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<td>PUBLICATIONS OF THE SETO MARINE BIOLOGICAL LABORATORY (1975), 22(5): 237-266</td>
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<td>Issue Date</td>
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<td>URL</td>
<td><a href="http://hdl.handle.net/2433/175903">http://hdl.handle.net/2433/175903</a></td>
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Kyoto University
Trawl collections made along the offshore shoals of the northwestern coast of Australia during the
Japanese program of the International Indian Ocean Expedition in December 1963 revealed 21 octocoral species comprising 1 Telestacea, 3 Alcyonacea, 16 Gorgonacea and 1 Pennatulacea (including a new species of *Mopsea*). These less-known deep-water octocorals are described and figured. The appendix records the station sites and the lists of all octocorallian species and antipatharian species collected at each.

Introduction


Among the benthic invertebrate samples thus collected, the Octocorallia and Antipatharia, together with their commensal Cirripedia, were placed at my disposal for identification and detailed study by Professor Senô after returning home.

A preliminary brief report based only on a tentative identification for the general prompt report to the Ministry of Education in support was already published in 1966 with other co-workers under the name of the representative J. Senô.

The present paper deals only with the Octocorallian material after a further detailed re-examination made in recent years.

All the specimens here treated are deposited in the Science Museum, Tokyo University of Fisheries, Minato-ku, Tokyo, together with other benthic samples obtained by the T/S “Umitaka-maru” on every cruise.

This study was made at the Seto Marine Biological Laboratory and supported by a grant of Scientific Research Fund from the Ministry of Education in 1966 (Synthetic Research Grant 6048), for which I wish here to express my sincere thanks.

1) Contributions from the Seto Marine Biological Laboratory, No. 604.

I am indebted to Dr. J. Senô, then of the Tokyo University of Fisheries and his cadet students for taking a trouble to sort the pertinent samples fitted for particular research and entrusting them to me for study. Furthermore I am specially grateful to my colleagues Mr. Chuichi Araga (Seto M. B. L.) and Mr. Yoshihisa Koyama (Gakushu Kenkyusha Co. Ltd.) for preparing many photographs of the studied material. My thanks are also due to Dr. Saburo Nishimura (Seto M.B.L.) for editing the manuscript.

**List of the Species Taken by Trawling**

I. **Telestacea**
   Fam. Telestidae Milne Edwards & Haime
   1. *Telesto multiflora* Laackmann

II. **Alcyonacea**
   Fam. Nephtheidae Gray
   2. *Nephthea granulata* Kükenthal
   3. *Umbellulifera striata* (Thomson & Henderson)

Fam. Nidaliidae Gray (emend. Utinomi)
   4. *Siphonogorgia obspiculata* Chalmers

IIIa. **Gorgonacea—Scleraxonnia**
   Fam. Anthothelidae Broch
   5. *Solenocaule tortuosum* Gray
   6. *Solenocaule ramosum* Hickson

Fam. Subergorgiidae Studer
   7. *Subergorgia suberosa* (Pallas)
   8. *Subergorgia reticulata* (Ellis & Solander)

Fam. Melithaceidae Gray
   9. *Melithaia modesta* (Nutting)
   10. *Acabaria formosa* Nutting

IIIb. **Gorgonacea—Holaxonnia**
   Fam. Acanthogorgiidae Gray
   11. *Acanthogorgia turgida* Nutting
   12. *Anthogorgia glomerata* Thomson & Simpson

Fam. Paramuriceidae Bayer
   13. *Muriceides dubia* Nutting
   14. *Discogorgia dentata* (Nutting)

Fam. Plexauridae Gray
   15. *Euplexaura robusta* Kükenthal

Fam. Ellisellidae Gray
   16. *Viminella gracilis* (Wright & Studer)
   17. *Junceella gemmacea* (Valenciennes) Milne Edwards & Haime

Fam. Primnoidae Gray
   18. *Thouarella (Amphilaphis) plumacea* (Thomson & Mackinnon)
Fam. Isididae Lamouroux
19. *Mopsea squamosa* Kükenthal

IV. Pennatulacea—Subselliflorae
Fam. Virgulariidae Verrill
21. *Virgularia hexangularis* Köllicher

**Taxonomic Account**

I. Order TELESTACEA Hickson, 1930
Family Telestidae Milne Edwards & Haime, 1857
Genus *Telesto* Lamouroux, 1812

1. *Telesto multiflora* Laackmann, 1909

(Text-fig. 1; Pl. I, fig. 1)

*Telesto multiflora* Laackmann, 1909, p. 91, fig. H; ——— Kükenthal, 1910, p. 36, pl. I fig. 6, pl. II fig. 12; ——— Kükenthal, 1913, p. 235 (distribution).

Text-fig. 1. *Telesto multiflora* Laackmann.

\(a\), Lateral polyp viewed from side, anthocodial part completely retracted; \(b\), septal spicules lying in deeper layer beneath longitudinal furrows illustrated in \(a\); \(c\), interseptal spicules lying on periphery of longitudinal ridges in lateral polyps, illustrated in \(a\). \([a, \times 28; b, c, \times 96]\)
Material examined.—5 fragments from Station 13 (3rd haul), depth 110–120 m (19. 12. '63).

Description.—All samples, measuring up to 6.8 cm in total length and 2–3 mm in diameter, are represented by almost straight single stem or branch, covered thickly with lateral polyps all around the length throughout.

The axial polyp is truncately ended. The lateral polyps, which are rather more numerous than in the related *Telesto arborea* Wright & Studer, are alternately placed around the wall of the axial polyp. They are about 4–5 mm long and 1.5 mm wide, and somewhat labiate in form, their tip being obliquely truncated in lateral view. Their walls are formed of 8 distinct longitudinal grooves and broader spiculated interseptal ridges.

The outer layer of the interseptal ridges in the lateral polyps is closely packed with less spinose rod-like spicules (0.015–0.03 mm long and 0.01–0.018 mm wide in size) arranging longitudinally, but there is no sign of fusion between these spicules whatever. In addition, there are found a few much larger needle- or rod-like bluntly ended spinose spicules (about 0.4–0.5 mm long), lying in deeper layer of septal area.

Color in alcohol.—The body walls are grayish white, while the anthocodiae partly extended are rosy brown, somewhat darker than the body walls.

Distribution.—Bass Strait, south-eastern Australia and Sharks Bay, western Australia.

II. Order ALCYONACEA Lamouroux, 1816

Family Nephtheidae Gray, 1862 (emend. Utinomi, 1954)

Genus Nephthea Audouin, 1828

2. *Nephthea granulata* Kükenthal, 1910

(Text-fig. 2; Pl. I, fig. 2)


Material examined.—A flabby flabellate colony from Station 1 (1st haul), depth 124 m (1. 12. '63).

Description.—The main stem, of which the basal part is torn off, ramifies into 4 flattened primary branches, about 3–10 cm long, at different heights in a flabellate form. Each branch bears a number of polyp-bearing catkins around the distal part. The catkins are elongate conical, more or less bluntly tipped, measuring about 3–5 mm long and 1.5 mm wide at base.

The polyps are compactly placed on the catkins and their heads are oval in lateral view, about 1 mm long, with a stalk ca. 0.7 mm long and slightly wider toward the head without distinct demarcation.

Anthocodial armature seems to be very weak, as compared with other species of the genus. The spicules longitudinally arranged on the dorsal surface of the polyp-
head forming a weak supporting bundle are varied in size, but generally much smaller than those illustrated in Kükenthal's type specimen, as measuring up to 0.33 mm in length. On the dorso-lateral surface, similar spinose spindles are arranged rather irregularly in innumerable rows.

In the surface layer of the distal parts of the branches there are exclusively jagged or irregular-shaped spicules, varied greatly in outline and size, approximately 0.01–0.04 mm in extent. Apparently there are no spicules in the canal-walls.

**Distribution.**—Sharks Bay, NE of Heirisson Proug, Western Australia, 11–12.5 m deep (Type locality); Saint-Vincent Bay, New Caledonia.

**Genus Umbellulifera** Thomson & Dean, 1931

3. *Umbellulifera striata* (Thomson & Henderson, 1905)

(Pl. II, fig. 1)

For description and synonymy, see Verseveldt (1973, pp. 165–168, fig. 42).

**Material examined.**—A large colony, 44 cm in total length and 3–4 cm wide at
base, from Station 2 (Rowley Shoals, west of Broome, depth 123 m) (2. 12. ’63).

Remarks.—This umbellate octocoral has been well described repeatedly by many authors from various localities, so that it may be unnecessary to reiterate any detailed description on the present sample. However, some observations made on living specimens occurring in Japanese waters from time to time may be added here.

This species always inhabits on gravelly soft bottom of the deep water ranging between 30–100 m, anchoring with a few short stolons attached around the base of the large flaccid stalk which may attain up to ca. 2 meters. When growth proceeds to the extreme, the spiculation may often be obsolete, especially in the terminal branches.

In living state, the ramifying terminal branches, bearing a number of relatively small umbellate twigs, are usually bright reddish, darker basalwards, and the cylindrical sterile stalk is very plump, yellowish brown and often overgrown with epizoic hydroids (such as *Hydrichthella*).

**Distribution.**—Widespread in the Indian Ocean to West Pacific Ocean, as far north as Sagami Bay, Japan.

Family Nidaliidae Gray, 1869 (emend. Utinomi, 1958)

Subfamily Siphonogorgiinae Kölliker, 1875

Genus *Siphonogorgia* Kölliker, 1874

4. *Siphonogorgia obspiculata* Chalmers, 1929

(Pl. I, fig. 3)

*Siphonogorgia obspiculata* Chalmers, 1929, p. 164; ——— Thomson and Dean, 1931, p. 172, pl. IV fig. 5, pl. XXV fig. 1.

**Material examined.**—4 young colonies from Station 13 (19. 12. ’63), Geographe Channel, entrance to Sharks Bay, Western Australia, depth 110–120 m (3rd haul).

**Description.**—One of the specimens is 27 mm in total length and 6 mm thick at base, with a single short lobate branch. Other specimens consist of 3 or 4 short branches. All are small for the genus and with a flat basal attachment, so that they may be assumed to be young forms. Color in alcohol is yellowish white. The texture is rigid and brittle.

Cortical spicules arranged longitudinally on the stem are all blunt-ended tuberculate spindles, mostly 2–3 mm long. Polyps are crowded around the tip of branches and completely retractile.

Anthocodial formula:  Completely retractile=(3–4)p+(4–5)Cr+0M

**Distribution.**—Malay Archipelago (Siboga-Stations 260, 289, 90–112 m), Western Australia.
III. Order GORGONACEA Lamouroux, 1816
   Suborder SCLERAXONIA Studer, 1887
   Family Anthothelidae Broch, 1916
   Subfamily Anthothelinae Broch, 1916
   Genus Solenocaulon Gray, 1862

5. Solenocaulon tortuosum Gray, 1862

   (Pl. II, fig. 5)

Solenocaulon tortuosum Gray, 1862, p. 34, p. 36—woodcut; ——— Kükenthal, 1924, p. 24; ———
   Thomson & Mackinnon, 1910, p. 196; ——— Thomson & Simpson, 1909, p. 154; ———
   Thomson & Dean, 1931, p. 192; ——— Stiasny, 1937, p. 54, fig. Q; ——— Tixier-Durivault,

   Material examined.—An incomplete colony (40 cm long), lacking the basal and
distal parts, entangled by egg-sacs of unknown squid from Station 7 (West of Dirk
Hartog Is. off Sharks Bay, depth 118 m) (18. 12. '63).

   Distribution.—Hitherto recorded from North Australia, Maldives, Singapore,
Ceylon, Bay of Bengal, Persian Gulf, Malay Archipelago, East Africa. But so far
as explored, it extends northwards to Kii coast, western Japan.

6. Solenocaulon ramosum Hickson, 1903

   (Text-fig. 3; Pl. II, figs. 3–4)

Solenocaulon ramosa Hickson, 1903, p. 498, pl. XXVII figs. 14–17; ——— Stiasny, 1937, p. 49, text-
fig. 0.
Solenocaulon ramosum, Hickson, 1940, p. 269, text-fig. 1; ——— Verseveldt, 1971, p. 68, pl. 12
fig. 2.

   Material examined.—A magnificent large colony (42 cm long) from Station 1
(Rowley Shoals, west of Broome, 124 m) (1. 12. '63).

   Description.—The specimen examined here has been divided into two stems
with a diameter of 2 cm, and the basal and distal parts have been cut off.

   Due to the fragility in dry condition most of the ramified twigs have been
broken off, but some short frill-like twigs 3–26 mm long and 2 mm across, are still
retained, arising from the edges of “belted” openings of the hollow stem. The
polyps placed along the edges of flattened twigs serially on each side are about 2 mm
long and 1.5 mm wide.

   The spicules on the outer layer of the stem are short tuberculose rods, about 0.13
mm long, while those lying in the deeper layer of the coenenchyme are much longer
slender needles covered with high warts, about 0.5–0.75 mm long.

   The color of the stem is dirty brown, with lighter grey twigs.

   Distribution.—Hitherto recorded from the Maldives (Hickson), the Bay of Bengal
(Harrison; Thomson & Simpson), Cape Guardafui, Indian Ocean (Hickson) and
Text-fig. 3. *Solenocaldon ramosum* Hickson.

*a*, A short polyp-bearing twig, arisen from upper margin of the so-called "belt"; *b*, spicules from surface layer of hollowed stem; *c*, spicules from deeper layer of hollowed stem. [a, $\times 12$; b–c, $\times 150$]

from Nosy Bé, Madagascar (Verseveldt).

**Family Melithaeidae Gray, 1870**

**Genus Melithaea** Milne Edwards & Haime, 1857

7. *Melithaea modesta* (Nutting, 1911)

(Text-fig. 4; Pl. I, fig. 4)

*Melitodes modesta* Nutting, 1911, Siboga-Exp., 13b$^5$, p. 42, pl. VII figs. 2–2a, pl. XII fig. 2; Kükenthal, 1924, Das Tierreich, 47, p. 58.

**Material examined.**—A number of fragments branched in one plane and reticulate, from Station 13 (19. 12. '63), Geographe Channel, entrance to Sharks Bay, depth 110–120 m.

**Description.**—A number of fragments may be of one flabellate colony probably broken when obtained.

The colony is dichotomously branched at an angle of about 20°–30° in one plane and reticulates, forming narrow, longitudinally elongate meshes. The nodes are moderately plump, about 3–5 mm long and so wide. The internodes are 5–20 mm long and 1.5–3 mm wide. The calyces scatteredly placed on the internodes
are very low rounded domes, about 0.3 mm in diameter.

The color of the colony in alcohol is light yellowish brown, but when dried, it is quite lemon yellow.

Coenenchymal spicules are mainly rather large spiny spindles, lemon-yellow-colored, measuring 0.045–0.09 mm long and 0.026–0.06 mm wide. Spicules in the axial nodes are as usual smooth rods, pink-colored, about 0.053 mm–0.01 mm.

**Distribution.**—Hitherto known only from Malay Archipelago (Siboga Stations 164, 273, in 32–57 m deep).
Genus *Acabaria* Gray, 1859

8. *Acabaria formosa* Nutting, 1911

(Text-fig. 5; Pl. I, fig. 5)

*Acabaria formosa* Nutting, 1911, Siboga-Expeditie, 13b, p. 46, pl. VII figs. 3–3a, pl. XII fig. 3; ——— Kükenthal, 1924, p. 77; ——— Stiasny, 1940, p. 227, text-fig. G, pl. XI fig. 20.

*Material examined.*—10 fragments of bright vermillion color from Station 13 (19. 12. '63), Geographe Channel, entrance to Sharks Bay, 110–120 m.

*Description.*—The colony represented by fragments only is poorly branched at right angles in one plane. The branches are slender and apparently moniliform, low conical calyces (about 0.5 mm wide) being biserially arranged rather alternately and closely, leaving a longitudinal groove along the axis.

The denuded axis is vermillion red and fragile. The coenenchyme is thin and wholly white in alcohol. The prevailing coenenchymal spicules are thorny clubs or spindles slightly bent, about 0.08–0.10 mm long.

*Distribution.*—Hitherto known only from Malay Archipelago (Siboga Stations 60, 240, in 9–80 m deep) and Sulu Archipelago.

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**Text-fig. 5. *Acabaria formosa* Nutting.**

*a*, Details of polyp, side view; *b*, part of branch, showing bilinear arrangement of polyps; *c*, spicules from cortex. [*a*, ×10.6; *b*, ×12; *c*, ×96]
Family Subergorgiidae Gray, 1859

Genus Subergorgia Gray, 1857

9. Subergorgia suberosa (Pallas, 1766)

(Pl. IV, fig. 5)

For synonymy and description refer to Stiasny, 1937, Siboga-Expeditie, Suppl. II, monogr. 13b, p. 87, text-fig. CC, pl. VI fig. 46; Tixier-Durivault, 1966, Faune de Madagascar, 21, p. 382, fig. 342.

Material examined.—7 fragments of light grayish brown color from Station 13 (19. 12. '63), Geographe Channel, 110–120 m, one of which carries 5 specimens of an epizoic barnacle, Acasta hirsuta Broch, 1916.

Remarks.—Branches are much appressed, with a deep longitudinal furrow along the axis; they are branched at angles of 30°–45°. The calyces are low conical verrucae (about 1 mm high and so wide), arranged at intervals of about 1–2 mm.

Distribution.—Australia, Malay Archipelago and Indian Ocean.

10. Subergorgia reticulata (Ellis & Solander, 1786)

(Pl. IV, fig. 6)

For synonymy and description refer to Stiasny, 1937, Siboga-Expeditie, 13b, p. 101, pl. VII fig. 48, Text-fig. GG; Tixier-Durivault, 1966, Faune de Madagascar, 21, p. 383, fig. 343.

Material examined.—2 fragments of reticulated flabellum, 2.5–7.5 cm long, all uniformly grayish brown, from Station 13 (19. 12. '63), Geographe Channel, entrance to Sharks Bay, 110–120 m.

Distribution.—Indian Ocean, Australia, Malay Archipelago, Japan, Marshall Is., Samoa.

Suborder Holaxonia Studer, 1887

Family Acanthogorgiidae Gray, 1859

Genus Acanthogorgia Gray, 1957

11. Acanthogorgia turgida Nutting, 1910

(Text-fig. 6; Pl. III, fig. 1)


Material examined.—16 incomplete colonies, lacking basal parts, from Station 13 (19. 12. '63), Geographe Channel, entrance to Sharks Bay, 110–120 m.
Description.—All the specimens are equally small for the genus, being less than 6 cm in total height and sparsely branched in one plane. The side branches are relatively long.

The polyps of subequal size are irregularly disposed all throughout the stem and branches, excepting near the base. They are up to 2 mm high and about 1 mm wide at the distal end. They are somewhat barrel-shaped, being not so elongate and spinose as in most of other species of *Acanthogorgia*. The calycular spicules are mostly irregularly disposed. The projecting distal spicules, up to 0.03 mm long, are placed only just below the tentacle bases, forming 8 small bundles (about 2 or 3 in each bundle).

Details of general spiculation in polyps and body walls agree with the descriptions given by Nutting (1910) and Stiasny (1947). As some are illustrated here, spiny spindles (straight or bent) and triradiates, quadriradiates or antlers are contained in varied abundance, not localizing basally.

Commensals.—7 specimens of rosy colored barnacle *Balanus venustus venustus* Darwin were found adhering to branches of a colony.

Distribution.—Malay Archipelago only, in 75–520 m depth.
Octocorallia in the Western Australia

Genus *Anthogorgia* Verrill, 1868 (emend. Aurivillius, 1931)


(Text-fig. 7; Pl. III, fig. 2)


Material examined.—6 flabellate fragments, lacking basal stem, from Station 13 (19. 12. '63), Geographe Channel, entrance to Sharks Bay, 110–120 m.

Description.—The colonies are of small size, being only 4 to 6 cm in total length, approximately 4 to 6 cm in total length, though incomplete, Branching in one plane, short branches issuing at right angles separating widely each other. Such an anastomosis as figured in the type specimen does not occur in the present materials.

The main stem and branches are generally slender, less than 1 mm in diameter and somewhat flattened on the branching plane. The polyps mostly occur towards the distal part of side branches, and they are placed alternately. Individual polyps are low cones, about 0.75 mm high and so across and pinkish or grayish white. The majority of calycular spicules are tuberculate spindles up to $0.7 \times 0.3$ mm and disposed

Text-fig. 7. *Anthogorgia glomerata* Thomson & Simpson.

\textit{a}, A polyp seated on branch, side view; \textit{b}, calycular spicules; \textit{c}, cortical spicules. [\textit{a}, approximately \( \times 30 \); \textit{b–c}, \( \times 150 \)]
in parallel with the axis of the branches, excepting 8 distal point spicules, disposed longitudinally just below the tentacle bases, which are shorter spindles, 2 or 3 per radius, without neck zone.

The coenenchyme is thin and composed of much tuberculate spindles (up to 0.31 \( \times \) 0.07 mm) longitudinally arranged. The axis is horny, flexible and brown in color.

Distribution.—Hitherto known only from the type locality (Andamans in the Bay of Bengal).

Family Paramuriceidae Bayer, 1956

Genus *Muriceides* Studer, 1887

13. *Muriceides dubia* Nutting, 1910

(Text-fig. 8; Pl. III, fig. 4)

*Muriceides dubia* Nutting, 1910, Siboga-Expeditie, 13b, p. 29, pl. IV figs. 2–2a, pl. XIX fig. 11; Kükenthal, 1924, Das Tierreich, Lief. 47, p. 163, fig. 111; Tixier-Durivault, 1972, Téthys Suppl. 3, p. 41.

Material examined.—A small unbranched fragment (3 cm long) from Station 13 (19. 12. '63), Geographe Channel, entrance to Sharks Bay, 110–120 m.

Description.—The coenenchyme is thick and closely packed with large tuberculate spindles only. Polyps are densely set all around the coenenchyme. The horny axis is dark brown.

Distribution.—Hitherto recorded from Malay Archipelago (Aru Islands, 57 m) and Madagascar (Tuléar, 6–9 m).

![Text-fig. 8. *Muriceides dubia* Nutting.](a, x2.2; b, x96)
Genus Discogorgia Kükenthal, 1919 (emend. Bayer, 1956)
= Placogorgia (nec Wright & Studer, 1888) Nutting, 1910

14. Discogorgia dentata (Nutting, 1910)

(Text-fig. 9; Pl. IV, fig. 1)

Placogorgia dentata Nutting, 1910, Siboga-Expeditie, 13b, p. 80, pl. XII figs. 4-4a, pl. XXII fig. 10; Kükenthal, 1924, Das Tierreich, Lief. 47, p. 211; Stiasny, 1940, Temminckia, 5, p. 241, pl. XII figs. 27-28, Text-fig. L; Tixier-Durivault, 1972, Tethys Suppl. 3, p. 45, fig. 17.

Material examined.—5 fragments without basal attachment from Station 13 (19. 12. '63), Geographe Channel, entrance to Sharks Bay, 110–120 m.

Description.—The colonies are openly flabellate, alternately giving off subequal branches with wide intervals. Each branch, about 2–6 cm long and 2 mm in diameter and bluntly ended. The coenenchyme is rather thick and uniformly brown in color, and the central horny axis is dark brown. The calyces are irregularly arranged all around the coenenchyme are much depressed cones, about 1 mm across. The anthocodiae are completely retractile. Their central operculum is slightly elevated above the surrounding coenenchymal surface, and coated only with slender fusiform spicules.

Cortical spicules are exclusively irregular-shaped thorn-discs with irregularly

Text-fig. 9. Discogorgia dentata (Nutting).

a, Part of pinnately branched colony, showing scattered polyps and narrowed basal portion of branches; b, anthocodial spicules; c, cortical spicules. [a, ×4; b–c, ×73]
dentated margin or tri- or multiradiates. But there are not found such protuberant thorn-scales as seen in the related *Placogorgia, Echinomuricea*, etc., for protecting the calyces.

**Distribution.**—Hitherto recorded from Philippines (Sulu Archipelago), Malay Archipelago (Flores Sea, South of Timor) and Madagascar (Is. Europa).

**Remarks.**—Kükenthal (1919) established a new genus *Discogorgia* for some Indo-west Pacific paramuriceids which were referred by Nutting (1910) to Wright & Studer’s *Placogorgia* (type: *P. atlantica* Wr. & S.). He transferred Nutting’s *P. dendritica* to this new genus, but still retained Nutting’s *P. dentata* in *Placogorgia*. This procedure was followed by most of later authors. Following Bayer’s revision of *Placogorgia* and related genera (1956, 1959), however, I have thought myself justified in dealing with this species too as a member of *Discogorgia* like *D. dendritica* Nutting (cf. Utinomi, 1961, p. 203).

**Family Plexauridae Gray, 1859**

**Genus Euplexaura** Verrill, 1865 (emend. Kükenthal, 1909)

15. *Euplexaura robusta* Kükenthal, 1908

(Text-fig. 10; Pl. IV, fig. 2)


**Material examined.**—A flabellate colony (dried and somewhat shrunken) from Station 1 (1.12. '63), Rowley Shoals, west of Broome, Western Australia, 124 m taken by 2nd haul.

**Description.**—The colony is decidedly flabellate, but not reticulate, measuring about 20 cm in height and 11 cm in maximum expanse. The main stem and large branches are somewhat flattened in the plane of branching and about 3–5 mm in

![Text-fig. 10. Euplexaura robusta Kükenthal. a, Cortical spicules; b, calycular spicules. [a–b, × 150]](image)
Octocorallia in the Western Australia

Many twigs subpinnately arise in the same plane between larger branches. The coenenchyme is light brown-colored. Low and small calyces are disposed, about 1.0–1.2 mm apart.

Coenenchymal spicules of the stem and branches are mostly bluntly ended tuberculate spindles, often dumbell-shaped, ca. 0.01–0.1 mm long. Calycular ones are a little longer with narrowed ends.

Distribution.—Hitherto recorded from Japan (Kükenthal), West Australia (Broch), Great Barrier Reef (Hickson) and Malay Archipelago (Thomson & Dean; Stiasny).

Family Ellisellidae Gray, 1859

Genus Viminella Gray, 1870 (Revived)


Scirpearella Wright & Studer, 1889, Challenger Rep. Zool. 31, p. 154 (emend. Nutting, 1910, p. 23 (Type: Sc. profunda Wr. & St.) (part.)


Emended Diagnosis: Colonies unbranched or sparingly branched, with a few long, whiplike branches; calyces prominent, biserial or in lateral tracts; spicules including short double-heads, approaching 0.2 mm in length, concentrated in calyces, but no longer double-spindles.

[Condensed after Deichmann’s diagnosis for Scirpearia and after Bayer’s diagnoses for Ellisella and Toeplitzella.]

16. Viminella gracilis (Wright & Studer, 1889)

(Text-fig. 11; Pl. III, fig. 5)

Scirpearella gracilis Wright & Studer, 1889, Challenger Rep., Zool., 31, p. 156, pl. 31 figs. 1–1a, pl. 34 fig. 6.


Material examined.—2 unbranched fragments from Station 13 (19.12. ’63), Geographe Channel, entrance to Sharks Bay, 110–120 m.

Description.—Either one of the material measures only 70 mm long and 2 mm wide. Its upper portion is dorsiventrally flattened and lanceolate in outline. The lower portion is short and sterile. The calcareous axis is 1 mm in diameter; pointed in its distal end but lacks basal attachment. Polyps arranged in one row on both
Text-fig. 11. Viminella gracilis (Wright & Studer), cortical spicules. [×150]

edges are prominent, club-shaped, up to 2 mm high and slightly incurved.

The surface of the coenenchyme is quite granular and contains within double-headed spicules with indistinct median constriction, measuring about 0.08–0.09 mm long. The colony is wholly white. Presumably it may be a young form.

Distribution.—Widely distributed in the Indian Ocean, Malay Archipelago, as far north as Japan.

Genus Junceella Valenciennes, 1885

17. Junceella gemmacea (Valenciennes, M.S.)

Milne Edwards & Haime, 1857

(Pl. III, fig. 6)

For synonymy and description refer to Kükenthal, 1924, Das Tierreich, 47, p. 363.

Material examined.—2 pieces of one and the same colony, one of which is dichotomously branched, 3 mm in diameter and orangish brown in color, from Station 13 (19.12. '63), Geographe Channel, entrance to Sharks Bay, 110–120 m.

Distribution.—Widespread in the Indo-Westpacific.

Family Primnoidae Gray, 1857

Subfamily Primnoinae Gray, 1857

Genus Thouarella Gray, 1870

18. Thouarella (Amphilaphis) plumacea (Thomson & Mackinnon, 1911)

(Text-fig. 12; Pl. IV, fig. 3)

Amphilaphis plumacea Thomson & Mackinnon, 1911, Mem. Austral Mus., 4(13), p. 680, pl. 65 fig. 3, pl. 68 fig. 3, pl. 74.

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Text-fig. 12. Thouarella (Amphilaphis) plumacea (Thomson & Mackinnon).

a, A short polyp attached to distal part of the colony, side view; b, cortical spicules.

Material examined.—2 fragments without basal parts from Station 13 (19.12. '63), Geographe Channel, entrance to Sharks Bay, 110-120 m.

Description.—The specimens herein examined are represented by 2 terminal branches, measuring respectively 9.3 cm and 12 cm in length.

Both are dichotomously branched at acute angles (30°-40°) in one plane. These terminal branches are extremely slender and elongate. They are almost white wholly in alcohol. The axis is calcareous and about 1 mm across, covering with scaly coenenchyme, about 1.5 mm across in situ. Clavate polyps, about 1.0-1.5 mm long, are distributed spirally around the coenenchyme. Usually there are 8 polyps for a length of 1 cm on the branch.

The opercular scales are isosceles triangles with a strong concavity to the outer surface. Other calycular and coenenchymal scales are greatly varied in size and outer ornamentation, though having central nucleus or median ridge, characteristic to the genus. Their upper edges are uniformly denticulate.

Distribution.—Hitherto known only from Barrenjoy, Australia, 30-40 fathoms (Type locality).

Family Isididae Lamouroux, 1812
Subfamily Mopseinae Gray, 1870 (emend. Wright & Studer, 1889)
Genus Mopsea Lamouroux, 1816

19. Mopsea squamosa Kükenthal, 1919

(Text-fig. 13; Pl. III, fig. 3)

Mopsea flabellum Thomson & Mackinnon, 1911, Mem. Austral. Mus., 4, p. 676, pl. 63 figs. 1-3, pl. 67
fig. 6, pl. 71.


Non *Acanthoisis flabellum* Wright & Studer, 1889, Challenger Rep., Zool., p. 45, pl. 8 figs. 1–1b, pl. 9 fig. 12; ——— Thomson & Mackinnon, 1911, Mem. Austral. Mus., 4, p. 679, pl. 62 figs. 1–2.

Non *Mopsea flabellum*: Küenthal, 1924, Das Tierreich, 47, p. 439.

**Material examined.**—Fragments of broken branches from Station 13 (19.12. '63), Geographe Channel, entrance to Sharks Bay, 110–120 m.

**Description.**—As shown in the photograph (Pl. III, fig. 3), all the material available to me are only fragments of fragile texture, so that their intact condition cannot be deduced. But, their brick-red colored thick bark and their mode of branching clearly suggest a closest affinity to Thomson & Mackinnon’s *‘Mopsea flabellum’* as illustrated in colored figures.

A few branches retained are rather robust and short. The branches are arisen from the stem approximately at an angle of 40° and all terminate to blunt end. The coenenchymal spicules are all irregular-formed discs tuberculated on surface and serrate on edges; their shape is mostly oval, never elongated.

**Distribution.**—Hitherto recorded from Australian waters (type locality not designated).

Text-fig. 13. *Mopsea squamosa* Küenthal, cortical spicules. [×80]

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20. *Mopsea alternata*, Utinomi, n. sp.

(Text-fig. 14; Pl. IV, fig. 4)

**Holotype.**—A flabellate colony lacking the basal portion from Station 13 (19.12. '63), Geographe Channel, entrance to Sharks Bay, Western Australia, 110–120 m.

**Description.**—The colony is rather robust and alternately branched in one plane, forming the main stem a zigzag course; thus the main branching is sympodial against that the majority of other known species of *Mopsea* show a monopodial or bifurcate branching as usual.

The total length is about 10 cm and the maximum expanse in the upper flabellate portion is about 4 cm. The diameter of the main stem is about 1.5 mm in the lowest end and about 0.5 mm in the distal ends, which are mostly truncatedly cut off.

Terminal branches are arisen at acute angles (ca. 20°～30°) at different levels, and they run on both sides of the main stem in parallel to one another, keeping a wide interval between. These branches are similarly long, measuring as 2.5 cm, 3 cm, 5 cm in each length and about 1.5 mm in width.
The color of the colony in alcohol is ivory white all throughout. The coenenchyme is very thin. The polyps are rather ovoid, about 1 mm long and 0.5 mm wide. They occur densely along the lateral sides of branches on opposite sides, directing upwards. The axis is as usual composed of calcareous internodes (2 mm long) with indented fluting surface and narrowed horny nodes (1 mm long) of yellowish brown colors alternately jointed together.

The superficial spicules of polyps are flat, tuberculate scales, greatly varying in
outline and size; mostly are oval or oblong, scales eccentric without nucleus but scattered with many small warts on upper surface. In larger ones among them the overlapping margin is often entire and studded with short ridges radially arranged on its outer surface, while another margin is more or less indented and warted on its outer surface. The coenenchymal spicules are flat, oval to oblong, multituberculate scales, about 0.04~0.1 mm long.

Remarks.—This specimen obtained with the preceding species *Mopsea squamosa*, is apparently most closely related to *Mopsea elegans* Thomson & Mackinnon (1911) recorded from Australia, but easily distinguishable from all of the known species of the genus by its unique mode of branching, as well as the shape of colorless spicules.

Distribution.—Type locality only, given above.

IV. Order PENNATULACEA Verrill, 1865

Suborder SUBSELLIFLORAE Kükenthal, 1915

Family Virgulariidae Verrill, 1868 (emend. Jungersten, 1904)

Genus Virgularia Lamarck, 1816

21. *Virgularia hexangularis* Kölliker, 1872

(Text-fig. 15; Pl. II, fig. 2)


*Virgularia andamanensis* Kükenthal, 1915, Das Tierreich, 43, p. 78 (Substitute name for Thomson & Simpson’s *V. ornata*).

Material examined.—One complete specimen, 47 cm in total length and six naked axes, with fleshy stalk only, as dried intact condition, ranging from 39 cm to 48 cm in total length, taken by the first haul of Otter trawling at Station 1 (1.12. ’63), Rowley Shoals, west of Broome, western Australia, 124 m in depth.

Description.—A complete specimen and other six dry specimens are quite large-sized slender, elongate virgulariid.

A single complete specimen bears a number of small fleshy polyp-leaves closely placed biserially on the ventral side of the rhachis, leaving free a shallow longitudinal furrow. The exact number of the polyp-leaves on the rhachis closely set from base to tip is practically innumerable. The shape of polyp-leaves is gradually varied from transversely elongated trapezoid to semicircular, about 6–7 mm in width and lower in height. The lower attaching part of each leaf is thin and smooth on surface, whereas the curved marginal part is thickened, bearing a number of autozooids crowded (apparently formed of 2–3 transverse rows).
By a detailed examination under high-power lens on polyp-leaves, unexpectedly enough, a few minute calcareous spicules (measuring ca. 2–5μ in length) could be detected around the distal end of autozooids, slightly projecting. No siphonozooids could be seen between polyp-leaves, though Kölliker noted only as “Zooide lateral”, but not seen also in his Fig. 143.

The fleshy stalk, which occupies approximately the lower 1/6~1/5 of the total length of the colony, is as usual orangish or brownish in living state and tapers downward from a slight swelling beneath the uniformly slender rhachis.

The calcareous axis is quite stout, white and tapers upward to an elastic flagellum. Its distalmost part (Fig. 20a) is rather cylindrical, less than 1 mm in diameter and sharply ended. The penultimate whip-like part (Fig. 20b) is quite quadrangular in
section, about 1.2–2.0 mm wide (ventral side slightly concave, while dorsal side flat). Going downward to the stalk, the widest part (Fig. 20c), where the fleshy bark is swollen near the base of the rhachis, is about 3 mm wide, its ventral surface is longitudinally furrowed by 2 prominent ridges into one wide axial furrow and one narrow lateral furrow on each side; while its dorsal surface (Fig. 20d) is convex with a narrow central furrow; thus the transverse section of the axis at the upper level of the stalk looks apparently hexangular, as indicated by the specific name. The basal end (Fig. 20e) of the axis is dorsiventrally flattened and truncated distally with a width of about 2 mm, and when dried, its basal end often bent dorsad.

**Measurements (in cm).**

<table>
<thead>
<tr>
<th></th>
<th>Total length</th>
<th>Rhachis</th>
<th>Stalk</th>
</tr>
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<tbody>
<tr>
<td>Complete one</td>
<td>47</td>
<td>37</td>
<td>+ 10</td>
</tr>
<tr>
<td>Naked one</td>
<td>48</td>
<td>36</td>
<td>+ 12</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>34</td>
<td>+ 10</td>
</tr>
<tr>
<td><em>V. hexangularis</em></td>
<td>67 (=)</td>
<td>52.7</td>
<td>+ 14.3</td>
</tr>
<tr>
<td>(after Kölliker)</td>
<td></td>
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<td></td>
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<tr>
<td><em>V. ornata</em></td>
<td>?</td>
<td>2.3</td>
<td>?</td>
</tr>
<tr>
<td>(after Thomson and Simpson)</td>
<td></td>
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**Remarks.**—This large-sized virgulariid is referable to a less known *Virgularia hexangularis* Kölliker, which was first described and figured as a valid species of the genus *Virgularia*, basing upon a fragment deposited in the British Museum and formerly designated by Gray (1870, Catalogue of sea-pens in the British Museum, p. 15) only as a mere variety of *V. elegans* Gray, obtained together from Sharks Bay, western Australia, both without giving any figures and detailed notes. In general appearance, particularly on account of peculiar polyp-leaves and axis, as described above, *‘Virgularia ornata’* Thomson & Simpson, 1909), recorded only once from Andamans (not far from Sharks Bay, western Australia), seems to be conspecific to *V. hexangularis*. Inferring from Thomson & Shimpson’s original description without figures and Kükenthal’s emended diagnosis, Andamans specimen consisting of a short fragment of a colony, merely “23 mm long, with 13 leaves on each side” and “with quadrilateral axis”, which bears 2 longitudinal furrows on the lateral sides”, and on each polypearl (‘pinnule’) about 12–45 autozooids arranged in four rows”, may represent a distal part of the present *V. hexangularis* Kölliker (1870).

More noteworthy of special interest is the occurrence of a few tuberculate rodlets (not biscuit-like nor needle-like) on tentacles of autozooids of polyp-leaves, against the generally recognized diagnostic characteristics of *Virgularia*. This fact too suggests a closest relationship with *Stylatula* of Verrill (1864) in which the autozooidal small spicules are either present or absent, although not supported beneath by such a ‘Kalkplatte’ peculiar to *Stylatula*, of larger needles.

**Distribution.**—Hitherto known only from the Eastern Indian Ocean (Sharks Bay, Rowley Shoals herein recorded) and the Sea of Bengal (Andamans), in rather deep waters.
REFERENCES (SELECTED)


Ellis, J. & D. Solander 1786. The natural history of many curious and uncommon zoophytes collected from various parts of the globe. London. xii+208 pp., 63 pls.


——— 1916. The Pennatulacea of the Siboga Expedition, with a general survey of the order. Siboga-Expeditie, monogr. XIV, x+265 pp., 10 pls., map.


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H. Utinomi


—1973b. Description of a new species of Telesto from the Inland Sea of Japan, with a review of the Telestacean octocorals. Ibid., 20: 145–154, pl. I.


APPENDIX

1. List of Trawling Stations (UMITAKA-MARU) and Octocoral Collection

Station 1 (1.12.1963). Rowley Shoals, west of Broome, Western Australia (18° 24.5' S, 119° 25.3' E~18° 17.7' S, 119° 40.5' E). Depth 124 m.

Nephthea granulata Kükenthal
Solenocaulon ramosum Hickson
Euplexaura robusta Kükenthal
Virgularia hexangularis Kolléker

Station 2 (2.12.1963). Rowley Shoals, west of Broome, Western Australia (18° 10.0' S, 119° 50.6' E~18° 10.0' S, 119° 55.0' E). Depth 123 m.

Umbellulifera striata (Thomson & Henderson)

Station 7 (18.12.1963). Northwest of Dirk Hartog Island, entrance to Sharks Bay (25° 09.5' S, 112° 34.0' E~25° 02.0' S, 112° 46.0' E). Depth 118 m.

Solenocaulon tortuosum Gray

Station 13 (19.12.1963). Geographe Channel, entrance to Sharks Bay, Western Australia (24° 58.5' S, 112° 46.8' E~24° 46.9' S, 112° 45.7' E). Depth 110–120 m.
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**Telesto multiflora** Laackmann
**Siphonogorgia obspiculata** Chalmers
**Melithaea modesta** (Nutting)
**Acabaria formosa** Nutting
**Subergorgia suberosa** (Pallas) (With commensal barnacle, *Acesta hirsuta* Broch)
**S. reticulata** (Ellis & Solander)
**Acanthogorgia turgida** Nutting (With commensal barnacle, *Balanus (B.) venustus* Darwin)
**Anthogorgia glomerata** Thomson & Simpson
**Muriceides dubius** Nutting
**Discogorgia dentata** (Nutting)
**Viminella gracilis** (Wright & Studer)
**Jumceella gemmacea** (Valenciennes)
**Thouarella (Amphilaphis) plumacea** (Thomson & Mackinnon)
**Mopsea squamosa** Kükenenthal
**M. alternata** n. sp.

**2. Record of antipatharians and commensal barnacles obtained together.**

Station 13 (19.12.1963). Geographe Channel, entrance to Sharks Bay, western Australia (24° 58.5' S, 112° 46.8' E~24° 46.9' S, 112° 45.7' E). Depth 110-120 m.
**Antipathes sarothamnoides** Brook
(With a barnacle, *Oxynaspis celata* Darwin and *Balanus (Conopea) antipathidis* (Broch))
**Antipathes verticillata** (Brook)
**Antipathes cf. fruticosa** Gray
EXPLANATION OF PLATES I-IV

PLATE I

Fig. 1. *Telesto multiflora* Laackmann. ×1
a, A single stem (unbranched axial polyp) with lateral polyps partially expanded; b, a single denuded stem, lateral polyps largely retracted.

Fig. 2. *Nepthia granulata* Kukenthal. About ×1

Fig. 3. *Siphonogorgia obspiculata* Chalmers. About ×1.6
a and b, 2 young colonies.

Fig. 4. *Melithaea modesta* (Nutting). About ×2
a–c, 3 fragments of colonies.

Fig. 5. *Acabaria formosa* Nutting. ×1
a, 2 colonies, showing beaded branches with warty calyces; b, a naked axis.

PLATE II

Fig. 1. *Umbellulifera striata* (Thomson & Henderson). Approximately ×1/3

Fig. 2. *Virgularia hexangularis* Kölliker, complete specimen. Approximately ×1/3

Figs. 3-4. *Solenocaulon ramosum* Hickson, 2 fragments of a single colony. Approximately ×1/3

Fig. 5. *Solenocaulon tortuosum* Gray, 2 terminal branches with a part of hollowed stem. Approximately ×1/3

PLATE III

Fig. 1. *Acanthogorgia turgida* Nutting, 4 colonies. ×0.8

Fig. 2. *Anthogorgia glomerata* Thomson & Simpson, 2 flabellate colonies. ×2/3

Fig. 3. *Mopsea squamosa* Küenthal, 4 fragments one of which shows a naked axis. ×1.3

Fig. 4. *Maricoides dubia* Nutting, polyp-bearing unbranched fragment. ×1

Fig. 5. *Viminella gracilis* (Wright & Studer), young colony with prominent polyps biserially arranged. ×2/3

Fig. 6. *Junceella gemmacea* (Valenciennes M.S.) Milne Edwards & Haime, 2 fragments of a single colony. ×1

PLATE IV

Fig. 1. *Discogorgia dentata* (Nutting), 2 colonies without basal attachment. ×1/3

Fig. 2. *Eupleura robusta* Kukenthal, mostly denuded colony (dried). Approximately ×4/5

Fig. 3. *Thouarella (Amphilaphis) plumacea* (Thomson & Mackinnon), partly broken fragment of a flabellate delicate colony. ×1/2

Fig. 4. *Mopsea alternata* Utinomi (n. sp.), holotype, lacking its lower part. ×2/3

Fig. 5. *Subergorgia suberosa* (Pallas), 3 fragments, infested with commensal barnacle *Acasta hirsuta* Broch (on stem on both sides). ×1/3

Fig. 6. *Subergorgia reticulata* (Ellis & Solander), 2 fragments. ×4/5
H. Utinomi: Octocorallia in the Western Australia
H. Utinomi: *Octocorallia in the Western Australia*
H. Utinomi: Octocorallia in the Western Australia
H. Utinomi: *Octocorallia in the Western Australia*