (3)

Description: Protoconch $2\frac{1}{2}$ smooth, shining whorls, merging gradually into main whorls, nucleus submerged. Teleoconch 4 roundly convex whorls, first whorls roundly shouldered but vertical at base. Sutures deeply impressed at base of narrow canal. Sculpture of numerous fine oblique axial riblets, about 65 on body-whorl, 40–45 on penultimate, crossed by numerous transverse striae of equal strength, with fine threads between; whole sculpture has a granulated appearance and is over-riden by microscopic growth lines. Umbilicus a fine fissure behind inner-lip callus. Aperture widely elongate, contracted either end, short wide open siphonal canal; columella straight with 3 strong oblique plaits, inner-lip reflected as strong callus on to body-whorl; outer-lip regularly curved, flared outwards anteriorly, sharply edged and finely crenulated; about 16 lirations commence near edge of outer lip and extend well into aperture. Colour frequently pure white, but often with brown bands of irregular width and depth of colour, some very dark with no white remaining; aperture white or cream, anterior end of columella very dark in some of the darker specimens.

Type locality. Turtle Bay, North-West Cape, Western Australia (22° 20' S., 114° 09' E.).

Dimensions. Holotype, length 30.2 mm, breadth 19.8 mm—average size. Coll. L. Figgis, Feb., 1972. Largest specimen examined, 35 mm x 23 mm.

Location of type. Presented to W.A.M., Perth, W. Aust. Reg'd No. 697-44 Ex. A.M., Sydney.

Distribution. Type locality as above, and Bay of Rest, Exmouth Gulf, W. Aust. (22° 18' S., 114° 07' E.), to Yampi Sound, N.W. Aust. (16° 07' S., 123° 35' E.), eastwards to Darwin, Northern Territory (12° 25' S., 130° 50' E.). Appears to be subtidal only.

Material. Bay of Rest as above, 1 specimen, "Ningaloo" Exped., 27/8/68, W.A.M. No. 485-71. Yampi Sound as above, 1 specimen, W.A.M. No. 487-71. Darwin as above, 1 specimen, Q.M. unreg'd. A.M. 48 specimens (18 lots), N.M.V. 23 specimens (11 lots), S.A.M. 10 specimens (2 lots), W.A.M. 9 specimens (7 lots), Q.M. 1 specimen. Total 91 specimens (39 lots).

In addition 9 specimens are held by S.A.M. marked as below:

2 white specimens marked Hong-Kong, S.A.M. No. D. 15122.

3 with red-brown bands marked China, No. D. 7506.

4 with red-brown bands marked Philippines, No. D. 15121.

2 further specimens marked Hong-Kong, pres. C. Hedley, held by A.M., Reg'd No. C. 36767.

As 2 of these 4 lots were purchased from shell dealers as shown on the labels, the probability exists that the others were also, and marked with a published or known locality where the species occurs, it being common practice to do this where the actual source of a specimen is unknown. The strong resemblance to *C. (Merica) sinensis* Reeve would suggest to the dealers the localities marked, and as no definite evidence can be obtained in confirmation, this new subsp. possibly exists only in the distribution area as shown above.

Discussion. This species has been named as new only after comparison with a number of specimens, also with enlarged photographs of holotypes, of *C. (Merica) sinensis* Reeve, and *C. (M.) melanostoma* Sowerby (2 specimens are figured at pl. 4, figs 15, 16); the canaliculate whorls and distinctive finely cancellate sculpture set it apart from others without difficulty. The closest species in general appearance is *C. (Merica) sinensis* Reeve from Japan, which is without the canal at the suture and has an acutely deviated protoconch. Richard E. Petit states (pers. comm.) that he has examined many hundreds of specimens of *C. (M.) sinensis* from Japan and further south, and that without exception all had the deviated form of protoconch, also that the species occurs from southern Taiwan northwards. Comparison has been made with photographs of the holotype of *C. (M.) melanostoma* Sowerby, the type for the subgenus, also with photographs of Reeve's and Sowerby's figured specimens (pl. 4, figs 15, 16 as above), and they show this subspecies to be closely related, the main point of similarity being the almost identical sculpture. This new subspecies differs consistently however in the following respects:

1. Canal at top of shoulder is decidedly deeper.
2. The columella plaits are decidedly less prominent and less oblique.
3. The parietal shield does not extend entirely over the umbilical area, but leaves a small fissure exposed.
4. The outer-lip is more depressed inwards posteriorly and flared outwards anteriorly.
5. Colour patch on anterior end of parietal shield is consistently lighter in colour.

From information available *C. (M.) melanostoma* is confined to the Persian Gulf area.

Subgenus *NEVIA* Jousseume, 1887: 222. Type species by original designation *Cancellaria spirata* Lamarck, 1822

References: Nil.

Diagnosis: Shell medium, solid, ovate, deeply canaliculate, aperture widely oblong, tapering either end; outer-lip acute, lirate internally; columella straight

with 3 oblique plaits; axially ribbed in early whorls, ribs tending later to flatten or disappear. Deep canal at top of shoulder is main distinguishing feature.

Cancellaria (Nevia) spirata Lamarck, 1822

Figure 1, (4) and (5)

Cancellaria spirata Lamarck, 1822: 115.—Sowerby, 1832: 4, fig. 25.—Deshayes, 1839: 645.—Kiener, 1841: 38, pl. 4, fig. 3.—Deshayes, 1843: 408.—Sowerby, 1849: 449, pl. 93, fig. 22.—Reeve, 1855: 10, pl. 12, fig. 56.—Chenu, 1859: 276, fig. 1833.—Loebbecke, 1885: 25, pl. 6, figs 9, 10.—Cotton and Godfrey, 1932: 55, pl. 3, fig. 4.

Cancellaria (Trigonostoma) spirata Tryon, 1885: 77, pl. 4, fig. 71, pl. 5, fig. 72.

Cancellaria excavata Sowerby, 1848: 137.—Sowerby, 1849: 449, pl. 93, fig. 18.—Crosse, 1861: 234.—Loebbecke, 1885: 92, text figs.

Description. Protoconch 2 smooth, shining, deviated whorls, merging gradually into main whorls, nucleus well submerged. Teleoconch 4 flatly convex whorls, turreted, deeply canaliculate. Sutures well impressed. Sculpture of numerous deeply-incised transverse lines with finer lines between, body-whorl may have over 100 on good specimens; narrow, close-set rounded axial riblets on first 2 or 3 whorls in most specimens, becoming irregular folds later and tending to disappear on body-whorl; whole sculpture crossed by fine growth lines. Umbilicus a very fine fissure behind inner-lip callus. Aperture broadly ovate, contracted either end, a short narrow open siphonal canal; columella straight, 3 strong oblique plaits, anterior plait continues to end of canal; peritreme entire, inner-lip reflected and strongly calloused over umbilical fissure; outer-lip regularly curved, reflected outwards anteriorly, sharp-edged, 12 strong lirations extending well into aperture. Colour cream with band of dark brown square blotches below suture and one or two indefinite bands below; some specimens with vertical markings below sutures continued as axial flames down body-whorl; interior white with irregular traces of brown in some specimens.

Type locality. Garden Island, Swan River, Western Australia (32° 02' S., 115° 47' E.).

Dimensions. Holotype, length 19.125 mm. Grows to 35 mm length, 22 mm breadth. Average size 28 mm x 18 mm.

Location of type. Two syntypes Museum d'Histoire Naturelle, Geneva, Reg'd No. 1097/90.

Distribution. From Bunbury, Western Australia (33° 25' S., 116° 03' E.) southwards and along southern Australian coastline to Western Port Bay, Victoria (38° 20' S., 145° 40' E.), and including Tasmania, exact localities not marked. Intertidal and subtidal.

Material. Bunbury as above, 1 specimen, W.A.M. No. 364-40. Western Port Bay as above, 8 specimens, A.M. No. C. 74980.

A.M. 120 specimens (26 lots), N.M.V. 78 specimens (19 lots), W.A.M. 60 specimens (17 lots), S.A.M. 39 specimens (14 lots), Q.M. 10 specimens (1 lot). Total 307 specimens (77 lots).

Discussion. This species is variable in length-width ratio, strength of columella plaits, and presence or otherwise of axial ribs. It closely resembles *C. (Sydaphera)*

lactea Deshayes, but the canaliculate whorls of *C. (Nevia) spirata* distinguish it. Western Australian specimens generally grow to a larger size, are more prominently sculptured and with bolder markings. The species has a superficial resemblance to *Zemira australis* (Sowerby), family Olividae, with which it appears to be often confused by collectors, but the latter has no plaits, no canal at the shoulders, and a sharp tooth towards the anterior end of the outer lip.

Subgenus *Sydaphera* Iredale, 1929: 341. Type species by original designation
Sydaphera renovata Iredale (= *Sydaphera undulata* Sowerby, 1848).

References: Kuroda, Habe and Oyama, 1971: 310; Wenz, 1938-44: 1367.

Diagnosis: Large to very large, heavy and solid, spire medium or exerted, whorls shouldered, strongly axially ribbed and cancellate, aperture ovate, lirate internally, columella straight and 3-plaited; protoconch $1\frac{1}{2}$ tall prominent whorls, first half-whorl deviated. Compared with *Cancellaria reticulata* Linnaeus, the type for genus *Cancellaria* s.s., *Sydaphera* species consistently have three medium-sized plaits compared with two in *C. reticulata*, of which the posterior is very large and prominent with one or two smaller ridges; *C. reticulata* also has a regular two whorled protoconch with no sign of deviation as in *C. (Sydaphera)*. Tertiary fossil species are *Cancellaria wannonensis* Tate and *Cancellaria torquayensis* Chapman.

Note: The only feature which distinguishes the genus *Cancellaria (Nevia)* Jousseau from *C. (Sydaphera)* Iredale is the deep canal at the shoulder. However if the two were to be regarded as congeneric *C. (Nevia)* would take precedence. As no species now included in *C. (Sydaphera)* is canaliculate it is advisable to regard them as separate subgenera.

Cancellaria (Sydaphera) undulata Sowerby, 1848

Figure 1, (6) and (7), figure 5, (1), (2) and (3)

Cancellaria undulata Sowerby, 1848: 136; 1849: 443, pl. 92, fig. 12; pl. 95, fig. 79.—Reeve, 1856, pl. 3, fig. 9.—Angas, 1865: 171, no 93.—Loebbecke, 1885: 40, pl. 13, figs 1-3.—Tryon, 1885: 67, not fig'd.—Watson, 1886: 273.—Hedley, 1913: 304.—Cotton and Godfrey, 1932: 54, pl. 3, fig. 2.

Sydaphera undulata.—Macpherson and Gabriel, 1962: 226, fig. 269.

Sydaphera renovata Iredale, 1929: 341, pl. 38, fig. 3; Iredale, 1931: 231, pl. 23, fig. 7; Laseron, 1955: 267, figs 1, 2.

Sydaphera obnixa Iredale, 1936: 318, pl. 23, fig. 6; Laseron, 1955: 269, fig. 3.

Sydaphera deliciosa Laseron, 1955: 269, fig. 5.

Description: Protoconch 2 prominent whorls, first half-whorl deviated, smooth and shining, nucleus submerged. Teleoconch up to 6 whorls, flatly convex, roundly shouldered, almost vertical at base. Sutures slightly impressed. Sculpture commences with fine axial ribbing on early whorls, ribs becoming more prominent as growth advances, also tending to become irregularly spaced on many specimens and often mere undulations on body-whorl; initial transverse sculpture of finely incised lines through ribs and interstices, increasing in number, becoming broader and shallower, and more irregular in width of spacing; number of ribs on body-whorl and penultimate varies from 12 to 22, and number of depressed lines on body-whorl from 35 to 45, the interspaces frequently becoming raised into flatly rounded cords; whole sculpture is crossed by microscopic growth lines, giving impression of pitting

in the depressed lines. *Umbilicus* a very fine fissure behind inner-lip callus. *Aperture* elongate, recurved anteriorly below columella in form of a short open siphonal canal; columella straight, two strong slightly oblique plaits, with third anterior fold forming edge of canal; inner-lip recurved as strong glazed callus over umbilical fissure, coarsely granulose anteriorly; outer-lip regularly curved, sharply edged, flared outwards anteriorly; 14 to 18 lirations commence below edge of outer-lip and extend well into aperture. *Colour*—base colour cream, irregularly banded with fawn or light brown and white, the white being on some, but not all, of the flatly raised cords; a band of irregular dark-brown blotches on the shoulders; aperture irregularly coloured with fawn or brown blotches or bands.

Type locality. Port Jackson, New South Wales (Brazier, 1884: 226). (33° 57' S., 151° 09' E.).

Dimensions. Holotype, length and breadth not given. An average specimen measures approx. 43 mm length, 26 mm breadth; maximum approx. 60 mm length, 37 mm breadth.

Location of type. B.M.N.H. Reg'd No. 1968266.

Distribution. From Toogoom Beach, Hervey Bay, southern Queensland (25° 12' S., 152° 22' E.) southwards along Queensland coast, throughout New South Wales, Victoria, Tasmania, South Australia, southern coast of Western Australia and northwards to Dunsborough (33° 41' S., 115° E.), and N.E. of Rottneest Island (32° 03' S., 115° 32' E.), 31 metres, lowest depth recorded. Average depth approx. 5 metres.

Material. Toogoom Beach as above, 1 specimen, A.M. No. C. 89746, Dunsborough as above, 1 specimen, coll. B. R. Wilson, 12/1955, W.A.M. No. N/2050; Rottneest Island as above, 1 specimen, F.V. "Bluefin", 18/9/65, W.A.M. No. 499-71.

A.M. 415 specimens (97 lots), N.M.V. 286 specimens, (59 lots), S.A.M. 101 specimens (16 lots), Q.M. 53 specimens (9 lots), W.A.M. 21 specimens (5 lots), total 876 specimens (186 lots).

Discussion. This species is by far the most common in Australian waters and has the widest distribution. One specimen from the Hargreaves collection is held by A.M. (No. C. 38855) marked "New Caledonia", and a further specimen from a private collection, a typical *C. (Sydaphera) undulata*, is also marked as being from same locality. If these localities are correct it would appear almost certain to be the species named as *Cancellaria semperiana* Crosse, which would be synonymous with *C. (S.) undulata*. However definite proof from New Caledonia has proved impossible to obtain, although an enlarged colour photograph of the type of *C. semperiana* certainly appears to confirm this.

A comparison of the holotype of *Sydaphera deliciosa* Laseron, (A.M. No. C. 80102) type locality Woolgoolga, N.S.W., with many specimens from the surrounding area, shows it to be a weakly ribbed, immature and worn specimen of *C. (S.) undulata*, several intermediate specimens being observed. Similarly *C. (S.) renovata* Iredale (A.M. No. C. 57838) and *C. (S.) obnixa* Iredale (A.M. No. C. 60664) both fall well within the range of variation exhibited by series of specimens from many parts of the area of distribution of *C. (S.) undulata*.

Cancellaria (Sydaphera) anxifer Iredale, 1925

Figure 1, (9) and (10)

Cancellaria purpuriformis anxifer Iredale, 1925: 264, pl. 43, fig. 24.*Sydaphera anxifer*; Laseron, 1955: 269, fig. 6.

Description: Protoconch $1\frac{1}{2}$ smooth shining whorls, first half-whorl deviated, merging gradually into main whorls, nucleus submerged. Teleoconch $4\frac{1}{2}$ rounded convex whorls. Sutures deeply impressed. Sculpture of fine oblique axial ribs, 14 on both body-whorl and penultimate, crossed by flat-topped transverse cords of indefinite outline, 10–12 on body-whorl, 4–5 on penultimate, with numerous flat-topped minor cords and threads between; whole sculpture crossed by microscopic growth lines. Umbilicus absent. Aperture ovate, narrowing anteriorly to a short open siphonal canal; columella straight with 3 strong oblique plaits; inner-lip reflected as light callus over body-whorl; outer-lip regularly curved, thin and sharp-edged; about 12 lirations commence close to edge and extend well into aperture. Colour pale fawn with brown bands, lighter band above sutures continues round centre of body-whorl, dark brown spots on top of shoulders.

Type locality. Off Eden, New South Wales ($37^{\circ} 05' S.$, $150^{\circ} 07' E.$), 45–54 metres.

Dimensions. Holotype, length 23 mm, breadth 12 mm. Normal size. Largest specimen examined 28 mm length, 15 mm breadth.

Location of type. A.M., Sydney, Reg'd No. C. 53773.

Distribution. 5 km E. of Forster, N.S.W. ($32^{\circ} 15' S.$, $152^{\circ} 30' E.$), to E. of Twofold Bay, N.S.W. ($37^{\circ} 05' S.$, $149^{\circ} 45' E.$). Greatest depth, 146 metres off Sydney, N.S.W. ($34^{\circ} 03' S.$, $151^{\circ} 15' E.$). One authentic specimen from Stanley, N.W. Tasmania, very pale in colour, a little broader for length than N.S.W. specimens, otherwise identical. Coll. Sir Henry Somerset, T.M. Reg'd No. E. 6695. Shallow to medium depths.

Material. E. of Forster as above, 11 metres, 1 specimen ex. T. A. Garrard coll., A.M. No. C. 90180. Off Twofold Bay as above, 82 metres, 3 specimens, ex. T. A. Garrard coll., A.M. No. C. 90085. Greatest depth as above, 146 metres off Sydney, ex. T. A. Garrard coll., A.M. No. C. 90075.

A.M. 32 specimens (16 lots), N.M.V. 4 specimens (3 lots), W.A.M. 1 specimen, T.M. 1 specimen. Total 38 specimens (21 lots).

Discussion. This species was originally named by Iredale (1925: 264), as a subsp. of *Cancellaria (Sydaphera) purpuriformis* Valenciennes, from which it differs considerably by its cancellate sculpture of fine axial ribs overridden by transverse cords, compared with the numerous fine transverse grooves of *C. (S.) purpuriformis*. It is usually only obtainable by dredging.

Cancellaria (Sydaphera) australis Sowerby, 1832

Figure 2, (1) and (2)

Cancellaria australis Sowerby, 1832: 3, fig. 23; 1849: 442, pl. 95, figs 72, 73.—Brazier, 1877: 311.—Hedley, 1913: 304.—Reeve, 1856; pl. 10, fig. 24.—Tryon, 1885: 69, pl. 2, fig. 22.—Crosse, 1861: 236.—Loebbecke, 1885: 83, pl. 21, fig. 6.

Description: Protoconch $1\frac{1}{2}$ whorls, smooth and shining, first half-whorl deviated, merging gradually into main sculpture, nucleus submerged. Teleoconch

4 convex whorls, body-whorl 75 per cent of total length. *Sutures* deeply impressed. *Sculpture* of slightly oblique rounded axial ribs, about 25 on body-whorl and 22 on penultimate, crossed by strong transverse striae, about 14 on body-whorl and 6 on penultimate, forming elongate nodules at intersections; 2 or 3 fine threads between transverse striae, the whole crossed by microscopic growth lines. *Umbilicus* a fine fissure behind inner-lip callus, axial ribs continued into opening. *Aperture* oval, half-length of shell; outer-lip regularly curved, sharp-edged, flared outwards anteriorly, 12 strong lirations within; columella straight, 3 strong plaits, posterior slightly oblique, central and anterior strongly so, anterior forming edge of a short wide-open siphonal canal; inner-lip reflected as heavy glaze on to body-whorl. *Colour* shining white.

Type locality. New South Wales. No specimen is since on record from New South Wales, but as Queensland formed part of "New South Wales" when the species was recorded it is quite possible that the species was taken in Queensland waters. It is not on record from elsewhere as far as known.

Dimensions. Holotype, length 20.25 mm, breadth 12.66 mm. Largest of 3 paratypes, length 21.8 mm, breadth 13 mm.

Location of type. B.M.N.H. Reg'd No. 1968388.

Distribution. Type locality only.

Material. Four specimens as above at B.M.N.H. The specimen recorded by Brazier (1877: 311) from 54 metres off Darnley Island, Torres Strait, is held in the Macleay Museum, University of Sydney, unregistered. On examination this has proved to be the body-whorl only of *Fusiaphera dampierensis* nov. (this revision).

Discussion. Description of this species has been compiled from the original description coupled with examination of enlarged photographs of two of the four syntypes by courtesy of B.M.N.H. The only mention of this species during the present century appears to be that by Hedley (1913: 304), who provisionally identified a species from Port Curtis, Queensland. This was most likely the species, later named by Iredale as *Cancellaphera amasia* (1930: 80), the type locality being Port Curtis; this occurs quite frequently in a pure white form which bears a superficial resemblance to *C. (Sydaphera) australis*, and identification as that species is quite understandable. This species compares favourably with others in the genus in regard to protoconch, type of sculpture, and shape of whorls and aperture.

Cancellaria (Sydaphera) granosa Sowerby, 1832

Figure 1, (8)

Cancellaria granosa Sowerby, 1832: 2, fig. 17.—Kiener, 1841: 30, pl. 8, fig. 1.—Sowerby, 1849: 443, pl. 95, figs 58, 59.—Reeve, 1856, pl. 5, fig. 20.—Brazier, 1884: 226.—Loebbecke, 1885: 48, pl. 14, figs 5, 6.—Tryon, 1885: 68, pl. 2, fig. 16.—Cotton and Godfrey, 1932: 55.

Sydaphera granosa.—Macpherson and Gabriel, 1962: 225, fig. 266.

Description: *Protoconch* 1½ smooth, shining whorls, first half-whorl deviated, merging gradually into main whorls, nucleus submerged. *Teleoconch* 4 whorls, flatly convex, strongly shouldered. *Sutures* strongly impressed. *Sculpture* of strong rounded oblique axial ribs, 18–20 on body-whorl, 14 on penultimate, and strong spiral cords, 15 on body-whorl, 4 on penultimate; double cord at angle of shoulders, whole sculpture over-ridden by microscopic growth lines; sculpture

presents a grained or decussated appearance. *Umbilicus* a fine fissure behind inner-lip callus. *Aperture* ovate, tapering to short, broad open siphonal canal; columella straight, 3 weak oblique plaits, centrally situated; inner-lip recurved as strong callus over umbilical fissure; outer-lip regularly curved, thin, 10–12 lirations commencing on or a little below outer-lip and extending well into aperture. *Colour* pinkish-fawn with red-brown or grey-brown interstices between transverse cords, red-brown spots on shoulders; interior, including inner-lip, blotched with brown.

Type locality. Tasmania (Sowerby, 1849). South Australia (Brazier, 1884: 226).

Dimensions. Holotype, length 43 mm, breadth 25.3 mm. Average size approx. 33 mm x 20 mm.

Location of type. B.M.N.H. Reg'd No. 1968268.

Distribution. From Twofold Bay, N.S.W. (35° 06' S., 149° 45' E.), throughout Victoria, Tasmania (north and east coasts), King Island, and South Australia. Intertidal to 15–27 metres off Gabo Island, Victoria. Recorded as being taken alive on sand banks in Victoria, Macpherson and Gabriel (1962: 225).

Material. Twofold Bay as above, 2 specimens, A.M. No. C. 7819. South Australia, 1 specimen Kingston Beach (34° 89' S., 139° 48' E.), A.M. No. C. 74987. Tasmania, 11 specimens Ulverstone, N.W. coast, A.M. No. C. 75500. King Island as above (39° 48' S., 143° 52' E.), 2 specimens, A.M. No. C. 48997. Gabo Island as above, (37° 40' S., 149° 34' E.), 1 specimen, A.M. No. C. 74988.

A.M. 70 specimens (25 lots), N.M.V. 92 specimens (30 lots), S.A.M. 18 specimens (7 lots), others W.A.M. and Q.M. Total 191 specimens (66 lots).

Discussion. In his original description Sowerby referred to two figures, Nos 16 and 17, however Strong (1954: 17) showed the drawings to be those of two distinct species, and named the species based on fig. 16 as *Cancellaria peruviana*, giving the type locality as Peru. *C. (Sydaphera) granosa* is a lot less common than *C. (S.) undulata* and confined to a decidedly smaller area; main recognition point is the strong transverse cords crossing the axial ribbing in early whorls, compared with the finely incised lines crossing the ribs in *C. (S.) undulata*.

Cancellaria (Sydaphera) lactea Deshayes, 1830

Figure 2, (4) and (5)

Cancellaria lactea Deshayes, 1830: 180; 1843: 412.—Kiener, 1841: 36, pl. 6, fig. 4.—Reeve, 1856, pl. 18, fig. 82.—Loebbecke, 1885: 84; pl. 21, fig. 8.—Tryon, 1885: 74, pl. 3, fig. 51.—Cotton and Godfrey, 1932: 54, pl. 3, fig. 3.

Cancellaria laevigata Sowerby, 1832: 3, fig. 24; 1849: 448, pl. 92, fig. 16, pl. 96, fig. 81.—Reeve, 1856, pl. 8, fig. 34.—Chenu, 1859: 275, fig. 1825.—Loebbecke, 1885: 49, pl. 14, figs 7, 8; p. 90, pl. 23, figs 5, 6.

Cancellaria (Euclia) laevigata Tryon, 1885: 74, pl. 3, fig. 52.

Sydaphera lactea Macpherson and Gabriel, 1962: 225, fig. 267.

Description: *Protoconch* 2 smooth, shining, deviated whorls, merging gradually into main whorls, nucleus well submerged. *Teleoconch* 4½ flatly convex whorls, shouldered, with strong subsutural ramp. *Sutures* well impressed. *Sculpture* of about 15 rounded axial ribs on early whorls, tending to disappear on body-whorl:

about 5 vague flat cords cross anterior end of body-whorl, with occasional traces of 3 or 4 others in centre. *Umbilicus* a very fine fissure behind inner-lip callus. *Aperture* broadly ovate, contracted either end, a broad very short open siphonal canal; columella straight, 3 strong plaits, inner-lip recurved as strong callus over umbilical fissure; outer-lip flared outwards anteriorly, thickened but sharply-edged, 11 or 12 strong lirations extending well into aperture. *Colour* creamy-white, with cream-brown bands round body-whorl, usually leaving white bands in centre; irregular dark brown spots on top of shoulders.

Type of locality. Not stated.

Dimensions. Average measurement given by Deshayes (1843: 412), length 22–25 mm, breadth 13–15 mm, which is typical. Largest specimen examined is 32 mm x 17 mm.

Location of type. École des Mines, Paris. Reg'd No. not available.

Distribution. Smoky Bay, South Australia (32° 28' S., 133° 54' E.), eastwards to Western Port Bay, Victoria (38° 15' S., 145° 20' E.); northern and eastern Tasmania, southwards to Blackman's Bay, Hobart (42° 52' S., 147° 17' E.). Sub-tidal to 40 metres.

Material. Smoky Bay as above, 4 specimens, 40 metres (greatest depth recorded), A.M. No. C. 89748. Western Port Bay as above, 3 specimens, A.M. No. C. 74964. Blackman's Bay as above, 4 specimens, A.M. No. C. 89749.

A.M. 61 specimens (16 lots), N.M.V. 63 specimens (18 lots), S.A.M. 65 specimens (7 lots), sundry others, total 195 specimens (42 lots).

Discussion. This species appears to be seldom taken alive, but quite common in many places in a beach-worn condition, and usually with signs of a number of breakages. Axial ribbing is very variable, mainly on first two or three whorls, occasionally persisting on to body-whorl in an uneven manner. Although resembling *C. (Nevia) spirata* in form and colour, it is easily separated by the complete lack of a canal at top of shoulders.

Cancellaria (Sydaphera) sp.

Figure 2, (3)

Description: Shell small, whorls very convex, strongly ribbed, thin fawn periostracum. *Protoconch* 1½ smooth, shining, flatly convex whorls, first half-whorl deviated, merging gradually into main whorls, nucleus submerged. *Teleoconch* 4½ roundly convex, strongly ribbed whorls. *Sutures* deeply impressed. *Sculpture* of strong rounded oblique axial ribs, 12 on body-whorl and penultimate, crossed by strong spiral striae, 10 on body-whorl, 6 on penultimate, with 3 to 5 fine threads between each; cross striae form strong nodules, elongate and lateral, at intersections with ribs; fine threads between striae are granulated by crossing of microscopic growth lines. *Umbilicus* absent. *Aperture* ovate, a short wide open siphonal canal; columella straight with 2 strong oblique plaits, a third oblique fold bordering edge of anterior canal; outer-lip regularly curved, broken in specimen but obviously very thin and finely crenulate, no internal lirae. *Colour* fawn with narrow white central band on body-whorl adjoining sutural line; columella white.

Locality. East of Caloundra, southern Queensland (26° 48' S., 153° 35' E.), 109–128 metres.

Dimensions. Specimen is 16.9 mm length, 10.1 mm breadth.

Location of specimen. A.M., Sydney Reg'd No. C. 89278. ex. T. A. Garrard coll.

Distribution. Above locality only.

Material. Specimen is unique.

Discussion. This species bears a slight resemblance to *C. (Sydaphera) anxifer* Iredale, however the axial ribs on this new species are far stronger and bolder, the strong spiral lirae are not flat-topped as they are in *C. (S.) anxifer*, it has one white band and no brown bands, and the whorls are more globose and compressed, the shell therefore being broader for its length. It has been compared with the 32 specimens of *C. (S.) anxifer* in the A.M., and no connection can be found between the two species. Also any resemblance to *Admetula garrardi* Petit is superficial, the ribs being far stronger, the whorls more globose, 3 to 5 fine threads between each pair of transverse striae compared with one only in all specimens of *A. garrardi*, and the colour fawn with one white band contrasts with the light olive-brown of the latter, shading to fawn; in addition the 6-7 varices which distinguish specimens of *A. garrardi* are completely absent.

*Cancellaria (Sydaphera) panamuna** sp. nov.

Figure 2, (7)

Description: Protoconch $1\frac{1}{2}$ smooth, slightly deviated convex whorls, nucleus slightly submerged, translucent, microscopic growth lines, merging gradually into adult sculpture. Teleoconch 4 convex whorls, finely cancellate; body-whorl 70 per cent of total length. Sutures well impressed. Sculpture of fine vertical axial ribs, about 50 on penultimate, crossed by transverse striae equal in strength to ribs, 8 on penultimate, about 18 on body-whorl, with one fine thread between each pair; ribs are finely nodular at intersections; whole sculpture crossed by microscopic growth lines. Umbilicus absent. Aperture elongate-ovate, contracted both ends, a very short siphonal canal; columella straight with 3 strong oblique plaits; inner-lip reflected as heavy white glaze on to body-whorl; outer-lip regularly curved, thick and heavy but sharply edged, 17 internal lirations. Colour off-white.

Type locality. 28 km N.W. of Anchor Island, off Onslow, Western Australia (21° 15' S., 114° 38' E.), 119 metres.

Dimensions. Holotype, length 17.2 mm, breadth 6.9 mm. Fully mature.

Location of type. W.A.M., Perth, Reg'd No. 551-71.

Distribution. Type locality, and 14 km N. of Long Island, near Onslow (21° 37' S., 114° 38' E.), also 161 km N. of Croker Island, Northern Territory (9° 30' S., 132° 34' E.), 77 to 124 metres.

Material. Holotype and 2 paratypes from type locality. "Western Australian—Hawaiian Exp." 7/1/60, W.A.M. No. 486-72. (2 paratypes), 1 specimen 10 km N.N.W. of Anchor Island, 84 metres, 17/6/60, same expedition, W.A.M. No. 552-71. 1 specimen 14 km N. of Long Island as above, 77 metres, same expedition, W.A.M. No. 551-71. 3 specimens N. of Croker Island as above, coll. P. H. Colman, 9/11/69, M.V. *San Pedro Sound*, 124 metres, B.M.R. Stn. P. 69-1144, A.M. No. C. 89364. W.A.M. 5 specimens (3 lots), A.M. 3 specimens (1 lot), total 8 specimens (4 lots).

Discussion. The only other species occurring in Australian waters which may be confused with this is the further new species *Fusiaphera dampierensis*, which

*A New South Wales Aboriginal noun meaning "Ocean."

is smaller but with similar but coarser sculpture, a much larger and more depressed protoconch, and the axis of the aperture much further inclined from the vertical. Compared with *C. (Sydaphera) purpuriformis* Valenciennes (below), this new species has many fine vertical axial ribs compared with the low oblique flattened ribs of *C. (S.) purpuriformis*, and the many fine transverse grooves in the latter species are replaced by fine raised striations, nodular at intersections with ribs.

Cancellaria (Sydaphera) purpuriformis "Valenciennes" in Kiener, 1841

Figure 2, (6)

Cancellaria purpuriformis Valenciennes (in Kiener), 1841: 37, pl. 7, fig. 4.—Sowerby, 1849: 448, pl. 95, figs 68, 70.—Reeve, 1856, pl. 16, fig. 76.—Loebbecke, 1885: 88, pl. 22, figs 9, 10.—Tate and May, 1901: 373.—Iredale, 1925: 264.

Cancellaria tasmanica Tenison-Woods, 1876: 150.

Cancellaria maccoyi Pritchard and Gatliff, 1899: 182, pl. 20, fig. 6.

Cancellaria purpuraeformis.—Cotton and Godfrey, 1932: 55.

Description: Protoconch 2 broadly obese whorls, smooth and shining, merging gradually into main whorls, nucleus not submerged. Teleoconch 4 convex whorls, body-whorl 75 per cent of total length. Sutures well impressed. Sculpture—finely transversely grooved throughout, 28–30 on body-whorl, up to 17 on penultimate, interspaces wider than grooves, more so in centre of body-whorl; broad, flattened oblique axial ribs commence about second whorl, becoming increasingly prominent on body-whorl; transverse grooves microscopically axially striated by growth lines. Umbilicus a small fissure behind recurved inner-lip callus. Aperture elongate-ovate, tapering sharply posteriorly, a short narrow open siphonal canal, recurved to left; columella straight, 3 strong oblique plaits, anterior plait forming edge of canal; inner-lip recurved as a thin glazed callus on to body-whorl and over umbilical opening, granulated anteriorly; outer-lip regularly curved, sharply edged, finely crenulate on inner-edge, some specimens with about 12 lirae extending into aperture. Colour off-white with two broad pale fawn bands on body-whorl, blotches of same colour below sutures and between ribs.

Type locality. Tasmania.

Dimensions. Holotype, length 20·25 mm. Maximum size approx. 30 mm x 18 mm. Beach-worn specimens are usually half grown.

Location of type. Whereabouts unknown.

Distribution. 27–36 metres (deepest record) off St Francis Island, South Australia (32° 35' S., 133° 19' E.), to Western Port Bay, Victoria (38° 15' S., 145° 20' E.), beach W. of Cape Portland, Tasmania (40° 45' S., 148° 07' E.), King Island, Tasmania (39° 45' S., 143° 57' E.). Subtidal to 36 metres.

Material. St Francis Island as above, 11 specimens, S.A.M. No. D. 7529. Western Port Bay as above, 1 specimen, A.M. No. C. 89753. Cape Portland as above, 1 specimen, A.M. No. C. 89752. King Island as above, 1 specimen, A.M. No. C. 48996.

S.A.M. 36 specimens (8 lots), N.M.V. 22 specimens (12 lots), A.M. 6 specimens (6 lots), total 64 specimens (26 lots).

Discussion. The protoconch of this species is not quite typical of the *C.* (*Sydaphera*) group, the nucleus not being submerged nor the first half-whorl deviated. However others features agree well with the type for the genus, *C. (S.) undulata* Sowerby. This species is seldom found alive and first-class specimens are a rarity. The nearest congener in general appearance is *C. (S.) lactea* Deshayes, but that species lacks the numerous transverse grooves which distinguish *C. (S.) purpuriformis* from all others in the genus.

Genus *FUSIAPHERA* Habe, 1961

Fusiaphera Habe, 1961: Append. 27. Type species by original designation *Cancellaria macrospira* A. Adams and Reeve, 1848.

References: Nil.

Diagnosis: Shells small, light in weight, fusiform, slightly canaliculate; up to 6 convex whorls, finely ribbed, 5–6 varices; aperture small, broad, contracted either end; umbilicus a very fine fissure; protoconch 2 smooth, shining, depressed whorls. (Differs from genus *Cancellaria* s.s. in being more elongately fusiform, invariably with varices, protoconch depressed and expanding rapidly in size, compared with tall prominent protoconch in *Cancellaria* s.s.).

Fusiaphera macrospira (A. Adams and Reeve, 1848)

Figure 3, (9)

Cancellaria macrospira A. Adams and Reeve, 1848: 41, pl. 10, fig. 2.—Reeve, 1856: pl. 11, fig. 50.—Loebbecke, 1885: 56, pl. 16, figs 7, 8.—Tryon, 1885: 76, pl. 4, fig. 67.—Chenu, 1859: 275, fig. 1818.—Crosse, 1861: 232.

Cancellaria (Narona) macrospira; Schepman, 1911: 263.

Fusiaphera macrospira.—Habe, 1961: 439.

Description: *Protoconch* 2 smooth, shining depressed whorls, expanding rapidly, merging gradually into main whorls, nucleus submerged. *Teleoconch* 6 convex whorls, constricted at base, a little canaliculate. *Sutures* deeply impressed. *Sculpture* of 12–14 rounded, slightly oblique axial ribs, together with one varix to each whorl, crossed by fine narrow transverse striations, 14 on body-whorl, 9 on penultimate, forming fine nodules at intersections with ribs; up to 7 microscopic hair-lines in between striae, central the strongest, crossed by microscopic growth lines; ribs scaly and recurved at top of shoulders, forming a fine coronation, some being continued as a low lamellate ridge to sutures at an oblique angle. *Umbilicus* a very fine fissure behind inner-lip callus. *Aperture* widely elongate, contracted either end, forming a short narrow open siphonal canal, one strong tooth posteriorly; columella straight, 3 strong oblique plaits; inner-lip recurved as strong callus over umbilical opening; peritreme entire; outer-lip thickened but sharp-edged and crenulate, flared anteriorly. *Colour* off-white with broad light-brown band covering most of whorl, leaving a narrow white band above suture, and continued round centre of body-whorl; aperture white with brown deep in interior.

Type locality. Coast of Borneo, China Sea.

Dimensions. Holotype, length 23.5 mm, breadth 10 mm, which is average size.

Location of type. Should be with B.M.N.H. but reported lost.

Distribution. 18–27 metres E. of Great Keppel Island, Queensland (22° 53' S., 150° 54' E.). Only known Australian record. Appears to be distributed over a wide area northwards to Japan.

Material. One specimen as above, ex. T. A. Garrard coll., presented to A.M. Sydney, Reg'd No. C. 89277.

Discussion. Further specimens are stated verbally to have been found in Queensland waters but definite confirmation not available. The above specimen is in very good condition and identification is certain. (See fig. 3 (9).)

Fusiaphera dampierensis sp. nov.

Figure 2, (8)

Description: *Protoconch* 2½ smooth shining whorls, convexly flattened, expanding rapidly, merging gradually into main whorls, nucleus slightly submerged. *Teleoconch* 4 globose whorls, rounded at shoulder, straighter at base. *Sutures* deeply impressed. *Sculpture* of fine sharp axial riblets, 21 on body-whorl, up to 24 on penultimate, crossed by strong transverse striae, 21 on body-whorl, 10 on penultimate, forming fine nodules at intersections with riblets; transverse striae are crossed by fine hair-lines of growth; several varices frequently present. *Umbilicus* a very fine fissure behind inner-lip callus. *Aperture* broad, ovate, tapering either end; outer-lip thin with heavy varix at rear, 12 strong lirations within aperture, one strong posterior tooth; columella straight but set at oblique angle to left; inner-lip strongly reflected on to body-whorl, peritreme entire; 3 strong oblique plaits from centre of columella to anterior end, short broad open siphonal canal. *Colour* off-white with slight fawn tinge in places.

Type locality. 11–12 km N. of Delambre Island, Dampier Archipelago, northwestern Australia (20° 30' S., 116° 25' E.), 40 metres.

Dimensions. Holotype, length 11.6 mm, breadth 6.6 mm. Largest specimen examined, 14 mm length, 6.9 mm breadth.

Location of type. W.A.M., Perth, Western Australia, Reg'd No. 550-71.

Distribution. Type locality to N. of Long Island, near Onslow, W.A., (21° 36' S., 114° 39' E.), 75 metres, greatest depth recorded. Also one damaged specimen, body-whorl only, from 54 metres off Darnley Island, Torres Strait (9° 40' S., 143° 50' E.).

Material. Holotype, coll. 9/6/60 (no varices). One paratype 11 km N. of Long Island near Onslow, W.A., 51 metres, coll., 17/6/60, 13.5 mm x 6.5 mm (7 varices at irregular intervals), W.A.M. Reg'd No. 434-72. One further paratype 16 km N. of Long Island, near Onslow as above, 75 metres, coll. 17/6/60, 14 mm x 6.9 mm (6 varices at irregular intervals), W.A.M. Reg'd No. 435-72. Above damaged specimen from Darnley Island in 1877, collected and recorded by Brazier as *Cancellaria australis* Sowerby. Held by Macleay Museum, University of Sydney, unregistered. A specimen is also held by W.A.M. (Reg'd No. 436-72), from 109–128 metres off Laoy Island, near Bohol Island, Philippine Islands, measuring 13.5 mm x 6.3 mm coll. 9/2/64, "Pele Sulu Exped." The specimen has a few less axials than the W.A. specimens, also the transverse and intermediate striae are a little finer, and it has one varix.

Discussion. Although broader for its length than other species in the genus *Fusiaphera*, this new species has the same depressed rapidly expanding protoconch, varices common to the genus, same general slightly coronated whorl formation, slightly canaliculate, and same type of aperture; the aperture has the axis tilted at 30° from the vertical, which is common to the other two species in the genus found in Australia.

This species differs from *Fusiaphera macrospira* in being decidedly broader for its length, whorls more convex, it has more numerous and sharper axial ribs, also stronger and more numerous transverse striae, in addition to which it grows to only half the size.

From *Fusiaphera pallida* it differs in having a greater number of axial ribs, closer spacing being very obvious in penultimate and earlier whorls, a greater number of transverse striae, and ribs are not scale-like at sutures.

Fusiaphera pallida (E. A. Smith, 1899)

Figure 2, (9) and (12)

Cancellaria pallida E. A. Smith, 1899: 313, text fig. 4.

Description: Protoconch 2½ convex whorls, expanding rapidly but depressed, nucleus glass-like and slightly elevated. Teleoconch 4½ whorls, evenly convex. Sutures well impressed. Sculpture of very fine narrow axial ribs, widely spaced, recurved and scale-like at sutures, 12 on body-whorl in addition to 2 varices, 10 ribs and 2 varices on penultimate, crossed by very fine striae, 7 on penultimate, 18 on body-whorl, sharply nodular at intersections with ribs; whole sculpture crossed by microscopic growth lines. Umbilicus a very fine fissure behind inner-lip callus. Aperture widely ovate, peritreme entire; columella straight but inclined to left, 3 strong oblique plaits; inner-lip strongly recurved on to body-whorl; outer-lip regularly curved, strongly variced and reflected, sharply-edged, 15 strong lirations extend well into aperture; one tooth posteriorly; a short wide siphonal canal anteriorly. Colour pale ivory, aperture white.

Type locality. Off Cassini Island, northwestern end of Bonaparte Archipelago, northwestern Australia (14° 56' S., 125° 38' E.), 45 metres.

Dimensions. Holotype, length 10.5 mm, breadth 6 mm. Largest specimen examined, length 11.2 mm, breadth 5.8 mm. Apparently fully grown.

Location of type. B.M.N.H. Reg'd No. 1891.11.21.96.

Distribution. Type locality to Arafura Sea, 161 km N. of Croker Island, Northern Territory (9° 30' S., 132° 34' E.), 124 metres. Only two localities and depths known.

Material. Holotype coll. J. J. Walker, H.M.S. *Penguin*. (Fig. 2 (9).) One mature specimen (fig. 2 (12)) and two immature specimens from Arafura Sea as above, coll. P. H. Colman, 9/11/1969, M.V. *San Pedro Sound*. (B.M.R. Stn. P69-1144). A.M. Reg'd No. C. 89268.

Discussion. It is fortunate that further specimens of this small species have been found after a lapse of over 70 years, confirmation always being desirable when any new species is named from a unique specimen.

Compared with *Fusiaphera macrospira* (A. Adams and Reeve), type for the genus, this species grows to only half the size, whorls are more depressed and only $4\frac{1}{2}$ compared with 6 whorls in *F. macrospira*, also the oblique axial ribs are decidedly finer and narrower.

Genus *TRIGONOSTOMA* Blainville, 1827

Trigonostoma Blainville, 1827: 652. Type species by monotypy *Delphinula trigonostoma* Linnaeus, 1758.

References: Adams, H. and A., 1854: 276; Chenu, J. C., 1859: 276; Tryon, G. W., 1885: 65; Jousseume, F., 1888: 22; Cossmann, M., 1899: 24; Keen, A. M., 1971: 656; Wenz, 1938-44: 1358.

Synonyms: *Arizelostoma* Iredale, 1936. Type species by original designation *Arizelostoma laseroni* Iredale, 1936. It is considered that the diagnosis of *Trigonostoma* as shown below covers all the main points of *T. laseroni* Iredale, with the exception of the more depressed form of spire, which is not sufficient grounds for separation.

Cancellaphera Iredale, 1930. Type species by original designation *Cancellaphera amasia* Iredale, 1930. In this species also, all the main features agree well with those of the genus *Trigonostoma*, the trigonal aperture, turreted and flatly canaliculate whorls and cancellate sculpture, and *Cancellaphera* must also be regarded as a synonym.

Diagnosis: Shells small to medium, whorls broadly and flatly canaliculate, turreted, strongly contracted at base, finely ribbed and transversely striated, sutures deeply impressed; aperture trigonal and oblique; umbilicus small or large and deep; body-whorl oblique; protoconch $1\frac{1}{2}$ to 2 smooth, shining whorls, regular or deviated.

Note: The Tertiary fossil species *Cancellaphera confirmans* Ludbrook, 1958 should be placed in this genus.

Owing to the similarity in features of many species usually divided between the subgenera *Trigonostoma*, *Scalptia* and *Trigonaphera*, and to avoid making arbitrary decisions, the genus *Trigonostoma*, s.l. has been used to contain all species in this group.

Trigonostoma amasia (Iredale, 1930)

Figure 3, (11) and (12)

Cancellaphera amasia Iredale, 1930: 80, pl. 9, fig. 8.

Description: Protoconch $1\frac{1}{2}$ smooth, shining, convex whorls, merging gradually into adult sculpture, nucleus slightly submerged. Teleoconch 4 whorls, flatly convex, body-whorl greatly inflated, becoming increasingly canaliculate. Sutures deeply impressed. Sculpture of sharp oblique axial ribs, 15 on body-whorl, 18-21 on penultimate, crossed by fine transverse striae, about 12 on body-whorl with a finer thread between, 4 on penultimate; whorls are shouldered, with ribs continuing at oblique angle across sutural canal, and ribs are sharply nodular at intersections with spirals. Umbilicus small and deep, with ribs continued into opening. Aperture elongate-ovate, one sharp tooth posteriorly, short broad open siphonal canal; columella straight with 3 sharp plaits, posterior and central oblique; anterior horizontal; inner-lip strongly calloused, partly reflected over umbilicus,

outer-lip regularly curved, sharp-edged and serrated, 10–12 strong lirations extending well into aperture. *Colour*—unicoloured white, yellow, fawn, purple or various shades of brown.

Type locality. Port Curtis, Queensland (23° 47' S., 151° 15' E.), 16–20 metres.

Dimensions. Holotype, length 15 mm, breadth 10 mm. Normal size. Largest specimen examined 25 mm x 17 mm.

Location of type. A.M., Sydney. Reg'd No. C. 57740.

Distribution. Port Douglas, north Queensland (16° 27' S., 146° E.), southwards along Queensland coast to Wooli, New South Wales (29° 35' S., 152° 57' E.); greatest depth 118–146 metres N.E. of Cape Moreton, southern Queensland (26° 55' S., 153° 34' E.). Subtidal to 146 meters.

Material. Port Douglas as above, 1 specimen, W.A.M. No. 547-71. Wooli as above, 2 specimens, N.M.V., not reg'd. Greatest depth as above, 1 specimen, ex. T. A. Garrard coll., A.M. No. C. 90076.

A.M. 195 specimens (36 lots), N.M.V. 14 specimens (5 lots), W.A.M. 4 specimens (2 lots), Q.M. 3 specimens (2 lots), total 216 specimens (45 lots).

One dark brown specimen, Broome Creek, Roebuck Bay, W. Aust., (17° 58' S., 122° 27' E.), ex. Beresford Bardwell coll., N.M.V. Reg'd No. F. 27470. One further dark brown specimen, muddy sand, Roebuck Bay, coll. N. Coleman, 23/10/72, A.M. No. C. 96134. Only known Western Australian records.

Discussion. Several paratypes of the fossil species *Cancellaphera confirmans* Ludbrook, from Weymouth Bore, Adelaide, South Australia, have been forwarded for inspection, Reg'd No. 15412B. These show a strong resemblance to *T. amasia*, although the protoconch on all paratypes is 3 times the size of that on *T. amasia*, but similar in form. Both species have a peculiar scale-on-scale sculpture found in species of Muricidae, but horizontal instead of vertical.

Trigonostoma antiquata (Hinds, 1843)

Figure 3, (16)

Cancellaria antiquata Hinds, 1843: 49; 1844: 43, pl. 12, figs 17, 18.—Sowerby, 1849: 458, pl. 93, fig. 27.—Reeve, 1856, pl. 16, fig. 74.—Chenu, 1859: 276, fig. 1835.—Loebbecke, 1885: 57, pl. 16, figs 9, 10.—Tryon, 1885: 79, pl. 5, fig. 88.

Trigonostoma antiquata.—Habe, 1961: 435, pl. 23, fig. 8; pl. 24, fig. 14.

Description: *Protoconch* 2 convex whorls, expanding rapidly, smooth and shining, finishing abruptly at commencement of adult sculpture. *Teleoconch* 4½ whorls, slightly convex, very narrow at base, expanding rapidly to prominent shoulders where they curve inwards; flat area between shoulders and sutures canaliculate. *Sutures* well impressed. *Sculpture* of 12 very fine but sharp axial ribs on penultimate and body-whorl, crossed by 7 fine evenly spaced striae, forming very small nodules at intersections with ribs, and 3 microscopic threads between each striation; fine irregular microscopic growth lines cross threads between ribs; the ribs cross a cingulum at base of umbilicus into opening and terminate abruptly; ribs show scale-on-scale formation on reaching shoulders, curving inwards over flat canaliculate area, which has fine densely packed striae radiating from sutures to shoulders, crossed by microscopic spiral striae; this flat area also has fine radiating ridges, raised and sharp near sutures, fading towards shoulders. *Umbilicus* large and extending through

shell to protoconch, with very fine close-packed axial striae crossed by microscopic growth lines. *Aperture* trigonal, outer-lip thickened by densely packed growth lines and slightly reflected, about 14 lirations within; columella almost straight, two slightly oblique plaits, not prominent, occasionally a further almost obsolete plait at either or both ends; inner-lip slightly flared over umbilicus, peritreme entire; a narrow open siphonal canal, curved towards outer-lip. *Colour* off-white, occasionally with one or two pinkish-brown bands; thin cream coloured periostracum.

Type locality. New Guinea, 40 metres.

Dimensions. Holotype, length 14.77 mm. Average size 23 mm x 15 mm. Largest specimen examined 27 mm x 20 mm.

Location of type. B.M.N.H. Reg'd No. 1968416.

Distribution. From Carnarvon, Western Australia (24° 55' S., 113° 46' E.) across northern Australia and southwards along Queensland coast to Wide Bay (25° 47' S., 153° 09' E.). Greatest depth 124 metres, 161 km N. of Croker Island, Northern Territory (9° 30' S., 132° 34' E.). Widespread throughout Indonesia and Philippine Islands to Japan.

Material. Carnarvon as above, 1 specimen ex. J. Kerslake coll., June 1962, A.M. No. C. 68924. Wide Bay as above, 1 specimen, 58 metres, ex. T. A. Garrard coll., A.M. No. C. 89762. Greatest depth, N. of Croker Island as above, 2 specimens, coll. P. H. Colman 9/11/1969, M.V. *San Pedro Sound*, B.M.R. Stn. P.69-1144, A.M. No. C. 90362. A.M. 5 specimens (4 lots), N.M.V. 2 specimens (2 lots), W.A.M. 1 specimen from Malanipa, Mindanao, Philippine Islands, 36 metres, "Pele Sulu Exped." 12/2/64, W.A.M. No. 579-71. Total Australian specimens 7 (6 lots).

Discussion. Records by Angas (1877: 186) for variety from Port Jackson and Port Stephens, New South Wales, probably refer to species *Trigonostoma bicolor* Hinds (= *Trigonaphera interlaevis* Laseron olim.).

The fine sculpture on this species gives the impression under magnification of finely woven linen.

Trigonostoma bicolor (Hinds, 1843)

Figures 3, (10) and 5, (4)

Cancellaria bicolor Hinds, 1843: 48; 1844: 43, pl. 12, figs 13, 14.—Sowerby, 1849: 456, pl. 94, figs 49, 50; pl. 95, fig. 69.—Reeve, 1856, pl. 7, fig. 29.—Loebbecke, 1885: 87, pl. 22, figs 3, 4.—Tryon, 1885: 79, pl. 5, fig. 86, pl. 6, figs 89, 90.

Trigonaphera bicolor.—Habe, 1961: 436, pl. 23, figs 1, 2.

Cancellaria (Trigonostoma) bicolor; Schepman, 1911: 263.

Cancellaria septemcostata Ohdner, 1917: 55, pl. 2, fig. 57.

Trigonaphera interlaevis Laseron, 1955: 270, fig. 9.

Description: *Protoconch* 2 smooth shining whorls, depressed, ending abruptly at commencement of main sculpture, nucleus submerged. *Teleoconch* 4 flatly convex whorls, a little constricted at base. *Sutures* well impressed. *Sculpture* of 6-8 sharply raised narrow ribs on each whorl, continuing across shoulders to sutures at oblique angle, crossed by faint transverse striae, about 10 on body-whorl, with a

finer thread between; these are barely discernible in interstices, but form narrow prominent nodules in crossing ribs; faint punctures in irregular longitudinal rows occur spasmodically on some specimens (Ohdner, 1917: 55); whole sculpture is crossed by microscopic growth lines; space between shoulders and sutures slightly canaliculate, ribs prominent with sharp serrated edges. *Umbilicus* medium and deep, continuing through to spire, and with ribs continuing over edge into opening. *Aperture* trigonal, narrowing anteriorly to short open siphonal canal; columella straight with 3 strong oblique plaits; inner-lip reflected as heavy callus on to body-whorl and partly over umbilicus; peritreme entire: outer-lip widely flared outwards, thin, sharp and serrated, 9 internal lirations continuing well into aperture. *Colour* light cream or chestnut, dark red-brown line at sutures between ribs, often continued as broad band round centre of body-whorl, spot of same colour on tip of each rib at shoulders; aperture white-edged, usually brown internally.

Type locality. Straits of Macassar (01° N.-04° S., 117°-118° E.), 18 metres.

Dimensions. Holotype, length 23.21 mm, average size 18 mm high, 12 mm wide. Holotype is maximum size.

Location of type. B.M.N.H. Reg'd No. 1968413.

Distribution. De Puch Island, Dampier Archipelago, Western Australia (20° 27' S., 117° 05' E.). Broome Beach, Western Australia, Darwin, Northern Territory (12° 25' S., 130° 50' E.). Albany Passage, Torres Strait, and southwards along Queensland and New South Wales coasts to Cronulla, New South Wales (33° 54' S., 151° 06' E.). Mainly subtidal to 70-80 metres. A widespread species which extends through Indonesia and Philippine Islands to Japan.

Material. De Puch Island as above, 1 specimen, "Western Australian-Hawaiian Exped." 6/6/60, W.A.M. No. 555-71. 1 specimen marked "N.W.Aust." T.M., Hobart, No. E. 4662. Broome Beach as above, 2 specimens, Mel. Ward coll., A.M. No. C. 86376. Darwin as above, 1 specimen, Q.M., not reg'd. Albany Passage as above, 2 specimens, coll. C. Hedley, A.M. No. C. 89760. Cronulla as above, 1 specimen, 70-80 metres (deepest record), coll. J. McIntyre, Aug. 1964, A.M. No. C. 89761.

A.M. 33 specimens (18 lots), N.M.V. 9 specimens (5 lots), W.A.M. 5 specimens (3 lots), others 4 specimens (4 lots), total 51 specimens (30 lots).

Discussion. Ohdner's description of his *Cancellaria septemcostata* (1917: 55) with only 7 ribs, and faint punctures in longitudinal rows, is in keeping with numerous specimens from Queensland. Similarly, specimens of *Trigonaphera interlaevis* Laceron from New South Wales prove to be small pale-coloured *Trigonostoma bicolor*, apparently stunted in form and lacking much of the usual colour pattern through living in more temperate regions at the end of the range of distribution. The two specimens mentioned above from Albany Passage, Torres Strait, are from 16-22 metres, and have 16 fine red-brown hair-lines round body-whorl, 4 on penultimate, in lieu of one, two or even three broader red-brown bands found on some specimens.

Trigonostoma diamantina sp. nov.

Figure 3, (4)

Description: *Protoconch* large, prominent, translucent white, 1½ convex whorls, first half-whorl deviated, merging gradually into adult sculpture, nucleus

submerged. *Teleoconch* $4\frac{1}{2}$ whorls, strongly shouldered and turreted, flatly canalliculate, flatly convex, constricted at base. *Sutures* deeply impressed. *Sculpture* of thin, fine, sharp-edged vertical axial ribs or ridges, becoming flattened with age, 9 on body-whorl, 12 on penultimate and next whorl, elevated above shoulders, scale-on-scale formation and reflected backwards, continued obliquely across top of shoulders to sutures as very fine raised lines, numerous fine growth lines between; transverse sculpture of numerous tightly packed and extremely fine rounded striae, crossed by microscopic growth lines. *Umbilicus* a slight indentation towards base of inner-lip callus. *Aperture* elongate-ovate, constricted either end, obliquely truncated posteriorly and with one low rounded tubercle, short broad open siphonal canal anteriorly; inner-lip reflected as strong callus on to body-whorl; outer-lip thin and sharp but thickened into heavy varix at rear, consisting of fine closely packed lamellae; seven fine low lirations internally; columella straight, two strong scarcely oblique plaits in centre, a third fold forms edge of canal. *Colour* off-white or grey white, aperture pure white.

Type locality. North-west of Bunbury, Western Australia ($33^{\circ} 10' S.$, $115^{\circ} 18' E.$), 201–228 metres.

Dimensions. Holotype, length 12.6 mm, breadth 7.2 mm. Specimen is apparently fully mature.

Location of type. W.A.M., Perth, Western Australia, Reg'd No. 490-72.

Distribution. Type locality, and S.W. of Mandurah, Western Australia ($33^{\circ} 05' S.$, $115^{\circ} 18' E.$), 220 metres.

Material. Holotype, coll., H.M.A.S. *Diamantina*, 17/3/72, Stn. 24, (D.M. 1/72). One paratype S.W. of Mandurah as above, coll., H.M.A.S. *Diamantina*, 17/3/72 (D.M. 1/72). Length 11.7 mm, breadth 6.8 mm. W.A.M. Reg'd No. 437-72.

Discussion. This fine small species is closest to *Trigonostoma vinnula* Iredale, from New South Wales, having most features in common, but can be identified readily by the stark white aperture contrasting with the greyish-white colour of the shell; no specimen of *T. vinnula* has been observed which is other than a light shade of brown or fawn with a narrow white band round body-whorl. In addition this new species has vertical and not oblique axial ribs, also the sides of whorls and the outer-lip of aperture are far flatter in outline than the convex whorls and outer-lip of *T. vinnula*.

Trigonostoma iota sp. nov.

Figure 3, (3)

Description: *Protoconch* $2\frac{1}{4}$ smooth, shining, flatly convex whorls, merging gradually into main sculpture, nucleus slightly submerged. *Teleoconch* $4\frac{1}{4}$ convex whorls, body-whorl 73 per cent of total length. *Sutures* strongly impressed at base of slight canal. *Sculpture* of strong rounded oblique axial ribs, 9 to each whorl; whorls square shouldered, coronate, ribs continued across top of shoulders obliquely to sutures as sharp ridges; 5, 6 and 7 transverse striae on first 3 whorls respectively, 10–12 on body-whorl, with one fine thread between each pair; striae form smooth rounded nodules on first two whorls at points of intersection with ribs, becoming more elongate on penultimate and body-whorl, forming a lamellate effect and recurved inwards towards sutures. *Umbilicus* deep and narrow with fine growth lines internally, ribs terminating at outer edge. *Aperture* elongate-ovate, truncated

and toothed posteriorly, peritreme entire; outer-lip regularly curved, reflected and thickened, hollow-edged internally, 12 strong internal lirations; columella straight with 3 strong oblique plaits; siphonal canal short, open and narrow; inner-lip reflected as strong callus on to body-whorl and partly over umbilicus. *Colour* of protoconch and first whorls light brown, fading on body-whorl to pale fawn; nodules and top of shoulders white; aperture light brown.

Type locality. N.E. of Cape Moreton, southern Queensland (26° 47' S., 153° 40' E.), 114–124 metres.

Dimensions. Holotype, length 13.2 mm, breadth 7.1 mm, ex. J. Kerslake coll. Appears to be fully grown.

Location of type. A.M., Sydney, Reg'd No. C. 89274.

Distribution. Apart from type locality, only other specimen is from 36 metres off Hervey Bay, southern Queensland (25° S., 152° 35' E.).

Material. Holotype and one paratype as above, 11.6 mm x 6.4 mm, ex. T. A. Garrard coll., A.M. Reg'd No. C. 89294.

Discussion. This small species bears a slight resemblance to a small specimen of *Trigonostoma scalarina* (Lamarck) but is quite distinct, and as two specimens are held from different localities, identical in form and sculpture, it is considered that description as a distinct species is warranted. The width/length ratio in *T. scalarina* is 63 per cent, and in this new species only 55 per cent; the nodules on first two whorls tipped with white are quite pronounced and distinct from the sharply serrated ribs where crossed by the transverse striae in *T. scalarina*; the two transverse striations on top of the shoulders, forming a lamellate effect in the penultimate and body-whorl, recurved towards the sutures, contrast with the lamellate ribs on top of shoulders in *T. scalarina* recurved backwards from the aperture. In addition the two specimens, whilst almost certainly fully mature, are little more than half the size of an average specimen of *T. scalarina* with the same number of whorls.

Trigonostoma lamellosa (Hinds, 1843)

Figure 3, (13)

Cancellaria lamellosa Hinds, 1843: 49; 1844: 43, pl. 12, figs 15, 16.—Sowerby, 1849: 453, pl. 94, fig. 47; pl. 96, fig. 106.—Reeve, 1856, pl. 15, fig. 65.—Brazier, 1877: 312.—Loebbecke, 1885: 55, pl. 16, figs 5, 6.—Tryon, 1885: 80, pl. 6, fig. 98.

Cancellaria (Trigonostoma) lamellosa.—Schepman, 1911: 264.

Description: Protoconch 2 smooth shining whorls, merging gradually into main whorls, nucleus slightly submerged. Teleoconch 5 whorls, first 3 almost flat, penultimate and body-whorl convex, strongly shouldered and becoming increasingly canaliculate with age. Sutures well impressed, at base of deep canal. Sculpture 12–14 sharp and very oblique ribs, forming prominent sharp scaly projections on shoulders, inclined to right, continued across canal to sutures as sharp oblique ridges; ribs crossed by about 15 sharply raised transverse striae on body-whorl, 8 on penultimate; ribs cross into umbilical opening as sharp raised striae; ribs consist of lamellations, mostly in pairs, but often up to 8, densely packed in 2 or 3 places including outer-lip, as maturity is reached. Umbilicus broad and deep, with inner-lip of aperture strongly reflected over the opening. Aperture subtrigonal, tapering anteriorly to a narrow open siphonal canal, reflected towards outer-lip; peritreme

entire; very small tooth posteriorly; outer-lip heavily thickened, slightly reflected and sharply-edged, 11–12 lirae within; columella curved to right, plaits 3, evenly spaced, all slightly oblique. *Colour* white with dark brown band below shoulders, not showing on ribs, wide pale brown band below this then narrow white band, followed by thin red-brown line; dark brown patches deep in aperture.

Type locality. "Indian Archipelago". (Possibly intended to mean Lacadive Islands-Maldive Islands groups).

Dimensions. Holotype, length 15.8 mm. Maximum dimensions approx. 22 mm x 16 mm.

Location of type. B.M.N.H. Reg'd No. 1968414.

Distribution. 32 km N. of Delambre Island, Dampier Archipelago, Western Australia (20° 27' S., 117° 05' E.), southwards to S.E. corner of Dirk Hartog Island, W. Aust. (26° 05' S., 113° 15' E.).

Material. Delambre Island as above, 1 specimen, 41 metres, "Western Australian-Hawaiian Exped." 7/6/60. W.A.M. No. 566-71. Rosemary Island, Dampier Archipelago, 1 specimen, 4–7 metres, coll. B. R. Wilson, Aug., 1961, W.A.M. No. 537-71 (figured pl. 3, fig. 13). Dirk Hartog Island, as above, 1 specimen, 4–7 metres, coll. B. R. Wilson, March, 1966, W.A.M. No. 538-71. 13 specimens, Broome, W. Australia, N.M.V. coll., not reg'd, also 2 others same locality, Reg'd No. F. 4573.

W.A.M. 3 specimens (3 lots), N.M.V. 15 specimens (2 lots), total 18 specimens (5 lots).

Discussion. This species has been regarded by some workers in the past as a synonym of *Cancellaria scalarina* Lamarck, however examination of a number of specimens of each species from numerous localities shows them to be distinct. *T. lamellosa* has a lower spire, with body-whorl averaging 85 per cent of total length, compared with 78 per cent in *T. scalarina*, which species also has the umbilicus decidedly closer to the anterior end of shell. The axial ribs in *T. lamellosa*, also the columella, are more oblique, the ribs are composed of 2 or 3 lamellations, closely packed but quite distinct with sharp edges, which also applies to the recurved scaly projections on top of shoulders; the numerous densely packed lamellae forming the mature outer-lip are also separated to a certain extent, and not firmly fused together and glazed over as in *T. scalarina*, presenting in that species a much more solid appearance.

Trigonostoma laseroni (Iredale, 1936)

Figure 4, (12) and (13)

Arizelostoma laseroni Iredale, 1936: 318, pl. 24, fig. 9.—Laseron, 1955: 271, fig. 10.

Description: *Protoconch* 1½ smooth, shining whorls, merging gradually into adult sculpture, nucleus submerged. *Teleoconch* 3½ flatly convex whorls, sharply angled at shoulder, flatly canaliculate, constricted at sutures. *Sutures* strongly impressed. *Sculpture* of rounded, irregularly shaped, oblique axial ribs, about 8 on body-whorl, 10–12 on penultimate, crossed by flatly rounded cords, 5 on body-whorl, 3 on penultimate, nodular at intersections with ribs; 3–4 minor striations between each pair of cords, all crossed by microscopic growth lines; ribs cross shoulders in form of flatly rounded ridges leading across canaliculate depression to

sutures. *Umbilicus* large, leading through to protoconch; up to 10 flat irregular cords anteriorly, crossed by microscopic growth lines. *Aperture* trigonal, short narrow open siphonal canal; peritreme entire; columella straight with 2 strong central plaits, slightly oblique; inner-lip reflected partly over umbilicus as strong callus; outer-lip flared outwards anteriorly, thin and crenulated, 10–12 internal lirations in some specimens, often absent. *Colour* white, cream, pink or various shades of orange-brown; many light coloured specimens with triangular dark patches in canaliculate depression on top of shoulders; occasionally a narrow brown band in centre of whorls, and a second band on body-whorl.

Type locality. Shellharbour, New South Wales (34° 35' S., 150° 57' E.).

Dimensions. Holotype, length 7 mm, breadth 7 mm. Largest specimen examined, length 21 mm, breadth 18 mm. Average size 18 mm x 14 mm.

Location of type. A.M. Sydney, Reg'd No. C. 60686.

Distribution. Furthest north and greatest depth recorded, 54 metres off Laurieton, N.S.W. (31° 40' S., 152° 54' E.), southwards along New South Wales coast to Bermagui (36° 50' S., 150° 03' E.). Subtidal to 54 metres.

Material. Off Laurieton as above, 1 specimen ex. T. A. Garrard coll., A.M. No. C. 89763. Bermagui as above, 2 specimens, A.M. No. C. 89764. 1 specimen taken alive under rock, 16 metres in Wreck Bay, N.S.W. (35° 08' S., 150° 36' E.), 28/10/70, A.M. No. C. 92192. A.M. 21 specimens (9 lots), N.M.V 5 specimens (3 lots), S.A.M. 5 specimens (3 lots), total 31 specimens (15 lots).

Discussion. Apart from the finer ribbing on this species, it bears a striking resemblance to the larger *Trigonostoma goniostoma* Sowerby from central America, with the same general formation, umbilicus, aperture, dark patches between ribs on top of shoulders, and the presence of two plaits on columella.

Trigonostoma obliquata (Lamarck, 1822)

Figure 3, (17)

Cancellaria obliquata Lamarck, 1822: 115.—Sowerby, 1832: 4, fig. 26.—Kiener, 1841: 21, pl. 6, fig. 2.—Deshayes, 1843: 408.—Sowerby, 1849: 453, pl. 96, figs 82, 83.—Reeve, 1856: pl. 13, fig. 61.—Loebbecke, 1885: 60, pl. 17, figs 4, 5.—Tryon, 1885: 81, pl. 6, fig. 1.

Cancellaria (Trigonostoma) obliquata.—Schepman, 1911: 264.

Description: *Protoconch* 2 globose whorls, smooth and shining, microscopic growth lines, merging gradually into main whorls. *Teleoconch* 5 convex whorls, strongly shouldered, canaliculate. *Sutures* impressed, at base of deep narrow canal. *Sculpture* of strong slightly oblique rounded ribs, 14–15 on both body-whorl and penultimate, crossed by 11–12 fine transverse striae, forming sharp translucent-white nodules on ribs; sharp and prominent scales on shoulders, inclined to right, continued obliquely as fine sharp ridges across canal to sutures; a few vague threads between cross striae; ribs cross edge of umbilicus and continue as fine sharply-raised striae well into aperture. *Umbilicus* small but deep, partly covered by strongly reflected inner-lip callus. *Aperture* ovate with short open siphonal canal, one strong tooth posteriorly; outer-lip heavy, reflected and formed of several closely-packed sharply raised lamellae; 10–12 lirae within aperture, commencing short distance from edge of lip; columella straight, plaits 3, evenly spaced, posterior and central oblique,

anterior horizontal; inner-lip reflected as strong callus on to body-whorl, peritreme entire. *Colour* translucent white or pale pink, 2 to 4 fine red-brown horizontal lines on top of ribs between each main transverse striation; background frequently tinted pale blue.

Type locality. New Caledonia.

Dimensions. Holotype, length 19.12 mm. Largest specimen examined 20 mm x 16 mm, average 18 mm x 14 mm.

Location of type. Museum d'Histoire Naturelle, Geneva. Reg'd No. 1097/91.

Distribution. 10 km N. of Long Island, near Onslow, Western Australia, (21° 39' S., 114° 35' E.), eastwards to Darnley Island, Torres Strait, and Murray Island, Torres Strait (9° 58' S., 144° 02' E.). Subtidal to 55 metres.

Material. N. of Long Island as above, 1 specimen, 51 metres. "Western Australia-Hawaiian Exped.", 17/6/60. W.A.M. No. 556/71. Off Darnley Island as above, 1 specimen, 55 metres, A.M. No. C. 8001 (pt). Off Murray Island as above, 3 specimens, 9-14 metres, A.M. No. C. 30020. A.M. 14 specimens (6 lots), W.A.M. 12 specimens (3 lots), S.A.M. 8 specimens (1 lot), N.M.V. 3 specimens (2 lots), total 37 specimens (12 lots), all New Caledonia apart from 5 Australian specimens detailed.

Discussion. This species can be confused with *T. lamellosa* Hinds, having the same type of oblique body-whorl; canaliculate sutures and densely packed lamellate outer-lip at maturity; however it can be separated by its finely spinose sculpture on all ribs, tipped with numerous fine red-brown spots; this contrasts with the sharply raised lamellate ribs of *T. lamellosa*, with recurved scaly projections on top of shoulders; the figure at figure 3 (13) is enlarged to emphasize these features.

Trigonostoma scalariformis (Lamarck, 1822)

Figure 4, (3) and (4)

Cancellaria scalariformis Lamarck, 1822: 113.—Kiener, 1841: 12, pl. 5, fig. 4.—Deshayes, 1843: 404.—Tryon, 1885: 80.

Cancellaria costifera Sowerby, 1832: 5, sp. 33, fig. 31.—Sowerby, 1849: 456, pl. 95, figs 65, 66, 71.—Reeve, 1856, pl. 12, fig. 57.—Loebbecke, 1885: 74, pl. 19, figs 9-14.—Tryon, 1885: 82, pl. 7, figs 12, 13.

Cancellaria nitida Reeve, 1855, pl. 17, fig. 78.

Cancellaria mangelioides Reeve, 1856, pl. 15, fig. 69.

Cancellaria bocageana Crosse and Debeaux, 1863: 77, pl. 9, fig. 3; Loebbecke, 1885: 41, pl. 13, figs 4-6.

Trigonaphera bocageana.—Habe, 1961: 436, pl. 24, fig. 11.

Description: *Protoconch* 2 smooth shining whorls, slightly depressed, merging gradually into adult sculpture. *Teleoconch* 5 convex whorls, body-whorl 65 per cent of total length. *Sutures* strongly impressed. *Sculpture* of strong, high rounded ribs, 10 to each whorl, crossed by multiple fine flat-topped threads and striations, scarcely raised, in turn crossed by multiple microscopic growth lines; tops of ribs are crossed by elongate white denticulations, with brown patches between,

about 14 on body-whorl, less noticeable on penultimate; ribs continue from edge of shoulders to sutures at an oblique angle. *Umbilicus* a narrow fissure behind inner-lip callus. *Aperture* trigonal, tapering to a short narrow open siphonal canal; a single tooth posteriorly; columella straight with 3 oblique plaits; inner-lip reflected on to body-whorl and over umbilical opening as a strong callus; outer-lip flared outwards, thin sharp edge, 8–12 lirations from near edge of lip extending well into aperture. *Colour* greyish-blue, ribs white with elongate brown cross markings, continued faintly across interstices; edge of aperture white, lirations and inner aperture greyish-blue or brown.

Type locality. "La mare des Indies".

Dimensions. Holotype, length 23.62 mm, breadth 14.25. Holotype is maximum length. Average size 20 mm x 12 mm.

Location of type. Museum d'Histoire Naturelle, Geneva, Reg'd No. 1097/86.

Distribution. Moreton Bay, southern Queensland (27° 50' S., 153° 15' E.), northwards along Queensland coast and into Gulf of Carpentaria, off Karumbah (17° 30' S., 140° 44' E.). Greatest depth recorded, 22–45 metres off Burnett Heads, Queensland (24° 45' S., 152° 24' E.). Mainly subtidal down to 45 metres. Wide-spread throughout Indonesia and Philippine Islands to Japan.

Material. Moreton Bay as above, 1 specimen, coll. H. T. Johnston, 1918, A.M. No. C. 75012. Off Karumbah as above, 2 specimens, coll. McMichael and Yaldwin, Dec. 1963, A.M. No. C. 73227. Greatest depth as above, 1 specimen, ex. N. Buckland coll., A.M. No. C. 90077.

A.M. 83 specimens (32 lots), N.M.V. 21 specimens (12 lots), S.A.M. 10 specimens (3 lots), Q.M. 7 specimens (4 lots), W.A.M. 2 specimens (1 lot), total 123 specimens (52 lots).

Discussion. The original description of this species stated "columella uniplicata", which is misleading, an enlarged colour photo of the holotype showing the specimen obviously to have been occupied by a hermit crab, resulting in the wearing away of the lower end of the columella and two plaits; the remaining plait is the one bordering the siphonal canal. The above photo has been carefully compared with a similar enlarged photo of the holotype of *Cancellaria costifera* Sowerby, and the two are conspecific beyond doubt. The latter specimen is held by B.M.N.H., Reg'd No. 1968405.

The species figured by Habe (1961a: pl. 24, fig. 7, and 1961b: pl. 36, fig. 6) as *Trigonostoma (Trigonaphera) costifera* Sowerby, has since been found to be an undescribed species and has been omitted from the synonymy.

The species named as *Cancellaria "bocageana"* Crosse and Debeaux is the pure white or very lightly coloured form of *Trigonostoma scalariformis* which occurs in the Gulf of Carpentaria amongst the more brightly coloured specimens, and also apparently in New Caledonia and Japan. The holotype of *Trigonostoma scalariformis* is one of the brightly coloured specimens so common in Queensland, especially on beaches near Bowen. The closest species to *Trigonostoma scalariformis* in general appearance is *T. scalarina* Lamarck, but as shown under "Discussion" following the description of that species it has a wider umbilicus, more spinose sculpture, and narrower and sharper axial ribs.

A most interesting observation has been conveyed to me personally by Mr Frank Plant of Queensland, who states that in August 1966 he observed at Queen's

Beach and Gray's Beach, Bowen, Queensland, half-grown specimens of *Trigonostoma scalariformis* attached to more than 50 per cent of the very numerous *Eucrassatella cumingi* A. Adams in the area. In all cases the *Trigonostoma scalariformis* were attached to the area close to where the siphon of the *Eucrassatella* would later be extended for the extraction of food from the sea-water, but the reason for this commensal habit is unknown.

Trigonostoma scalarina (Lamarck, 1822)

Figure 3, (14)

Cancellaria scalarina Lamarck, 1822: 113.—Deshayes, 1830: 189.—Kiener, 1841: 8, pl. 5, fig. 3.—Deshayes, 1843: 403.—Sowerby, 1849: 452, pl. 96, figs 87, 88 (non Lamarck, 1822).—Reeve, 1856: pl. 6, fig. 25 (non Lamarck, 1822).

Cancellaria crenifera Sowerby, 1832: 5, fig. 29; Sowerby, 1849: 453, pl. 96, figs 84–86; Reeve, 1856, pl. 6, fig. 24; Crosse, 1861: 230; Loebbecke, 1885: 9, pl. 1, figs 13–16; Tryon, 1885: 80, pl. 6, figs 97–99.

Cancellaria (Trigonostoma) crenifera.—Schepman, 1911: 264.

Scalptia crenifera; Habe, 1961: 436, pl. 23, fig. 7; pl. 24, fig. 4; Habe, 1964: 113, pl. 36, fig. 5; Kuroda, Habe and Oyama, 1971: 203, pl. 54, fig. 4.

Cancellaria thomasi Crosse, 1861: 231; Loebbecke, 1885: 10, pl. 1, figs 17, 18; Tryon, 1885: 79, pl. 6, figs 92–94.

Cancellaria souverbiei Crosse, 1868: 272, pl. 9, fig. 5.

Description: *Protoconch* $2\frac{1}{2}$ smooth shining whorls, a little depressed, merging gradually into adult sculpture. *Teleoconch* $4\frac{1}{2}$ flatly convex whorls. *Sutures* strongly impressed. *Sculpture* of strong, high, sharp axial ribs, 10 to each whorl, crossed by fine transverse white striae, about 25 on body-whorl, 9 on penultimate, ribs sharply serrated at intersections; whorls sharply shouldered and turreted, ribs recurved and scaly on top of shoulders, continued as thin sharp ridges to sutures. *Umbilicus* small and deep, partly covered by inner-lip callus, ribs continued over base into opening. *Aperture* widely elongate, contracted both ends, a short open siphonal canal, toothed posteriorly; columella straight with 3 strong oblique plaits; inner-lip recurved as strong callus on to body-whorl; outer-lip flared outwards anteriorly, sharply edged, 10 lirations extend from near lip well into aperture. *Colour* white, purple-brown on top of shoulders, two broad brown or purple-brown bands round body-whorl, narrow white band between; lower brown band has a darker edge adjoining white section; lip of aperture white, brown blotching within.

Type locality. Seas of Isle-de-France.

Dimensions. Holotype, length 28.13 mm (marked on holotype as 27.5 mm). Holotype is maximum length. Average size 18 mm x 12 mm.

Location of type. Museum d'Histoire Naturelle, Geneva. Reg'd No. 1097/85.

Distribution. From 32 km N. of Delambre Island, Dampier Archipelago, northwestern Australia (20° 05' S., 117° 06' E.), across north of Continent in many localities, and south along Queensland coast to 77 metres (greatest depth recorded) off Moreton Bay (27° 22' S., 153° 39' E.). Subtidal to 77 metres. Widespread throughout the Indian Ocean, western Pacific Ocean and northwards to Japan.

Material. Delambre Island as above, 1 specimen, 41 metres, W.A.M. No. 565/71. Off Moreton Bay as above, 1 specimen, coll. W. F. Ponder, 29/3/69, H.M.A.S. *Kimbla*, A.M. No. C. 92793.

A.M. 230 specimens (44 lots), N.M.V. 103 specimens (21 lots), W.A.M. 17 specimens (7 lots), other 16 specimens (6 lots), total 366 specimens (78 lots).

Discussion. Tryon states (1885: 80) "*Cancellaria crenifera* and several other allied species are probably only varieties of *C. scalarina* Lamarck", also that "*C. scalarina* Sowerby (= *C. thomasi* Crosse) is a variety of *C. scalarina* Lamarck", with which remarks I concur. Deshayes' detailed description of the species (1830: 189) identifies it well, and the later descriptions by Sowerby (1855: 452) and Reeve (1858: fig. 25) of *C. scalarina* Sowerby (= *C. thomasi*) both agree with Deshayes' description. A number of specimens examined from Japan and Philippine Islands agree well with Australian specimens from the wide area of distribution shown above, only a few minor differences being apparent, all of which are variable and merge with those from other localities. Queensland specimens tend to have a darker background colour than those from most other areas. This species can be separated from *Trigonostoma scalariformis* Lamarck by its wider umbilicus, more spinose sculpture, and narrower and sharper axial ribs.

Trigonostoma tessella sp. nov.

Figure 3, (18)

Description. Protoconch $1\frac{1}{2}$ smooth convex shining whorls, first half-whorl slightly deviated, ending abruptly at commencement of adult sculpture, nucleus submerged. Teleoconch $3\frac{1}{2}$ whorls, flatly convex, contracted at base, strongly turreted and canaliculate, body-whorl 85 per cent of total length. Sutures strongly impressed at base of canal. Sculpture of strong, high, lamellate axial ribs, 17 on penultimate and body-whorl, crossed by strong transverse cords, high and rounded, giving shell a deeply pitted appearance; 4 of these cords on body-whorl, 3 on all others, situated between 3 or 4 closely packed smaller cords at top and bottom of each whorl; transverse cords are composed of 2 or 3 smaller cords tightly packed, and become broadly nodular at intersections with ribs; fine transverse threads and growth striae intersect in base of pits, giving a tessellated appearance under magnification. Umbilicus wide and deep, reaching to top of spire; axial ribs continue into aperture and are crossed by a number of striations. Aperture trigonal, columella straight, inner-lip curved outwards anteriorly, reflected over umbilical opening and on to body-whorl posteriorly; two weak plaits, centrally situated; outer-lip thin and slightly reflected; short open siphonal canal curved outwards; posterior end of aperture slightly depressed inwards. Colour pale chestnut with light brown band in centre of whorls, a further faint band towards base of body-whorl.

Type locality. Northeast of Cape Moreton, southern Queensland, (26° 47' S., 153° 40' E.), 114–124 metres.

Dimensions. Holotype, length 18.8 mm, breadth 14.3 mm. Very little variation in size of all specimens examined.

Location of type. A.M., Sydney, Reg'd No. C. 89285, ex. T. A. Garrard coll., together with 2 paratypes.

Distribution. From type locality southwards to Wooli, northern New South Wales (29° 42' S., 153° 26' E.), 109 metres, greatest depth recorded.

Material. Apart from holotype and 2 paratypes, 1 specimen from off Wooli as above, ex. T. A. Garrard coll., A.M. No. C. 89609. 1 specimen Moreton Bay,

southern Queensland (27° 17' S., 153° 12' E.), 1 km S. of Jumpin Pin Bar, 9 metres, July 1961, Univ. of Queensland, A.M. No. C. 67865. 1 specimen S. end of Stradbroke Island, southern Queensland (27° 50' S., 153° 20' E.), coll. Univ. of Queensland, 47-58 metres, A.M. No. C. 68719. 3 specimens off Moreton Bay, southern Queensland, H.M.A.S. *Kimbla*, coll. W. F. Ponder, 29/3/69, 77 metres, A.M. No. C. 77065. Total 9 specimens (5 lots), all A.M.

Discussion. This species is close to the African *Trigonostoma semidisjuncta* Sowerby, 1848, with the following exceptions; This new species has only 4 transverse cords on body-whorl and 3 in all others, in lieu of 6 and 5 respectively, these cords being between a solid band of fused smaller cords at top and bottom of each whorl; the transverse cords show no sign of bifurcation, which is common in *T. semidisjuncta*, and they also have an overlapping scaly form of growth, each new section being commenced behind and below the previous outer-lip; the protoconch in this new species is also higher and more prominent, with the typical deviated first whorl, common to many southern Australian species. It also has a slight resemblance to *T. amasia* Iredale, but is distinguished by the close-packed lamellate ribs and transverse cords, with deep pits between, also 2 weak columella plaits in lieu of 3 sharp plaits in *T. amasia*. *Trigonostoma semidisjuncta* Sowerby is recorded by Faustino (1928: 305) as occurring at Cagayan, Mindanao, P.I., but specimens are not available for study. The possibility cannot be overlooked that it may be this new species which has been misidentified as the South African shell.

Trigonostoma textilis (Kiener, 1841)

Figure 3, (1)

Cancellaria textilis Kiener, 1841: 10, pl. 7, fig. 1.—Sowerby, 1849: 455, pl. 93, fig. 34.—Reeve, 1856: pl. 6, fig. 28.—Loebbecke, 1885: 34, pl. 10, figs 5-8.

Scalptia textile Habe, 1961: pl. 24, fig. 19.

Description: Protoconch $1\frac{1}{2}$ smooth, shining depressed whorls, merging gradually into adult sculpture. Teleoconch $5\frac{1}{2}$ whorls, convex, strongly shouldered, canaliculate. Sutures impressed, sutural cavity becoming increasingly canaliculate with age. Sculpture of strong rounded axial ribs, about 10 on body-whorl, 12 on penultimate, several being in form of a varix at irregular intervals; ribs continue over shoulder, narrowing to a fine line at suture, nodular at top of shoulder; 10 main striae between shoulder of whorl and umbilicus on body-whorl, nodular on crossing ribs, scarcely visible between ribs; 5 striae on penultimate; 6 or 7 microscopic threads between each pair of main striae on body-whorl, 3 on penultimate; all striations crossed by microscopic growth lines. Umbilicus deep and very narrow; axial ribs cross umbilical ridge into opening as fine striations; inner-lip partly reflected over umbilicus. Aperture triangularly ovate, outer-lip thickened but with sharp reflected edge, 16 to 18 lirae within; inner-lip strongly recurved, partly over umbilicus; a short open siphonal canal inclined to left; columella straight with 3 plaits, posterior and central oblique; anterior horizontal. Colour light reddish-brown; main striae white on top of ribs, nodules on shoulders white; central main striation carries fine white hair-line round body-whorl and lower part of penultimate.

Type locality. Moluccas.

Dimensions. Holotype, length 24.75 mm. Average length 20 mm.

Location of type. Probably Museum d'Histoire Naturelle, Paris. Reg'd No. not available.

Distribution. 64 km W. of Cape Jaubert, Western Australia (18° 56' S., 120° 56' E.) and 23 km W. of Eaglehawk Island, Dampier Archipelago, Western Australia (20° 40' S., 116° 27' E.), only two Australian records. Also occurs over large area of western Pacific and northwards to Japan.

Material. Cape Jaubert as above, 1 specimen, 40 metres, W.A.M. No. 536-71. Eaglehawk Island as above, 1 specimen, 25 metres. W.A.M. No. 558-71. One further specimen examined from private collection, taken alive near Gaudalcanal, Solomon Islands; this specimen has first whorls a deep leaden-grey and body-whorl jet black, but with usual white tips on nodules.

Discussion. Compared with *T. scalata* Sowerby (not recorded from Australian waters) this species has white-tipped nodules without the accompanying brown flecks in *T. scalata*, and 10-11 axial ribs on body-whorl as against 19-20; it is also a smaller shell, and the body-whorl is about 52 per cent of total length compared with 62 per cent in *T. scalata*; it also has a wider umbilicus and a shallower canal at the suture.

Trigonostoma vinnula Iredale, 1925

Figure 3, (5) and (6)

Trigonostoma vinnulum Iredale, 1925: 263, pl. 43, fig. 18.

Trigonaphera vinnulum.—Iredale, 1936: 319.—Laseron, 1955: 270, fig. 8 (vinnula).

Description: *Protoconch* prominent, of 1½ smooth shining convex whorls, first half-whorl deviated, nucleus well submerged. *Teleoconch* 4½ convex, coronate, flatly shouldered whorls. *Sutures* deeply impressed. *Sculpture* of strong, rounded oblique axial ribs, 9 on body-whorl and penultimate, coronate at top of shoulders, and crossing flat space to sutures obliquely; ribs crossed by 9 fine transverse striae on body-whorl, 4 on penultimate, with a microscopic thread between each pair, whole sculpture crossed by microscopic growth lines. *Umbilicus* small and deep, partly covered by inner-lip callus. *Aperture* ovate, posterior end truncate, a short broad open siphonal canal; columella straight with 3 strong oblique plaits; inner-lip recurved as strong callus on to body-whorl; outer-lip regularly curved, sharp-edged and flared outwards; 10 lirations commence below edge of outer-lip and extend well into aperture. *Colour* fawn to light brown, with narrow white band round centre of body-whorl.

Type locality. Off Twofold Bay, New South Wales (37° 03' S., 150° 03' E.), 45 metres.

Dimensions. Holotype, length 12.5 mm, breadth 7 mm. Normal size. Largest specimen examined 18 mm x 12 mm.

Location of type. A.M. Sydney, Reg'd No. C. 53774.

Distribution. 73 metres off Redhead, New South Wales (32° 57' S., 151° 45' E.), southwards to Twofold Bay, N.S.W. (37° 04' S., 149° 56' E.), 27 metres. Greatest depth recorded, 73 metres off Redhead as above. Appears to be confined to moderate depths, seldom seen on beaches.

Material. Off Redhead as above, 19 km S. of Newcastle, 1 specimen, coll. T. Iredale, July, 1939, A.M. No. C. 89757. Twofold Bay as above, 1 specimen, ex. N. Buckland coll., A.M. No. C. 89758. A.M. 26 specimens (5 lots), other museums 5 specimens (4 lots), total 31 specimens (9 lots).

Discussion. The closest congener to this species is *T. diamantina* nov., described in this revision from Western Australia. The only species within its range with which collectors could confuse *T. vinnula* is *Trigonostoma bicolor* (Hinds), stunted specimens of which occur in central New South Wales, formerly known as *Trigonaphera interlaevis* Laceron; these can be readily separated by their much larger umbilicus, and even though the red-brown band may be absent round body-whorl, the brown patches are usually present in the concave spaces on top of shoulders between ribs.

Genus *Admetula* Cossmann, 1889: 228. Type species by original designation
Cancellaria evulsa (Solander, 1766)

References: Wenz, 1938–44: 1369.

Diagnosis: Shell small and broad, numerous axial ribs, up to seven varices, crossed by fine but strong spiral striae with finer threads between; aperture broadly ovate, columella with three strong plaits, anterior canal narrow and recurved.

Admetula garrardi Petit, 1974

Figure 2, (10)

Cancellaria (Merica) nassoides Schepman, 1911: 263, pl. 18, fig. 9.

Neadmete nassoides.—Habe, 1961: 435, pl. 23, fig. 5.

Admetula garrardi Petit, 1974: 109, text fig. 1 (new name for *Cancellaria nassoides* Schepman, 1911, not *Cancellaria nassoides* von Koenen, 1889: 149).

Description: *Protoconch* $1\frac{1}{2}$ smooth, shining, deviated whorls, merging gradually into main whorls, nucleus well submerged. *Teleoconch* 6 globose strongly ribbed whorls. *Sutures* strongly impressed. *Sculpture* of strong rounded oblique axial ribs, 14–17 on body-whorl and penultimate, crossed by strong spiral lirae, 9 on body-whorl with 8 intermediate, 4 main lirae and 5 intermediate on penultimate, elongate lateral nodules at points of crossing with ribs; whole sculpture crossed by extremely fine growth lines; usually 6–7 varices present. *Umbilicus* nil. *Aperture* small and ovate, a short broad open siphonal canal; columella straight with 3 strong oblique plaits; inner-lip a light glaze on to body-whorl; outer-lip regularly curved, thin and crenulate, 7 lirations extending well into aperture. *Colour* light olive-brown on first whorls, fawn body-whorl; thin hirsute fawn periostracum.

Type locality. Near Kei Islands, 397 metres ($5^{\circ} 26' 6''$ S., $132^{\circ} 32' 5''$ E.) South of western end of West Irian—now known as Ewab Islands.

Dimensions. Holotype, length 16.5 mm, breadth 10 mm. This is apparently average adult size.

Location of type. Amsterdam Museum, Netherlands, Reg'd No. unknown.

Distribution. Recorded in Australia only from N.N.E. of Cape Moreton, southern Queensland ($26^{\circ} 48'$ S., $153^{\circ} 35'$ E.), 114–124 metres. Extends northwards as far as Japan.

Material. 8 immature specimens from off Cape Moreton as above, ex. T. A. Garrard coll., obtained from trawler. A.M. No. C. 89279.

Discussion. Without close inspection the above small specimens could be confused with immature *Trigonostoma amasia* Iredale, but lack the square-cut shoulders, and the much bolder ribs and numerous varices are a distinguishing feature.

Note: The group dealt with from hereon (subfamily Admetinae of Cossmann, 1899) contains many small species, nearly all from temperate to cold regions and from deep to very deep water, all apparently lacking a radula and mostly without colour, being off-white to greyish-white. The columella is sometimes arcuate instead of straight, some completely lack columella plications, in others which have one or possibly two plications, these are mostly very weak or barely visible, and a variable feature.

Genus *Bonellitia* Jousseaume, 1887

Bonellitia Jousseaume, 1887, *Le Naturaliste* (2) 9: 225. Type species by original designation *Cancellaria bonelli* Bellardi.

References: Finlay, 1930: 240; Marwick, 1931: 120; Wenz, 1938-44: 1369.

Diagnosis: Shells very small, four convex main whorls, sharp oblique axial ribs crossed by strong transverse striae, sharply nodulose at intersections; no umbilicus; aperture broad, tapering either end; body-whorl usually 75 per cent of total length; columella straight, with 3 medium oblique plaits.

Bonellitia scobina (Hedley and Petterd, 1906)

Figure 2, (11)

Cancellaria scobina Hedley and Petterd, 1906: 222, pl. 38, fig. 12; Hedley, 1907: 360, Iredale, 1925: 265.

Sydaphera scobina; Laseron, 1955: 270.

Description: *Protoconch* $1\frac{1}{4}$ smooth, opaque, light-grey rounded whorls, first half-whorl deviated, ending abruptly at commencement of adult whorls, nucleus submerged. *Teleoconch* $3\frac{1}{2}$ convex whorls, strongly shouldered, concave shelf at top, contracted at base. *Sutures* well impressed. *Sculpture*—weak curved axial riblets on all whorls, 16 to whorl, crossing shoulders and continuing obliquely almost to sutures; ribs are crossed by strong flat-topped cords, 9 on body-whorl, 5 on penultimate, nodular at intersections; one or two weaker striae between cords; 5 or 6 weak striae between shoulder and suture. *Umbilicus* a minute fissure behind inner-lip callus. *Aperture* broad, contracted either end; outer-lip thickened and curved, finely lirate within; inner-lip reflected as strong callus on to body-whorl; columella straight, 3 medium plaits, posterior and central strongly oblique, anterior slightly so; siphonal canal short, broad and open. *Colour* light grey.

Type locality. Off Sydney, New South Wales ($33^{\circ} 55' S.$, $151^{\circ} 42' E.$), 549 metres.

Dimensions. Holotype, length 8 mm, breadth 5 mm.

Location of type. A.M., Sydney, Reg'd No. C. 24448.

Distribution. Type locality only.

Material. Holotype is unique. Pres. by authors.

Discussion. Hedley stated (1907: 360) that he had compared a specimen of this species from 80 fathoms (146 metres) off Narrabeen, New South Wales, with the holotype of *Cancellaria micra* Tate in the University Museum, Adelaide. He stated that the fossil had more and finer spirals, but weaker radials, and that in other respects they were identical. Attached to the glass tablet in the A.M. are two glass tubes, one containing the holotype and the other an immature specimen, purporting to be the same species, from 250 fathoms (457 metres) off Sydney (Hedley, 1906: 223). On examination this proves to be an immature specimen of *Gergovia exigua* E. A. Smith, whilst the other specimen referred to above from 146 metres off Narrabeen, and compared with the holotype of *C. micra* Tate, is one of 6 presented to the A.M. in 1907 by Prof. Haswell, and a new species named in this revision. This new species is certainly far closer to *C. micra* than it is to *Bonellitia scobina* or *Gergovia exigua*.

Genus *Gergovia* Cossmann, 1899

Gergovia Cossmann, 1899: 16. Type species by original designation *Cancellaria platypleura* Tate (= *Cancellaria laticostata* Tenison-Woods, 1879. Invalid name change).

References: Wenz, 1938-44: 1358.

Synonyms: *Microsveltia* Iredale, 1925. Type species by monotypy *Microsveltia recessa* Iredale, 1925. *Gergovia laticostata* Tenison-Woods, type for the genus *Gergovia*, is so close to *Microsveltia recessa* Iredale, that the former was almost certainly ancestral, and the introduction of a further genus was unwarranted.

Diagnosis: Shell very small, strongly and boldly ribbed, coronate and canaliculate, strong flat-topped transverse striae, prominent deviated protoconch, small ovate aperture, columella straight, two medium to strong plaits.

Gergovia exigua (E. A. Smith, 1891)

Figure 4, (1)

Cancellaria exigua E. A. Smith, 1891: 439, pl. 34, fig. 11.—Iredale, 1925: 265.

Description: Protoconch $1\frac{1}{2}$ smooth white, shining, deviated whorls, merging gradually into sculpture of main whorls, nucleus submerged. Teleoconch $3\frac{1}{2}$ flatly convex whorls, doubly angled by cross striae, constricted top and bottom. Sutures strongly impressed. Sculpture of strong raised axial ribs, 10 on body-whorl and penultimate, crossed by prominent striae, 8 on body-whorl, main two strongly nodular at intersections, the whorls crossed by numerous microscopic growth lines. Umbilicus a fine fissure behind inner-lip callus. Aperture oval, short broad open siphonal canal; columella arcuate, two oblique plaits, lower forming edge of canal; inner-lip reflected as glazed callus, partly over umbilical fissure; outer-lip regularly curved, thin, and crenulated by cords, which show as grooved channels interiorly. Colour off-white.

Type locality. Off Sydney, New South Wales ($33^{\circ} 55' S.$, $151^{\circ} 28' E.$), 750 metres (Disputed "Challenger" station 164B).

Dimensions. Holotype, length 6 mm, breadth 3 mm. Normal size.

Location of type. B.M.N.H. Reg'd No. 1889.10.12.16.

Distribution. Caloundra, Queensland ($26^{\circ} 47' S.$, $153^{\circ} 02' E.$), southwards along N.S.W. and Victorian coast to 118 metres E. of Babel Island, Bass Strait

(39° 26' S., 147° 23' E.). Greatest depth recorded, 1 463 metres E. of Sydney (33° 55' S., 151° 41' E.). The single specimen from Caloundra above was beach collected, which is out of keeping with the depths recorded for all other specimens. The most likely explanation is that the specimen was washed overboard from the deck of a trawler on return to port and then on to the nearby beach. Inhabits deep to very deep water. Eastern Australian coast only.

Material. Caloundra as above, 1 specimen, ex. J. Kerslake coll. A.M. Reg'd No. C. 89288. E. of Babel Island as above, 1 specimen, 118 metres, ex. T. A. Garrard coll. A.M. No. C. 89290. Greatest depth as above, 2 specimens, 56 km E. of Sydney, coll. Prof. Haswell, c. 1914. A.M. No. C. 26676-7. A.M. 23 specimens (7 lots). N.M.V. 1 specimen, 118 metres off Cape Everard, No. F. 20842.

Discussion. This very small species has proved to be widespread in greatly varying depths of water. Once studied under magnification it can be recognized on sight by the widely spaced ribs crossed by the two prominent centrally situated striations which bi-angulate the whorls, forming sharp nodules at points of crossing. Although the sculpture is not so bold and prominent as that of *Gergovia recessa*, it has the same general pattern with spirals over-riding the axial ribs and forming the same sharp elongate nodules at point of crossing; also 2 strong plaits, identical protoconch, and similar aperture.

Gergovia haswelli sp. nov.

Figure 4, (7)

Description: Protoconch $1\frac{1}{2}$ smooth, convex, translucent-white whorls, first half-whorl deviated, merging gradually into main whorls, nucleus submerged. Teleoconch $3\frac{1}{2}$ convex whorls, flatly shouldered, sharply contracted at base. Sutures deeply impressed. Sculpture of strong rounded axial ribs, 9 on body-whorl and penultimate, crossed by strong transverse striae, 3 on first whorl, increasing to 6 or 7 on penultimate, and about 12 on body-whorl, with one or two fine intermediate threads near periphery; cross striae are a little thickened at intersections with ribs, some gemmate on early whorls; whole sculpture is crossed by microscopic growth lines. Umbilicus—a very fine fissure usually present. Aperture widely elongate, regularly rounded posteriorly, slightly produced anteriorly into a broad open siphonal canal; columella straight, one slight central plait visible in some specimens, two in others, usually showing more strongly at rear of columella; inner-lip recurved as a strong glaze on to body-whorl; outer-lip regularly curved, thickened but sharp-edged, crenulate, 4 or 5 very weak internal lirae in some specimens. Colour off-white.

Type locality. 35 km E. of Narrabeen, New South Wales (33° 45' S., 151° 44' E.), 146 metres.

Dimensions. Holotype, length 3.8 mm, breadth 1.9 mm. Average size.

Location of type. A.M., Sydney, Reg'd No. C. 25843.

Distribution. From type locality southwards to 48 km S. of Cape Everard, Victoria (37° 17' S., 149° 47' E.). Lowest depth recorded, 366 metres, Cape Everard as above. Apparently confined to deep water.

Material. Type series contains holotype and 5 paratypes, coll. Prof. Haswell, 2/1/1907. Off Cape Everard as above, 4 specimens, "Endeavour", 22/10/1914, A.M. No. C. 89292. 1 specimen 43 km S. x E. of Cape Everard, 165-274 metres, "Endeavour", 9/5/1914, A.M. No. C. 89293.

Total A.M. 11 specimens (3 lots).

Discussion. This is the species referred to by Hedley (1907: 360) which he compared with the holotype of the Tertiary fossil *Cancellaria micra* Tate, then at the University Museum, Adelaide (see "Discussion" under *Bonellitia scobina* Hedley and Petterd). Enlarged drawings of two of the three type series of *C. micra* forwarded by Dr H. Laws from S.A.M. show the finer spirals and weaker radials as stated by Hedley, otherwise the resemblance of this new species to the fossil is strong.

Gergovia haswelli can be distinguished from *G. exigua* by its much smaller size and more numerous transverse striae, about 7 on penultimate whorl, compared with the 2 bold and prominent transverse striae which biangulate all whorls in *G. exigua*. It can also be separated from *G. recessa* by its smaller size and more numerous, finer transverse cords, whilst *G. recessa* has much bolder ribbing, crossed by two prominent transverse cords on each whorl, with finer cords above, below and between.

Gergovia recessa (Iredale, 1925)

Figure 3, (7) and (8)

Microsveltia recessa Iredale 1925: 265, pl. 43, fig. 16; Laseron, 1955: 271, fig. 11.

Description: *Protoconch* $1\frac{1}{2}$ whorls, tall and prominent, first half-whorl deviated, smooth and shining, nucleus submerged. *Teleoconch* $4\frac{1}{2}$ strongly bi-carinate convex whorls, turreted and slightly canaliculate. *Sutures* deeply impressed. *Sculpture* of very heavy prominent rounded axial ribs, 9 to each whorl, crossed by two bold and prominent narrow cords on each whorl, two additional towards base of body-whorl; cords form prominent lateral nodules at junction with ribs; one fine sharp striation below each cord, 2 on body-whorl below lower cord; 5 larger striae cross ribs and interstices on top of shoulders on body-whorl, four on penultimate and 3 on next whorl; a further 8 fine wavy striations at base of body-whorl; entire sculpture is covered by microscopic hair-like growth lines. *Umbilicus* small and narrow, partly covered by inner-lip callus. *Aperture* ovate, a short wide open siphonal canal; columella straight, 2 strong slightly oblique plaits; inner-lip recurved on to body-whorl as a strong callus; outer-lip regularly curved, 4 deep indentations from below shoulder to base caused by external cords; 8 strong lirations below edge of outer-lip extend well into aperture, with extremely fine hair-lines between. *Colour* bright chestnut; fine bristly greenish-brown periostracum.

Type locality. Off Bateman's Bay, New South Wales ($35^{\circ} 45' S.$, $150^{\circ} 29' E.$), 137 metres.

Dimensions. Holotype, length 6 mm, breadth 3.5 mm. Maximum length 7.5 mm.

Location of type. A.M. Sydney, Reg'd No. C. 53771.

Distribution. Off Crowdy Head, N.S.W. ($31^{\circ} 50' S.$, $152^{\circ} 39' E.$), southwards to Twofold Bay, N.S.W. ($37^{\circ} 05' S.$, $150^{\circ} E.$). Lowest depth recorded, 82–100 metres for specimen from off Crowdy Head, shallowest depth 18 metres in Twofold Bay.

Material. Apart from holotype, only 5 specimens are held in A.M., Sydney, and none by other Museums. 82–100 metres off Crowdy Head as above, ex. T. A. Garrard coll., A.M. Reg'd No. C. 90150. 128–146 metres off Cape Everard, Vic. 2 specimens, coll. T. Iredale, A.M. No. C. 94707. 18 metres in Twofold Bay, ex.

T. A. Garrard coll., A.M. No. C. 90151. 82 metres off Twofold Bay, coll. T. Iredale, A.M. No. C. 90152.

Discussion. This species is probably a direct descendant of the Victorian Tertiary fossil *Gergovia laticostata* Tenison-Woods, type for the genus, which it closely resembles. A most interesting comparison of *G. laticostata* and *G. recessa* with specimens of the larger *Agatrix agassizi* Dall, 1889, from the west coast of Florida, U.S.A., shows such a strong resemblance that a close relationship would appear to exist, despite the great distance between localities. The protoconch is identical, also the bold type of axial ribbing and cross striations, the strongly coronate shoulders and slight canal at the sutures, even in one specimen of *G. recessa* the remnants of tufted nodes of periostracum on top of the shoulders, referred to by Petit (1967: 218). The main point of difference apart from size is the existence of 3 columella plaits in *Agatrix agassizi* compared with only two in *G. recessa*.

Genus *Inglisella* Finlay, 1924

Inglisella Finlay, 1924: 513. Type species by original designation *Ptychatractus pukeuriensis* Suter, 1917.

References: Finlay, 1930: 240; Marwick, 1965: 41; Wenz, 1938-44: 1364.

Synonyms: Nil.

Diagnosis: Shell very small, elongate-ovate, four main whorls, strongly axially ribbed, heavy flared outer-lip, two small columella plaits, tall 2 whorled regular protoconch.

Inglisella etheridgei (Johnston, 1880)

Figure 4, (2)

Cancellaria etheridgei Johnston, 1880: 32.—Tate, 1889: 157; pl. 9, fig. 6.

Description: Protoconch large, smooth, $1\frac{1}{2}$ or 2 convex whorls, first half-whorl deviated, merging gradually into adult sculpture, nucleus submerged. Teleoconch $4\frac{1}{2}$ convex whorls, strongly ribbed. Sutures deeply impressed. Sculpture of strong, broadly rounded axial ribs, 10 on penultimate, tending to fade on body-whorl, and terminating a little below periphery; ribs crossed by strong flat-topped transverse striae, 12-14 on body-whorl, 4-5 on penultimate, all crossed by microscopic growth lines. Umbilicus nil. Aperture ovate, broadly rounded posteriorly, a short wide siphonal canal anteriorly, 2 small faint centrally situated plaits; inner-lip strongly reflected on to body-whorl, peritreme entire; outer-lip regularly curved, strongly thickened but sharp-edged, flared outwards, 6 strong internal lirae. Colour off-white.

Type locality. Fossil Bluff, Table Cape, near Wynyard, N.W. Tasmania. Table Cape Group: Longfordian: Lower Miocene.

Dimensions. Holotype, length 7 mm, breadth 3 mm. This appears to be maximum size.

Location of type. Tasmanian Museum, Hobart. Misaid at present time.

Material. 4 fossil topotypes, Q.V.M., Launceston, Reg'd No. 1957: 38: 222. 2 fossil topotypes ex. T. A. Garrard coll., A.M. No. C. 89270.

2 recent specimens, 48 km S. of Cape Everard, Victoria, 366 metres, "Endeavour", 22/10/1914, A.M. No. C. 89271 (37° 17' S., 149° 47' E.).

Distribution. Type locality for fossil specimens, and only locality noted above for Recent specimens.

Discussion. The only differences between the two Recent specimens above and fossil specimens is that in the fossils the transverse striae commence a little lower down the whorls, leaving a clear space below the sutures, the sutures are not quite so deeply impressed, and the columella plaits are a little stronger. These small differences are insufficient to warrant separation, especially as only two Recent specimens are known, and also in view of their eroded condition. This species is almost identical with the New Zealand fossil species *Inglisella pukeuriensis* Suter, type for the genus, except for the deviated protoconch in *I. etheridgei*.

Inglisella fischeri (A. Adams, 1860)

Figure 4, (8)–(11)

Cancellaria (Merica) fischeri A. Adams, 1860: 411.

Description: Protoconch large, white and shining, $1\frac{1}{2}$ whorls, first half-whorl deviated, merging gradually into adult sculpture, nucleus well submerged. Teleoconch $3\frac{1}{2}$ whorls, roundly convex, angulate at sutures. Sutures well impressed. Sculpture of flatly rounded axial ribs, 8 on penultimate, tending to fade on body-whorl, crossed by thin transverse striae, usually 7 on body-whorl, tending to disappear towards base, 3 on other whorls, all crossed by microscopic growth lines. Umbilicus a fine fissure behind inner-lip callus. Aperture broad, tapering a little either end; columella arcuate, two weak slightly oblique plaits, with a third fold on edge of short, broad open siphonal canal; inner-lip strongly calloused on to body-whorl, inclined to left anteriorly; outer-lip uniformly curved, thickened, flared outwards anteriorly, 8 or 9 lirations extending well into aperture. Colour uniformly chalky-white, possibly translucent when alive.

Type locality. "Strait of Corea" (35° N., 130° E.), 114 metres.

Dimensions. Three syntypes, B.M.N.H., Reg'd No. 1968419:

(1) length 6.9 mm, breadth 3.8 mm.

(2) length 6.5 mm, breadth 3.3 mm.

(3) length 7.2 mm, breadth 3.4 mm.

Location of type. Three syntypes as above.

Distribution. Only two localities recorded in Australia are: South of Cape Catastrophe, South Australia ($35^{\circ} 45'$ S., $135^{\circ} 52'$ E.), and between Eucla and Esperance, Western Australia (32° to 35° S., $121^{\circ} 30'$ to 129° E.).

Material. 4 specimens from S. of Cape Catastrophe, 114 metres, ex. T. A. Garrard coll., A.M. No. C. 89273. 4 specimens between Eucla and Esperance, 79–147 metres, coll. CSIRO, H.M.A.S. Gascoyne, G2/96-97/62, 5–9/7/1962. A.M. No. C. 89291. One specimen of this series donated to D.S.I.R., New Zealand Geological Survey Branch, Lower Hutt, New Zealand, in World Mollusca collection, cat. No. WM. 11,253.

Discussion. The above 8 specimens have all been compared with enlarged photographs of the 3 syntypes of *Cancellaria (Merica) fischeri* A. Adams, forwarded by courtesy of B.M.N.H. It is found that two or three very minor differences exist between the three syntypes, between the 8 specimens now held, and between these

specimens and the syntypes. These slight differences are only variable features common to other species in the group, and for the present the two populations can be considered conspecific. A note with the syntypes in B.M.N.H. states "Adams does not mention the source of his material". The type locality "Strait of Corea" has possibly been nominated by another worker at a later date, although the title of Adams' paper was "On some genera and species of shells from Japan".

Inglisella nympa sp. nov.

Figure 4, (14)

Description: Protoconch large and prominent, $1\frac{1}{2}$ transparent shining deviated whorls, terminating abruptly at adult sculpture, nucleus slightly submerged. Teleoconch 3 translucent, convex, bi-carinated whorls, body-whorl 60 per cent of total length. Sutures strongly impressed. Sculpture of two fine sharp transverse threads, bi-carinating whorls, a third thread on body-whorl at suture line; heavy growth lines, simulating narrow axial ribs, occur at irregular intervals, conforming to shape of outer-lip; commencing at third thread near suture line, and crossing a further vague flattened thread below it, occur a multitude of very fine sharp crowded growth lines extending to base of shell; these lines are completely absent above the third thread, where only a few finer growth lines occur spasmodically between the much heavier pseudo "ribs". Umbilicus absent. Aperture widely ovate, tapering sharply posteriorly, opening anteriorly into a short broad siphonal canal, inclined to left under columella; columella arcuate, one very weak flattened central ridge behind columella, inner-lip not calloused; outer-lip thin and regularly curved. Colour translucent off-white.

Type locality. 53 km E. × S. of Green Cape, New South Wales (37° 18' S. 150° 34' E.), 860 metres.

Dimensions. Holotype, length 6.6 mm, breadth 3.2 mm. Apparently mature.

Location of type. A.M., Sydney Reg'd No. C. 89280.

Distribution. Type locality, and 61 km S. of Tamboon Inlet, Victoria, off Gippsland coast (38° 24' S., 149° 08' 50" E.), 987 metres.

Material. Holotype coll. "Endeavour", 2/10/1912. Off Tamboon Inlet as above, 2 immature paratypes coll. C. Phipps, "Esso-Gipps", May, 1969, in ooze, Stn. 3. A.M. No. C. 94706.

Discussion. Compared with *Inglisella fischeri* A. Adams, this species has a protoconch twice the size, less transverse striations, no axial ribbing, the aperture widens out considerably more anteriorly, it has no internal lirae, and only one barely discernible columella plait; it is also a thinner and frailer shell. Fortunately the holotype and larger paratype are in fine condition.

Genus *Pepta* Iredale, 1925

Pepta Iredale, 1925: 266. Type species by monotypy *Admete stricta* Hedley, 1907

References: Wenz, 1938-44: 1371.

Synonyms: *Pallidonia* Laseron, 1955. Type species *Pallidonia simplex* Laseron, 1955. The general whorl formation, shape of aperture, over-riding spiral sculpture and axially ribbed protoconchs show too close a relationship between

Pepta stricta, type for the genus, and *P. simplex* to warrant separation in another genus.

Diagnosis: Shell very small, four convex main whorls, ribs over-riden by strong spiral cords, lunate aperture, axially ribbed protoconch, no columella plaits, off-white translucent or opaque.

Pepta stricta (Hedley, 1907)

Figure 4, (5)

Admete stricta Hedley, 1907: 295, pl. 54, fig. 10.

Pepta stricta; Iredale; 1925: 266; Laseron, 1955: 272, fig. 12.

Description: *Protoconch* 2 convex translucent whorls, obliquely closely axially ribbed, 15 to whorl, commencing at nucleus, which is submerged, 8 fine transverse striae between ribs, sculpture merging gradually into that of main whorls. *Teleoconch* 4 whorls, convex, periphery above centre, slightly quadrate in form. *Sutures* strongly impressed. *Sculpture*—whorls moderately to strongly axially ribbed, 14 on penultimate and body-whorl, crossed by strong transverse flat-topped striae, 6–7 on penultimate, 13 on body-whorl, slightly nodular in places at intersections with ribs, interstices a little broader than striae; microscopic growth lines cross both transverse striations and interstices. *Umbilicus* a very fine fissure behind inner-lip callus. *Aperture* broadly and roundly lunate; inner-lip reflected anteriorly on to body-whorl, a light glaze posteriorly; columella slightly arcuate, devoid of folds; outer-lip thin, regularly curved, crenulated exteriorly by striae; siphonal canal short, broad and open. *Colour* off-white, opaque.

Type locality. 35 km E. of Narrabeen, New South Wales (33° 45' S., 151° 33' E.), 146 metres.

Dimensions. Holotype, length 4.5 mm, breadth 1.76 mm. Fully grown.

Location of type. A.M., Sydney, Reg'd No. C. 25771.

Distribution. From 3 km N.E. of W. side of Gillett Cay, Swain Reefs, Queensland, (21° 43' S., 152° 25' E.), southwards along Queensland coast and New South Wales, thence westwards to Wilson's Bluff, Western Australia, (33° 05' S., 128° 40' E.) in depths from 63 to 183 metres.

Material. Apart from holotype, other specimens are as follows:

1 specimen, Gillett Cay as above, 63–73 metres, coll. A.M. party, 17–19 Oct., 1962, A.M. No. C. 92919.

1 specimen, 26 km E. of Wollongong, N.S.W. (34° 21' S., 151° E.), 183 metres (greatest depth), coll. C. Hedley, A.M. No. C. 25812.

1 specimen, 161 km S. × W. of Wilson's Bluff, Western Australia, as above, 75 metres, coll. CSIRO, H.M.A.S. *Gascoyne*, G2/97/62, 5/7/1962, A.M. No. C. 89295.

Discussion. The above specimen from off Wilson's Bluff, W.A., has 5 transverse striae in lieu of 7 on penultimate whorl, axial ribs are less pronounced than in holotype, and incremental growth lines are very clear and prominent in interstices between transverse striations.

Pepta simplex (Laseron, 1955)

Figure 4, (6)

Pallidonia simplex Laseron, 1955: 272, fig. 13.

Description: Protoconch 2 convex whorls, dome shaped, translucent, nucleus submerged, fine microscopic axial plications faintly visible, commencing close to nucleus. Teleoconch 3 whorls, convex, body-whorl more than half length of shell. Sutures impressed, at base of fine narrow canal. Sculpture—whorls carry very weak, broad rounded axial ribs, 10 to whorl, over-ridden by strong flat-topped striae, 7 on penultimate, 15 on body-whorl, interstices equal in width to striae, one varix present on penultimate whorl in type. Umbilicus nil. Aperture widely ovate; outer-lip thin with broad very shallow subsutural sinus, and crenulated exteriorly by striae; columella slightly arcuate, devoid of plaits; inner-lip reflected on to body-whorl as light glaze; anterior end of aperture a widely curved continuation of outer-lip. Colour off-white.

Type locality. Off Point Halliday, New South Wales (32° 02' S., 152° 36' E.), 14–18 metres.

Dimensions. Holotype, length 3.9 mm, breadth 1.7 mm.

Location of type. A.M., Sydney, Reg'd No. C. 80101.

Distribution. Type locality only.

Material. Holotype is unique. Pres. C. F. Laseron.

Discussion. The holotype is slightly worn, but the faintly visible axial plications commencing immediately after the protoconch nucleus, and with a similar protoconch to *Pepta stricta* Hedley, show its close affinity to that species. The outer-lip is slightly chipped and worn, but traces of a broad and very shallow subsutural sinus are present behind the lip, as stated by the author, but this does not appear to have any special significance.

Genus *Vercomaris* nov.

Vercomaris gen. nov. Type species here designated *Cancellaria pergradata* Verco, 1904.

Diagnosis: Shell very small, squarely turreted and coronate, flatly canaliculate; transversely sculptured with heavy cords crossing weak riblets, nodular at points of crossing; aperture elongate ovate, siphonal canal short, open and broad; columella two or three plaited; protoconch prominent, first half-whorl deviated, nucleus submerged; umbilicus negligible or absent.

The closest existing genus to *Vercomaris* nov. is probably *Oamaruia* Finlay, 1924 (Type *Admete suteri* Marshall and Murdoch). However in this new genus the whorls are coronate and flatly canaliculate, in *Oamaruia* the whorls slope downwards from the suture to the shoulder; in *Vercomaris* the spirals are strongly predominant, the axials in many specimens of *V. pergradata* being merely fine filaments in the interstices or missing altogether; in *Oamaruia* the axials and spirals are of approximately equal strength and sharply nodular at points of intersection. The aperture in *V. pergradata* is widely ovate, the anterior canal being very wide and open and flared outwards, whilst in *O. suteri* the aperture is narrowly ovate, contracted anteriorly into a narrower and more elongate canal.

Vercomaris pergradata (Verco, 1904)

Figure 3, (2)

Cancellaria pergradata Verco, 1904: 142, pl. 26, fig. 19.

Oamaruia pergradata; Cotton and Godfrey, 1932: 55, pl. 3, fig. 5.

Oamaruia pergradata profundior Cotton and Godfrey, 1932: 55, not fig'd.

Description: *Protoconch* $1\frac{1}{2}$ smooth, shining, deviated, flatly convex whorls, finishing abruptly at commencement of first main whorl, nucleus well submerged. *Teleoconch* $4\frac{1}{2}$ flatly convex whorls, constricted at base, strongly shouldered, flatly canaliculate. *Sutures* strongly impressed. *Sculpture* of strong, flat-topped transverse cords, 3 on first main whorl, 4 on next two, 8 on body-whorl; cords become axially denticulate in crossing thin, sharp axial riblets, situated well below top of cords, 20 to each whorl; between each pair of riblets are about 10 microscopic growth lines; a further strong coronate cord lies at the angle of each whorl, with a smaller tuberculate cord between it and the suture; riblets cross the flatly canaliculate area to the suture at an oblique angle. *Umbilicus* absent. *Aperture* elongate, medium width, columella recurved to left anteriorly, with two strong broadly rounded plaits; inner-lip forms a thin glaze on to body-whorl; outer-lip regularly curved, crenulate, flared outwards anteriorly, with short broad notched siphonal canal; short wide indentations in outer-lip behind each external cord, no internal lirae. *Colour*—sculpture light chestnut, darker brown colour shows through from interior in pits between cords and riblets.

Type locality. Gulf St Vincent, South Australia (centre 35° S., 138° E.), 30 metres.

Dimensions. Holotype, length 10 mm, breadth 5 mm. Normal size.

Location of type. S.A.M., Adelaide, Reg'd No. D. 13518.

Distribution. Cape Borda, Kangaroo Island, South Australia (35° 45' S., 136° 33' E.), eastwards and north to Narrabeen, New South Wales (33° 45' S., 151° 44' E.), and including Tasmania.

Material. Apart from holotype, 11 specimens held by S.A.M. Reg'd No. D. 10175, from 36, 73 and 274 metres off Beachport (37° 30' S., 140° E.), and 100 metres off Cape Borda, South Australia, all in one container. One paratype held by A.M. from type locality, pres. by Sir Jos. Verco (author), Reg'd No. C. 19969, and one immature specimen from 64 km S. of Cape Wiles, South Australia, 183 metres, "Endeavour", August, 1909, No. E. 4101. One specimen 35 km E. of Narrabeen, N.S.W., 146 metres, pres. Prof. Haswell, 2/1/1907, A.M. No. C. 25778 (body-whorl only). One specimen, A.M. No. C. 90606, 113 metres N. of Cape Lodi, Eastern Tasmania (41° 45' 30" S., 148° 31' E.), coll. P. H. Colman, 26/3/73, M.T. *Sprightly*, B.M.R. Stn. S. 73-2052. S.A.M. 12 specimens (2 lots), A.M. 4 specimens (4 lots), total 16 specimens (6 lots).

Discussion. Examination of the 11 paratypes from S.A.M. shows variable axial sculpture, ranging from that of *V. pergradata* s.s. to that of *V. pergradata profundior* Cotton and Godfrey, with the fine axial riblets barely visible, and it appears clear that a depth cline is involved. The specimens are marked as *Cancellaria pergradata* in Verco's handwriting, and a further label marked *Oamaruia profundior* by Cotton has been added, and it is evident that the original author did not consider the differences sufficient to warrant separation.

Genus *Zeadmete* Finlay, 1927

Zeadmete Finlay, 1927: 429. Type species by original designation *Cancellaria trailii* Hutton, 1873.

References: Nil.

Synonyms: Nil.

Diagnosis: Shell very small, $3\frac{1}{2}$ main whorls, strongly shouldered, finely cancellate, aperture elongate-ovate, columella straight with 2 small plaits; off-white. Body-whorl expands rapidly, and 70 per cent of total length.

*Zeadmete kulanda** sp. nov.

Figure 3, (15)

Description: Protoconch 2 depressed convex whorls, smooth and shining, first whorl slightly deviated, merging gradually into sculpture of main whorls, nucleus submerged. Teleoconch $3\frac{1}{2}$ flatly convex whorls, vertical at base, strongly and roundly shouldered, flat-topped, body-whorl 70 per cent of total length. Sutures strongly incised. Sculpture of strong flat-topped transverse cords, slightly narrower than interstices, one on edge of shoulder the strongest, 7 below this and 3 on top of shoulder on penultimate, body-whorl with 5 on top of shoulder and 28 below; vestigial axial riblets barely visible on early whorls, about 18 on second whorl, creating minute nodules at points of intersection with stronger cord on edge of shoulders; crowded microscopic growth lines intersect transverse cords. Umbilicus absent. Aperture ovate, 75 per cent of length of body-whorl, inner-lip reflected anteriorly as callus over body-whorl; columella straight, one vestigial fold towards base; outer-lip regularly curved, very thin, crenulated exteriorly, no internal lirations; siphonal canal short, broad and open. Colour translucent white.

Type locality. 53 km E. × S. of Green Cape, New South Wales, (37°1 7' S., 150° 35' E.), 860 metres.

Dimensions. Holotype, length 8.2 mm, breadth 5 mm. Apparently mature.

Location of type. A.M., Sydney, Reg'd No. C. 89275.

Distribution. Type locality only.

Material. Holotype is unique. Coll. "Endeavour", 2/10/1912.

Discussion. The holotype, which is in very fine condition, is the only species known in the genus *Zeadmete* from Australian waters, and in keeping with other deep-water species is extremely thin and fragile. Umbilicus as stated above is absent, the very small fissure visible in the photograph being due to a breakage in the inner-lip callus. Compared with *Zeadmete trailii* Hutton, the type for the genus, the differences are as follows:

*A New South Wales Aboriginal noun meaning "Salt water".

Zeadmete trailii

Spirals more flat-topped and wider than interstices.

Axial riblets over-shadowed by spirals, but still prominent and break spirals in places.

Protoconch prominent and deviated.

3 medium folds on columella.

Outer lip thicker and with distinct inner nacreous layer.

Zeadmete kulanda

Spirals rounded, interstices equal in width.

No riblets, spirals intersected only by numerous fine growth lines.

Protoconch regular and flatly depressed.

One barely visible anterior fold on columella.

Outer lip thinner and of one layer only.

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LIST OF AUSTRALIAN TERTIARY FOSSIL SPECIES

alveolata Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, (1887-88) 11: 154, pl. 10, fig. 7.

Lower beds, Muddy Creek, west of Hamilton, Victoria.

Muddy Creek Formation: Balcombian: Middle Miocene.

Holotype, length 4.5 mm, breadth 3 mm.

calvulata Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, 11: 153, pl. 9, fig. 3.

Blue Clays at Fossil Beach, Balcombe Bay, Mornington Peninsula, Vict. Grid. Ref. Cranbourne 072, 845.

Balcombe Clay: Balcombian: Middle Miocene.

Holotype, length 16 mm, breadth 12 mm.

caperata Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, 11: 158, pl. 9, fig. 7.

Blue Clays at Fossil Beach, Balcombe Bay, Mornington Peninsula, Vict. Grid. Ref. Cranbourne 072, 845.

Balcombe Clay: Balcombian: Middle Miocene.

Holotype, length 5 mm, breadth 2.5 mm.

capillata Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, 11: 158, pl. 10, fig. 10.

Lower beds, Muddy Creek, west of Hamilton, Vict.

Muddy Creek Formation: Balcombian: Middle Miocene.

Holotype, length 6 mm, breadth 3 mm.

confirmans Ludbrook, 1958. *Cancellaphera*, *Trans. Roy. Soc. S. Aust.*, 81: 78, pl. 6, fig. 5.

Weymouth Bore, Adelaide, South Australia, 310-330 ft.

Dry Creek Sands: Yatalan: Upper Pliocene.

Holotype, length 8 mm, breadth 5 mm.

epidromiformis Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, 11: 154, pl. 8, fig. 9.

Lower beds, Muddy Creek, west of Hamilton, Vict.

Muddy Creek Formation: Balcombian: Middle Miocene.

Holotype, length 20 mm, breadth 10 mm.

etheridgei Johnston, 1880. *Cancellaria*, *Pap. Proc. Roy. Soc. Tas.*, (1879), p. 32.

Fossil Bluff, Table Cape, near Wynyard, Tasmania.

Table Cape Group: Longfordian: Lower Miocene.

Holotype, length 7 mm, breadth 3 mm.

exaltata Tate, 1889. *Cancellaria*, *Proc. Roy. Soc. S. Aust.*, 11: 154, pl. 8, fig. 10.

Blue Clays at Fossil Beach, Balcombe Bay, Mornington Peninsula, Vic. Grid Ref. Cranbourne 072, 845.

Balcombe Clay: Balcombian: Middle Miocene.

Holotype, length 19.5 mm, breadth 8.5 mm.

laticostata Tenison-Woods, 1879. *Cancellaria*, *Proc. Linn. Soc. N.S.W.*, 4: 17, pl. 2, fig. 8.

Cancellaria platypleura Tate, 1898. *J. Proc. Roy. Soc. N.S.W.*, 31: 389. (Invalid name change for *C. laticostata* Tenison-Woods).

Lower beds, west of Hamilton, Muddy Creek, Vict.

Muddy Creek Formation: Balcombian: Middle Miocene.

Holotype, length 6 mm, breadth 3.5 mm.

micra Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, 11: 158, pl. 10, fig. 8.

Adelaide Bore, Kent Town, South Australia.

Blanche Point Marl: Aldingan: Upper Eocene.

Holotype, length 3.5 mm, breadth 1.75 mm.

modestina Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, 11: 157, pl. 9, fig. 4.

Upper beds, Muddy Creek, west of Hamilton, Vict.

Muddy Creek Formation: Balcombian: Middle Miocene.

Holotype, length 12 mm, breadth 7 mm.

ptychotropis Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, 11: 156, pl. 9, fig. 5.

Lower beds, Aldinga, S. Australia.

Blanche Point Marl: Aldingan: Upper Eocene.

Holotype, length 6.25 mm, breadth 3.5 mm.

semicostata Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, 11: 157, pl. 10, fig. 3.

Lower beds, Muddy Creek, west of Hamilton, Vic.

Muddy Creek Formation: Balcombian: Middle Miocene.

Holotype, length 3 mm, breadth 2 mm.

tatei Cossmann, 1899. *Cancellaria*, *Essais de Paleoconch.*, comp., 3: 24 (new name for *Cancellaria gradata* Tate, 1889, non Hoernes, 1856) (*Aneurystoma*).

Lower beds, Muddy Creek, west of Hamilton, Vict.

Muddy Creek Formation: Balcombian: Middle Miocene.

Holotype, length 13.5 mm, breadth 7 mm.

torquayensis Chapman, 1922. *Cancellaria*, *Proc. Roy. Soc. Vict.*, 35: 16, pl. 3, fig. 25.

Bird Rock cliffs, near Geelong, Victoria.

Jan Juc Formation: Janjukian: Upper Oligocene.

Holotype, length 22 mm, breadth 13 mm.

turriculata Tate, 1889. *Cancellaria*, *Trans. Roy. Soc. S. Aust.*, 11: 156, pl. 10, fig. 14.

Lower beds, Aldinga, S. Australia.

Blanche Point Marl: Aldingan: Upper Eocene.

Holotype, length 5.75 mm, breadth 2.5 mm.

varicifera Tenison-Woods, 1879. *Cancellaria*, *Proc. Linn. Soc. N.S.W.*, 3: 231, pl. 21, fig. 12.

Lower beds, Muddy Creek, west of Hamilton, Vict.

Muddy Creek Formation: Balcombian: Middle Miocene.

Holotype, length 19 mm, breadth 9 mm.

wannonensis Tate, 1889. *Cancellaria*, *Proc. Roy. Soc. S. Aust.*, 11: 156, pl. 8, fig. 11.

Upper beds, Muddy Creek, west of Hamilton, Vict.

Muddy Creek Formation: Balcombian: Middle Miocene.

Holotype, length 29 mm, breadth 17 mm.

FIGURE 1

- (1) *Cancellaria (Merica) elegans* Sowerby, 1822. 49 metres off Island Head, 80 km North of Yeppoon, Q. × 1·7 (33·2 mm x 20·6 mm). A.M. Reg'd No. C. 89756.
- (2) *Cancellaria (Merica) melanostoma westralis* Garrard, subsp. nov. Roebuck Bay, N.W. Australia. × 1·3 (31·5 mm x 20·1 mm). A.M. Reg'd No. C. 89755.
- (3) *Cancellaria (Merica) melanostoma westralis* Garrard, subsp. nov. Holotype. Near Turtle Bay, North-West Cape, W.Aust. × 1·7 (30·2 mm x 19·9 mm). W.A.M. Reg'd No. 697/44
- (4) *Cancellaria (Nevia) spirata* (Lamarck, 1822). Aldinga, South Australia. × 2 (26·5 mm x 18·3 mm). A.M. Reg'd No. C. 89283.
- (5) *Cancellaria (Nevia) spirata* (Lamarck, 1822). Holdfast Bay, South Australia. × 2·2 (26·3 mm x 15·2 mm). A.M. Reg'd No. C. 89284.
- (6) *Cancellaria (Sydaphera) undulata* Sowerby, 1848. Pittwater, N.S.W. × 1·5 (34·7 mm x 20·5 mm). A.M. Reg'd No. C. 89286.
- (7) *Cancellaria (Sydaphera) undulata* Sowerby, 1848. Boatswain's Beach, Kingston, S.E. South Australia. × 1·1 (53·3 mm x 27·5 mm). A.M. Reg'd No. C. 89287. Gerontic specimen, teleoconch $7\frac{1}{2}$ whorls.
- (8) *Cancellaria (Sydaphera) granosa* Sowerby, 1832. Between Stanley and Ulverstone, N.W. Tasmania. × 1·7 (29·6 mm x 18·5 mm). A.M. Reg'd No. C. 89750.
- (9) *Cancellaria (Sydaphera) anxifer* Iredale, 1925. Holotype. Off Eden (Twofold Bay), N.S.W., 45–54 metres. × 1·8 (23 mm x 12 mm). A.M. Reg'd No. C. 53773.
- (10) *Cancellaria (Sydaphera) anxifer* Iredale, 1925. 11 metres, 5 km E. of Forster, N.S.W. × 2·6 (24 mm x 12·5 mm). A.M. Reg'd No. C. 90180.

Photos—Chas. V. Turner, A.M., Sydney.

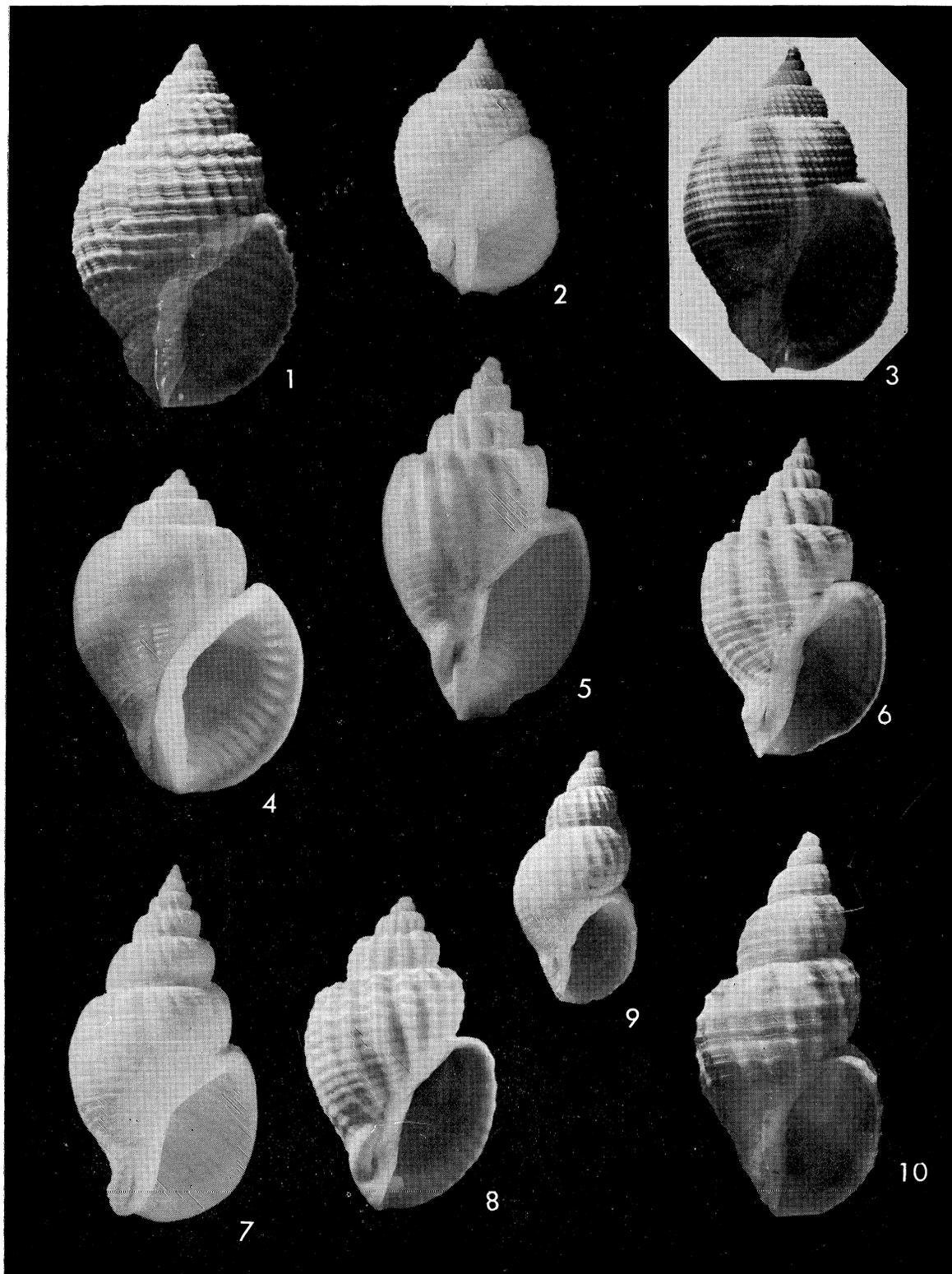


FIGURE 2

- (1) *Cancellaria (Sydaphera) australis* Sowerby, 1832. "New South Wales". $\times 2.3$ (21.8 mm x 13 mm). B.M.N.H. Reg'd No. 1968388. (Largest of 4 syntypes).
- (2) *Cancellaria (Sydaphera) australis* Sowerby, 1832. "New South Wales". $\times 3.1$ (16 mm x 9.8 mm). B.M.N.H. Reg'd No. 1968388. (Least worn of 4 syntypes).
- (3) *Cancellaria (Sydaphera)* sp. Off Caloundra, Q. 109–128 metres. $\times 3.2$ (16.9 mm x 10.1 mm). A.M. Reg'd No. C. 89278.
- (4) *Cancellaria (Sydaphera) lactea* Deshayes, 1830. Blackman's Bay, Hobart, Tas. $\times 2.1$ (28.5 mm x 14.4 mm). A.M. Reg'd No. C. 89749.
- (5) *Cancellaria (Sydaphera) lactea* Deshayes, 1830. Flinders, Victoria. $\times 2.2$ (25.2 mm x 15.1 mm). A.M. Reg'd No. C. 89751.
- (6) *Cancellaria (Sydaphera) purpuriformis* Valenciennes (in Kiener), 1841. Off St Francis Island, S. Australia. $\times 1.8$ (28.8 mm x 15.4 mm). S.A.M. Reg'd No. D. 7529.
- (7) *Cancellaria (Sydaphera) panamuna* Garrard, nov. Holotype. 32 km N.W. of Anchor Island, near Onslow, W. Australia. 119 metres. $\times 3$ (17.2 mm x 6.9 mm). In mud, 17/1/60, W.A.M. Reg'd No. 551-71.
- (8) *Fusiaphera dampierensis* Garrard, nov. Holotype. 11–12 km N. of Delambre Island, Dampier Archipelago, N.W. Australia, 40 metres. $\times 4.3$ (11.6 mm x 6.6 mm). W.A.M. Reg'd No. 550-71.
- (9) *Fusiaphera pallida* (E. A. Smith, 1899). Holotype. Off Cassini Island, Bonaparte Archipelago, N.W. Australia. $\times 3.9$ (10.5 mm x 6 mm). B.M.N.H. Reg'd No. 1891.11.21.96.
- (10) *Admetula garrardi* Petit, 1974. N.E. of Cape Moreton, southern Q. 114–124 metres. $\times 3.7$ (11.2 mm x 7.4 mm). A.M. Reg'd No. C. 89279.
- (11) *Bonellitia scobina* (Hedley and Petterd, 1906). Holotype. Off Sydney, N.S.W. 549 metres. $\times 4.5$ (8 mm x 5 mm). A.M. Reg'd No. C. 24448.
- (12) *Fusiaphera pallida* (E. A. Smith, 1899). Arafura Sea, 161 km N. of Croker Is. Northern Territory, 124 metres. $\times 3.6$ (11.2 mm x 5.8 mm). A.M. Reg'd No. C. 89268.

Photos—Chas. V. Turner, A.M., Sydney, except Nos 1, 2 and 9, B.M.N.H.

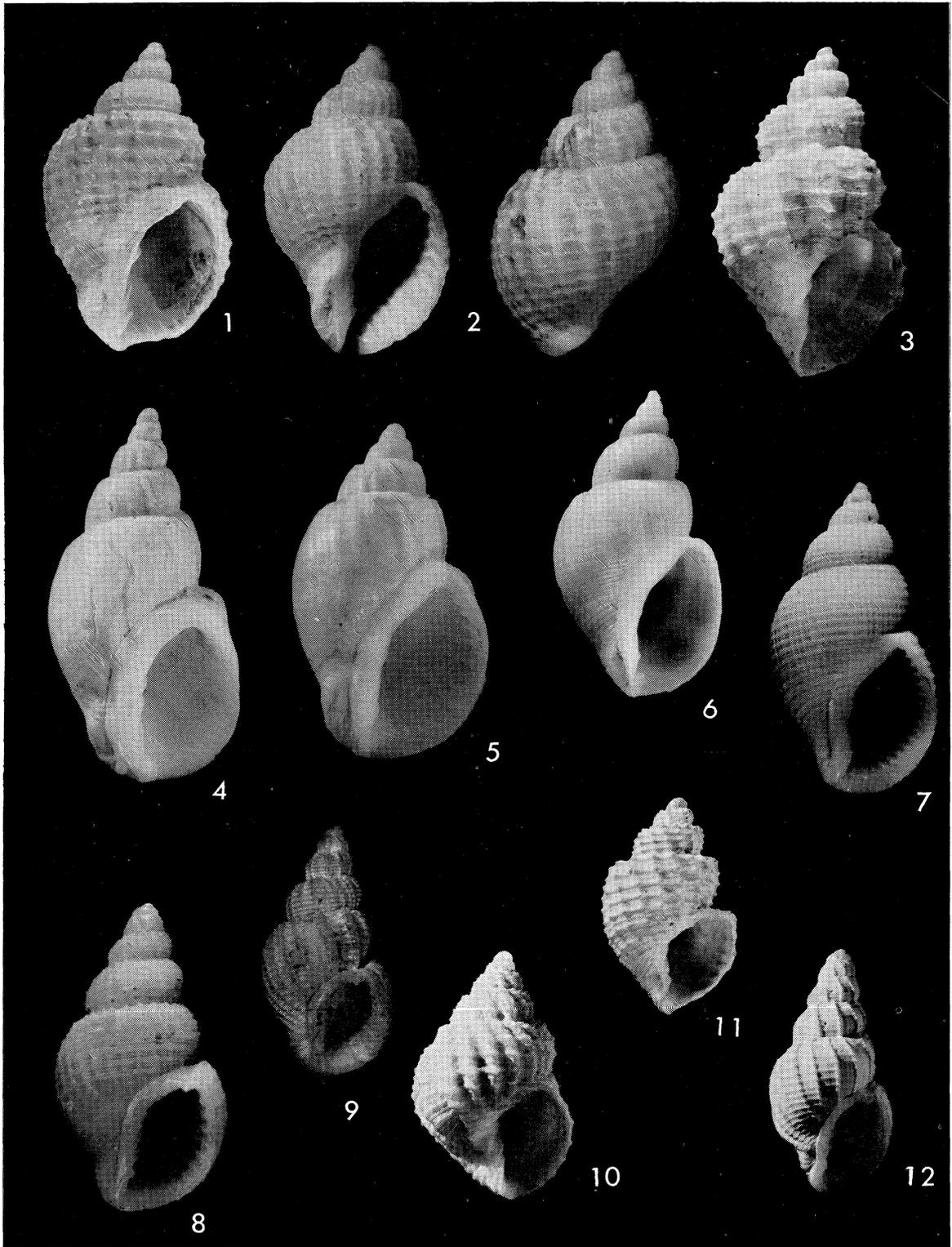


FIGURE 3

- (1) *Trigonostoma textilis* (Kiener, 1841). 23 km W. of Eaglehawk Is., Dampier Archipelago, N.W. Australia, 25 metres. $\times 2.7$ (18.3 mm \times 11 mm). W.A.M. Reg'd No. 558-71.
- (2) *Vercomaris pergradata* (Verco, 1904). Deep water, St Vincent's Gulf, South Australia. $\times 4$ (10.1 mm \times 4.9 mm). A.M. Reg'd No. C. 19969 (Paratype).
- (3) *Trigonostoma iota* Garrard, nov. Holotype. N.E. of Cape Moreton, southern Qld. 114-124 metres, $\times 3.3$ (13.2 mm \times 7.1 mm). A.M. Reg'd No. C. 89274.
- (4) *Trigonostoma diamantina* Garrard, nov. Holotype. N.W. of Bunbury, W. Australia. 201-228 metres. $\times 4$ (12.6 mm \times 7.2 mm). W.A.M. Reg'd No. 490-72.
- (5) *Trigonostoma vinnula* (Iredale, 1925). Holotype. Off Twofold Bay, N.S.W., 45 metres. $\times 3.3$ (12.5 mm \times 7 mm). A.M. Reg'd No. C. 53774.
- (6) *Trigonostoma vinnula* (Iredale, 1925). Off Crookhaven, N.S.W., 45 metres. $\times 2.7$ (15.5 mm \times 9.5 mm). A.M. Reg'd No. C. 75014.
- (7) *Gergovia recessa* (Iredale, 1925). Off Twofold Bay, N.S.W., 82 metres. $\times 4.1$ (8.2 mm \times 4.2 mm). A.M. Reg'd No. C. 90152.
- (8) *Gergovia recessa* (Iredale, 1925). Holotype. Off Bateman's Bay, N.S.W., 137 metres. $\times 4.3$ (6 mm \times 3.5 mm). A.M. Reg'd No. C. 53771.
- (9) *Fusiaphera macrospira* (A. Adams and Reeve, 1848). E. of South Keppel Is., Qld, 18-27 metres. $\times 1.9$ (24.6 mm \times 11.2 mm). A.M. Reg'd No. C. 89277.
- (10) *Trigonostoma bicolor* (Hinds, 1843). Port Curtis, Qld. $\times 2.4$ (18.1 mm \times 11.8 mm). A.M. Reg'd No. C. 89269.
- (11) *Trigonostoma amasia* (Iredale, 1930). Holotype. Port Curtis, Qld. 16-20 metres. $\times 2.6$ (15 mm \times 10 mm). A.M. Reg'd No. C. 57740.
- (12) *Trigonostoma amasia* (Iredale, 1930). Port Curtis, Qld. $\times 2.7$ (12.8 mm \times 9.4 mm). A.M. Reg'd No. C. 90079. (White specimen.)
- (13) *Trigonostoma lamellosa* (Hinds, 1843). Rosemary Is., Dampier Archipelago, N.W. Australia, 5 metres. $\times 2.3$ (22.5 mm \times 18.2 mm). W.A.M. Reg'd No. 537-71.
- (14) *Trigonostoma scalarina* (Lamarck, 1822). Off Bowen, Qld, 27-45 metres. $\times 2$ (19.1 mm \times 11.9 mm). A.M. Reg'd No. C. 90080.
- (15) *Zeadmete kulanda* Garrard, nov. Holotype. E. x S. of Green Cape, N.S.W., 53 km, (860 metres). $\times 4$ (8.2 mm \times 5 mm). A.M. Reg'd No. C. 89275.
- (16) *Trigonostoma antiquata* (Hinds, 1843). 3 metres off Black Is., Whitsunday Group, Qld, Oct., 1969. $\times 1.9$ (23.2 mm \times 15.5 mm). Live specimen. Neville Coleman coll.
- (17) *Trigonostoma obliquata* (Lamarck, 1822). Huailu, New Caledonia. $\times 1.3$ (25.1 mm \times 16.8 mm). A.M. Reg'd No. C. 89281.
- (18) *Trigonostoma tessella* Garrard, nov. Holotype. N.E. of Cape Moreton, southern Qld. 114-124 metres. $\times 1.8$ (18.8 mm \times 14.3 mm). A.M. Reg'd No. C. 89285.

Photos—Chas. V. Turner, A.M., Sydney.

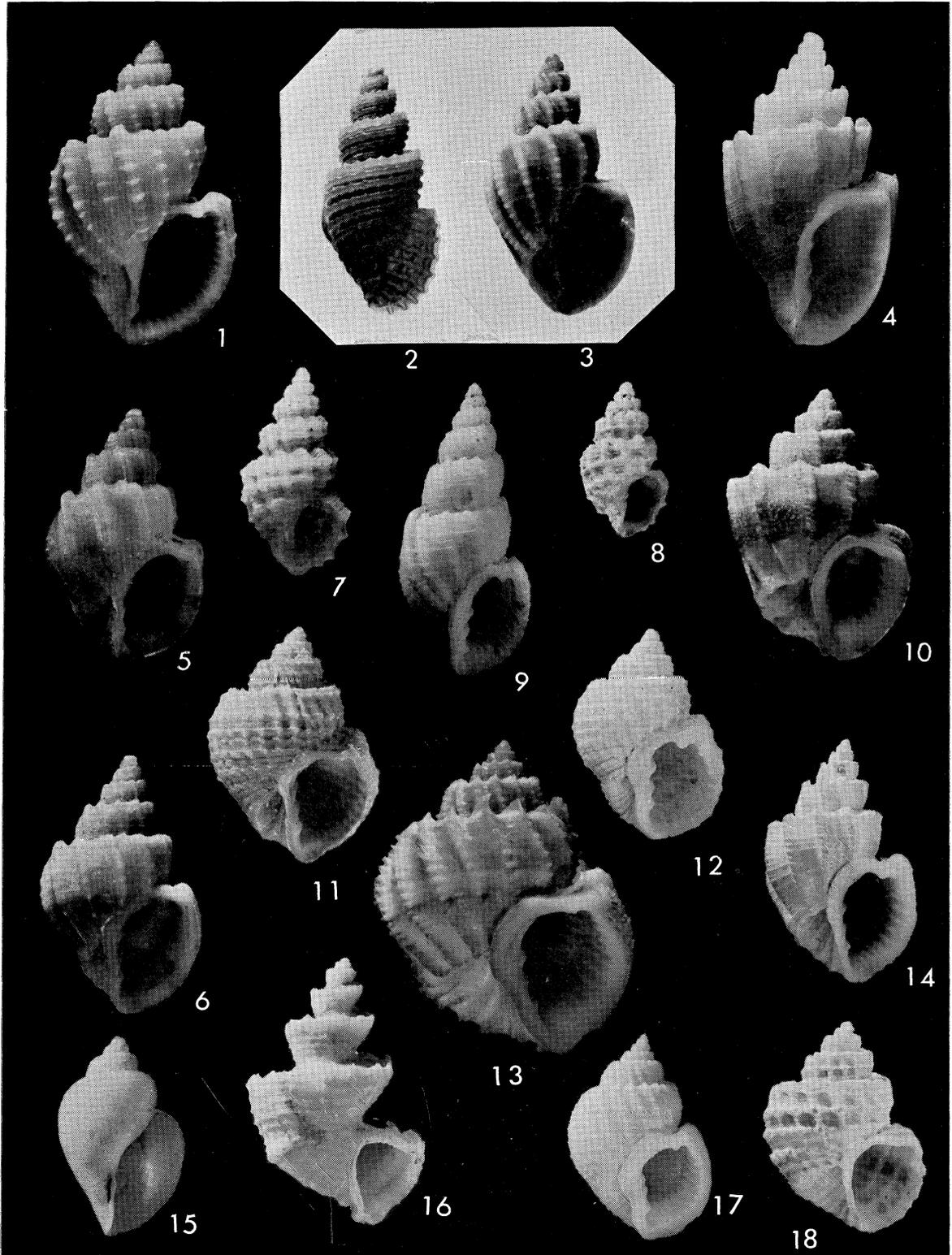


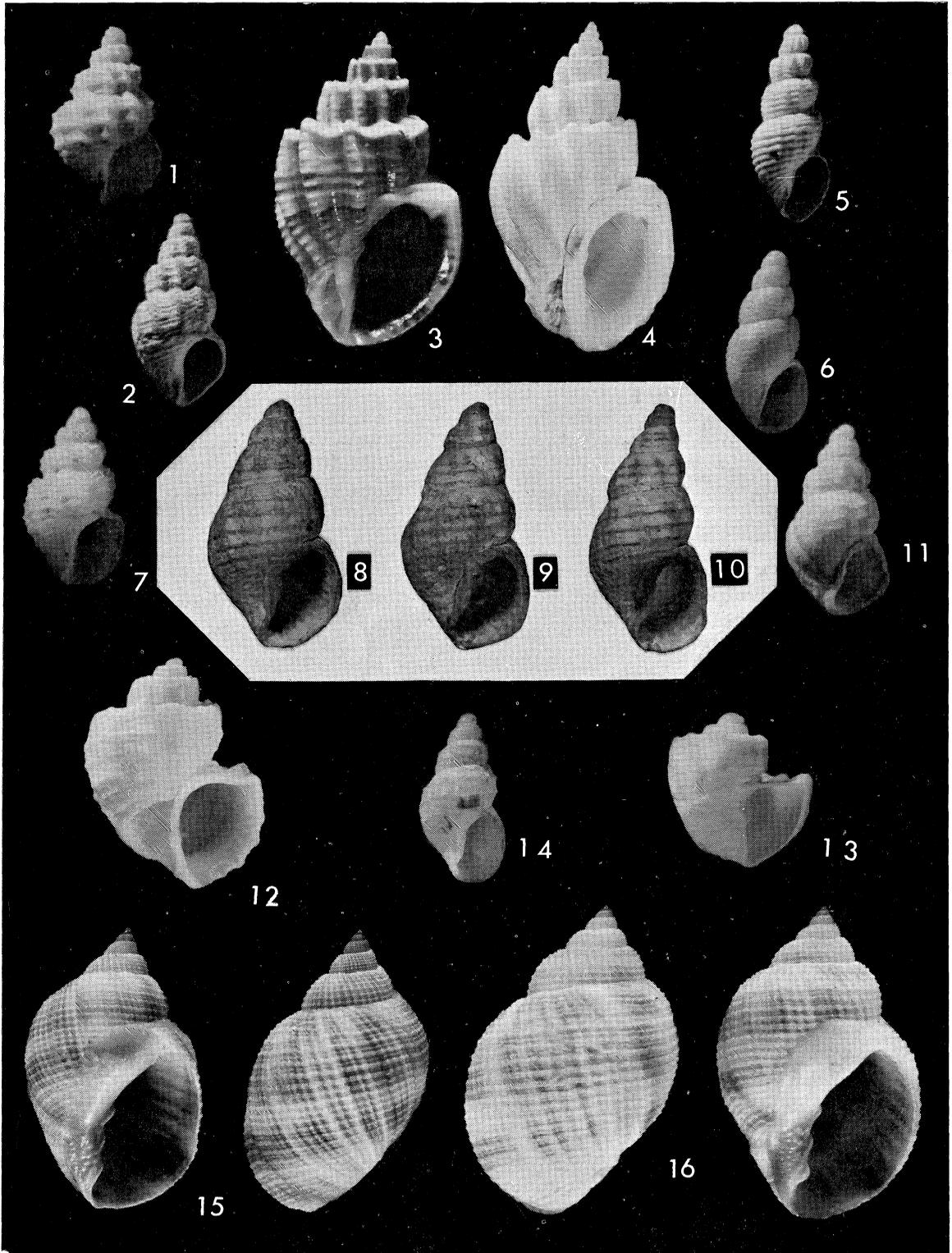
FIGURE 4

- (1) *Gergovia exigua* (E. A. Smith, 1891). S.E. of Lakes Entrance, Vict., 155 metres. × 4·2 (4·9 mm x 3 mm). A.M. Reg'd No. C. 89272.
- (2) *Inglisella etheridgei* (Johnston, 1880), 48 km S. of Cape Everard, Vict., 366 metres. × 5·2 (4·9 mm x 2·3 mm). A.M. Reg'd No. C. 89271. ("Endeavour", 22/10/1914).
- (3) *Trigonostoma scalariformis* (Lamarck, 1822). Mossman, Qld. × 2·5 (20·3 mm x 11·5 mm). A.M. Reg'd No. C. 83739. (Figured specimen, Rippingdale and McMichael, 1961, pl. 16, fig. 14. *Trigonaphera "crenifera"* Sowerby).
- (4) *Trigonostoma scalariformis* (Lamarck, 1822). Off Karumbah, Gulf of Carpentaria. × 2·1 (25·2 mm x 14·2 mm). A.M. Reg'd No. C. 90078. (forma "*bocageana*").
- (5) *Pepta stricta* (Hedley, 1907). Holotype. 35 km E. of Narrabeen, N.S.W., 146 metres. × 5·3 (4·5 mm x 1·76 mm). A.M. Reg'd No. C. 25771.
- (6) *Pepta simplex* (Laseron, 1955). Holotype. Off Point Halliday, N.S.W., 14–18 metres. × 4·1 (3·9 mm x 1·7 mm). A.M. Reg'd No. C. 80101.
- (7) *Gergovia haswelli* Garrard, nov. Holotype. 35 km E. of Narrabeen, N.S.W., 146 metres. × 2 (3·8 mm x 1·9 mm). A.M. Reg'd No. C. 25843.
- (8) *Inglisella fischeri* (A. Adams, 1860). "Strait of Corea". × 5·8 (6·9 mm x 3·8 mm). B.M.N.H. Reg'd No. 1968419 (1).
- (9) *Inglisella fischeri* (A. Adams, 1860). "Strait of Corea". × 6·2 (6·5 mm x 3·3 mm). B.M.N.H. Reg'd No. 1968419 (2).
- (10) *Inglisella fischeri* (A. Adams, 1860). "Strait of Corea". × 5·7 (7·2 mm x 3·4 mm). B.M.N.H. Reg'd No. 1968419 (3).
- (11) *Inglisella fischeri* (A. Adams, 1860). S. of Cape Catastrophe, S. Aust., 114 metres. × 4·5 (4·9 mm x 2·7 mm). A.M. Reg'd No. C. 89273.
- (12) *Trigonostoma laseroni* (Iredale, 1936). Broulee, near Bateman's Bay, N.S.W. × 2·1 (17·8 mm x 13·7 mm). A.M. Reg'd No. C. 89276.
- (13) *Trigonostoma laseroni* (Iredale, 1936). Holotype. Shellharbour, N.S.W. × 3·6 (7 mm x 7 mm). A.M. Reg'd No. C. 60686.
- (14) *Inglisella nympha* Garrard, nov. Holotype. 53 km E. × S. of Green Cape, N.S.W., 860 metres. × 4·1 (6·6 mm x 3·2 mm). A.M. Reg'd No. C. 89280.

Non-Australian species

- (15) *Cancellaria (Merica) melanostoma* (Sowerby, 1848). × 1·5 (29·9 mm x 18·2 mm). B.M.N.H. Reg'd No. not available. (Specimen used for Sowerby's figure, 1855, *Thes. Conch.*, 2: 447, pl. 95, fig. 78).
- (16) *Cancellaria (Merica) melanostoma* (Sowerby, 1848). × 1·6 (32·8 mm x 21·2 mm). B.M.N.H. Reg'd No. not available. (Specimen used for Reeve's figure, 1858, *Conch. Icon.*, 10, pl. 6, fig. 26).

Photos—Chas. V. Turner, A.M., Sydney, except Nos 8–10, 15 and 16 by B.M.N.H.



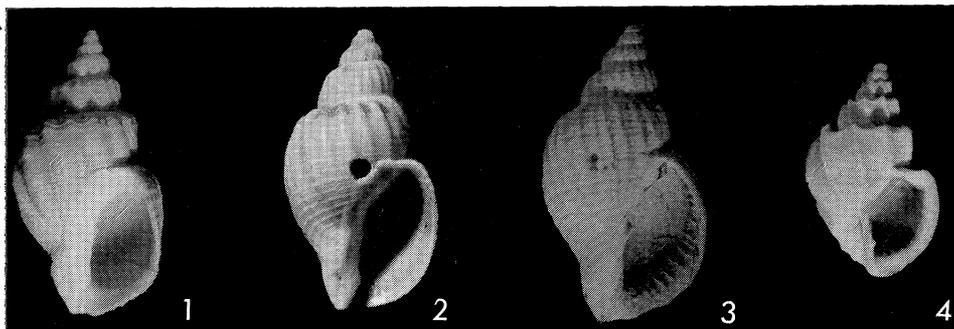


FIGURE 5

- (1) *Cancellaria (Sydaphera) undulata* Sowerby, 1848. (Holotype of *C. (S.) "renovata"* Iredale, 1929. Sydney Harbour). $\times 1.1$ (37 mm x 20 mm). A.M. Reg'd No. C. 57838.
- (2) *Cancellaria (Sydaphera) undulata* Sowerby, 1848. (Holotype of *C. (S.) "obnixa"* Iredale, 1936. Richmond River, northern New South Wales). $\times 1.6$ (26 mm x 16 mm), A.M. Reg'd No. C. 60664.
- (3) *Cancellaria (Sydaphera) undulata* Sowerby, 1848. (Holotype of *C. (S.) "deliciosa"* Laseron, 1955. Woolgoolga, northern New South Wales). $\times 1.8$ (24 mm x 11 mm). A.M. Reg'd No. C. 80102.
- (4) *Trigonostoma bicolor* (Hinds, 1843). (Holotype of "*Trigonaphera interlaevis*" Laseron, 1955. Port Stephens, New South Wales). $\times 2.1$ (14 mm x 9 mm). A.M. Reg'd No. C. 10646.

Photos—Chas. V. Turner, A.M., Sydney.

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