

# NOTEWORTHY OCTOCORALS COLLECTED OFF THE SOUTHWEST COAST OF KII PENINSULA, MIDDLE JAPAN

## PART 2, TELESTACEA, GORGONACEA AND PENNATULACEA<sup>1)</sup>

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*With Plates VII-X and 14 Text-figures*

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### Introduction

The present paper continues the records or descriptions of some noteworthy octocorals found in the offshore bottom samples collected by the bull trawler "Kaiun-maru" in the outer sublittoral region off the southwest coast of Kii Peninsula, mostly from the depths of about 100-200 meters. Therefore, the octocorals herein reported, especially the gorgonaceans, are for the most part fragments or small-sized forms, larger forms being more abundantly found there in shallower waters.

Part 1, which covered the Stolonifera and Alcyonacea, appeared in this journal, Volume VIII, no. 1 (1960). This second part deals with the members of the remaining groups, Telestacea, Gorgonacea and Pennatulacea.

### LIST OF THE SPECIES TREATED IN THIS PAPER

#### Telestacea

1. *Telesto trichostemma* (DANA)
2. *Telesto arborea* WRIGHT & STUDER
3. *Paratelesto rosea* (KINOSHITA)

#### Gorgonacea

4. *Parisis minor* WRIGHT & STUDER
5. *Acalycigorgia inermis* (HEDLUND)
6. *Acalycigorgia irregularis* KÜKENTHAL & GORZAWSKY

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1) Contributions from the Seto Marine Biological Laboratory, No. 365.

7. *Acanthogorgia japonica* KÜKENTHAL & GORZAWSKY
8. *Discogorgia dendritica* (NUTTING)
9. *Muricella abnormalis* NUTTING
10. *Muricella nitida* (VERRILL)
11. *Muricella magna* n. sp.
12. *Astrogorgia rubra* THOMSON & HENDERSON
13. *Menella indica* GRAY
14. *Filigella mitsukurii* KINOSHITA
15. *Euplexaura attenuata* (NUTTING)
16. *Chrysogorgia rotunda* KINOSHITA
17. *Plumarella cristata* KÜKENTHAL & GORZAWSKY
18. *Plumarella sert* KÜKENTHAL & GORZAWSKY
19. *Thouarella hilgendorfi* (STUDER)

### Pennatulacea

20. *Cavernularia obesa* MILNE EDWARDS & HAIME
21. *Echinoptilum macintoshi* HUBRECHT
22. *Sclerobelemnon burgeri* (HERKLOTS)
23. *Funiculina quadrangularis* (PALLAS)
24. *Stachyptilum dofleini* BALSS
25. *Leioptilus fimbriatus* (HERKLOTS)
26. *Pteroeides breve* KÖLLIKER

### TELESTACEA

#### Family Telestidae H. MILNE EDWARDS

##### 1. *Telesto trichostemma* (DANA), 1846

*Gorgonia trichostemma* DANA, 1846, p. 665, pl. 59, fig. 3.

*Telesto (Carijoa) trichostemma* WRIGHT & STUDER, 1889, p. 264; STUDER, 1889, p. 2, pl. 3, fig. 1a-b; pl. 5, fig. 1; pl. 6, figs. 1-2; THOMSON & HENDERSON, 1905, p. 319.

*Telesto trichostemma* HICKSON, 1903, p. 481; LAACKMANN, 1909, p. 77; THOMSON & MACKINNON, 1911, p. 692; KÜKENTHAL, 1911, p. 326, text-figs. 42-44, pl. 21, fig. 14; HICKSON, 1921, p. 369; UTINOMI, 1956a, p. 224, fig. 1.

*Material.* 5 fragments. Off Minabe, 100-200 m. III-1950. M. OZAKI coll.

The specimens are all fragmental, very flabby in texture and dirty white in color. They are as usual covered by an encrusting siliceous sponge (*Prosuberites* after HICKSON) thinly.

*Records of occurrence.* Widely distributed in the Indo-West Pacific: Fiji Islands (DANA), Torres Straits, 3-11 fms. (WRIGHT & STUDER), Aru Islands (KÜKENTHAL), Australia (THOMSON & MACKINNON), Patani, Siam (THOMSON &

HENDERSON), Maldive Archipelago, 25 fms. (HICKSON), Koror Island, Palau (UTINOMI), Uraga Channel, mouth of Tokyo Bay, 40-200 fms. (HICKSON), Miike Harbour in the Ariake Bay, Kyusyu, intertidal (Unpublished). From these records it seems to occur in shallow seas down to 200 fathoms in depth.

## 2. *Telesto arborea* WRIGHT & STUDER, 1889

(Fig. 1)

*Telesto (Carijoa) arborea* WRIGHT & STUDER, 1889, p. 262, pl. 39, figs. 1-1a; THOMSON & HENDERSON, 1906, p. 433; LAACKMANN, 1909, p. 88, text-fig. G, pl. IV, fig. 6.

*Telesto arborea* THOMSON & MACKINNON, 1911, p. 692, pl. 67, fig. 2; THOMSON & DEAN, 1931, p. 212, pl. XI, figs. 4 and 6.

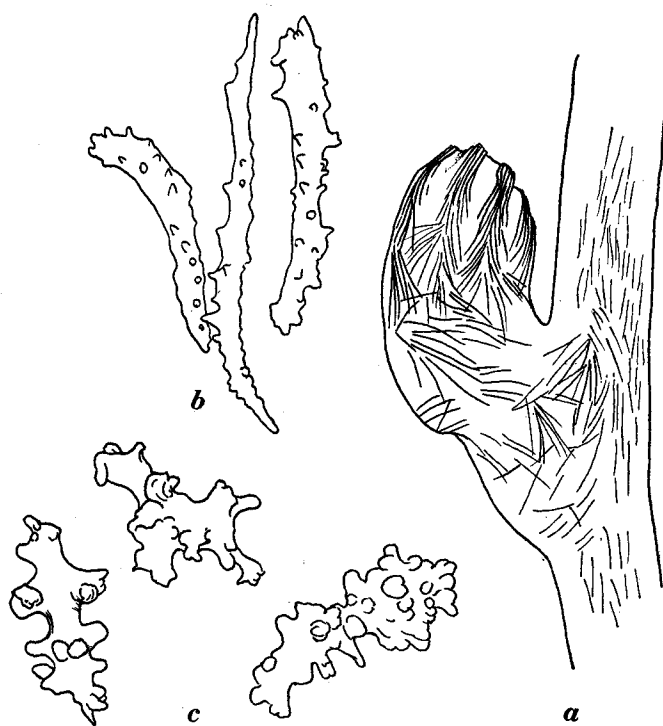


Fig. 1. *Telesto arborea* WRIGHT & STUDER.

a, Lateral polyp; b, anthocodial spicules; c, spicules from body wall of stem.

[a,  $\times 18$ ; b-c,  $\times 150$ .]

**Material.** A fragment. Southwest of Minabe, 100-200 m. III-1944. S. SAKAGUCHI coll.

**Description.** The material consists of a single stem, about 9 cm in length,

showing only a trace of branching in the basal part fixed to a shell shingle.

The stem, presumably of a younger stage, is evenly slender and longitudinally ridged in 8 rows closely packed with spicules. The diameter of the stem is approximately 0.7 mm distally and 1.2 mm basally. The distal part of the stem bears only seven lateral polyps, alternately arranging at an interval of about 3-4 mm.

The lateral polyps are all cylindrical, about 3-5 mm long and 1.2 mm wide. They exhibit eight longitudinal ridges where elongate spicules are closely packed together, leaving eight naked furrows between them. These spicules are either slender warty spindles or needles, measuring about 0.18-0.4 mm long and 0.017-0.018 mm wide.

The spicules of the stem wall are shorter but stouter tuberculate spindles or capstans, about 0.1-0.26 mm long and 0.02-0.035 mm wide. There is no sign of fusion between these spicules whatever.

*Records of occurrence.* Arafura Sea, 49 fms. (WRIGHT & STUDER), Australia (THOMSON & MACKINNON), Maldivé Archipelago, 23-25 fms. (HICKSON), Zanzibar, 10 fms. (THOMSON & HENDERSON), Amboina and Sydney (LAACKMANN), Malay Archipelagoes, down to 250 m in depth (THOMSON & DEAN).

### 3. *Paratelesto rosea* (KINOSHITA), 1909

*Telesto rosea* KINOSHITA, 1909a, p. 119; KINOSHITA, 1910, p. 209 (partim); KÜKENTHAL, 1913, p. 234 (listed only).

*Paratelesto rosea* U TINOMI, 1958, p. 93, textfig. 2, pl. 5, figs. 2-4.

- Material.* 1) Many specimens. Kii-ōsima. 1940. S. SAKAGUCHI coll.  
 2) 2 specimens. Off Minabe, 100-200 m. III-1944. S. SAKAGUCHI coll.  
 3) 1 specimen. Mouth of Tanabe Bay, 30 m. 26-IX-1953.  
 4) Fragments. Mouth of Tanabe Bay, 30 m. 29-IV-1955. T. YAMAMOTO coll.  
 5) 7 specimens. Mouth of Tanabe Bay, 20-30 m. 18-IV-1957. T. YAMAMOTO coll.  
 6) 4 specimens. Off Nada, Gobō. prob. 20-30 m. (taken by lobster-net). 27-IV-1958. T. YAMAMOTO coll.

*Records of occurrence.* Kasiwazima, Prov. Tosa, 80 fms. (type locality), southwest coast of Kii Peninsula (U TINOMI).

## GORGONACEA

### Suborder SCLERAXONIA

#### Family Parisididae AURIVILLIUS

### 4. *Parisis minor* WRIGHT & STUDER, 1889

For description see U TINOMI, 1958, p. 101.

*Material.* 2 fragments. Off Minabe, 100-200 m. III-1944. S. SAKAGUHI coll.

*Records of occurrence.* Hitherto known only from Japan: Sagami Bay, 345 fms. (WRIGHT & STUDER), Goto Islands, 160 m and Bonin Islands, 80 fms. (AURIVILLIUS), Kasiwazima, Tosa Bay. (UTINOMI).

Another species *Parisia fruticosa* VERRILL, type of the genus, has been found off Nada on April 27, 1958. In this area, this species seems to occur in inshore waters shallower than 50 meters in depth, though often recorded from deeper waters elsewhere.

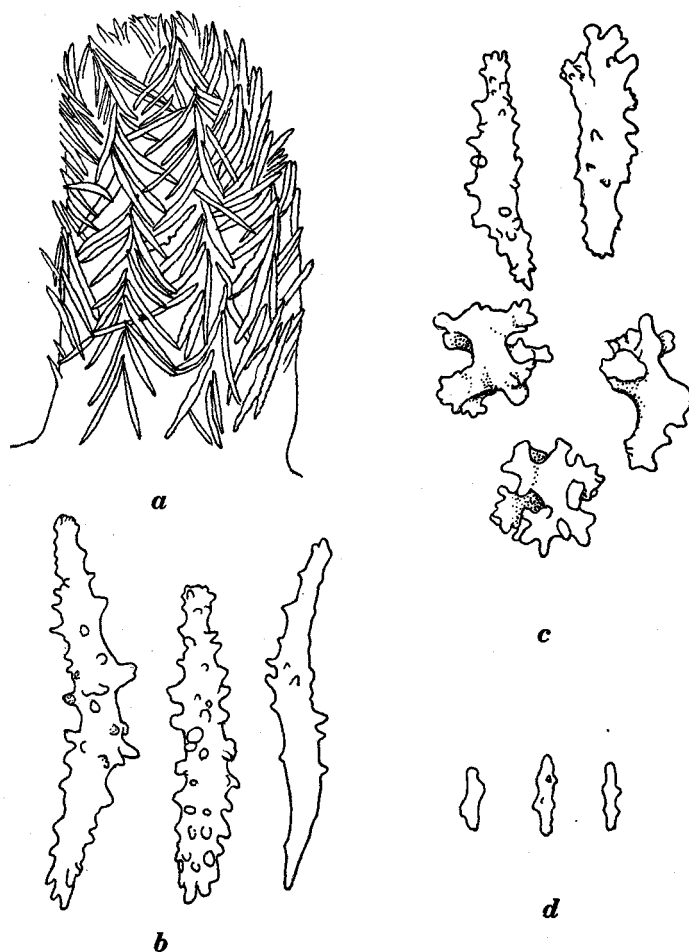


Fig. 2. *Acalycigorgia inermis* (HEDLUND).

*a*, Details of polyp; *b*, spicules of calicular wall; *c*, spicules of stem rind; *d*, tentacle spicules.

[*a*,  $\times 18$ ; *b-d*,  $\times 150$ .]

## Suborder HOLAXONIA

## Family Acanthogorgiidae GRAY

5. *Acalycigorgia inermis* (HEDLUND), 1890

(Fig. 2)

*Acanthogorgia inermis* HEDLUND, 1890, p. 6, pl. 2, figs. 1-27.*Acalycigorgia inermis* KÜKENTHAL & GORZAWSKY, 1908, p. 49, textfig. 46, pl. 3, fig. 17; KÜKENTHAL, 1909, p. 78; KÜKENTHAL, 1924, p. 239, fig. 139; AURIVILLIUS, 1931, p. 45, pl. 2, fig. 5a-b, textfigs. 8-9; STIASNY, 1947, p. 23 (listed only); U TINOMI, 1954, p. 104.*Material.* One specimen. Off Minabe, 100-200 m. III-1944. S. SAKAGUCHI coll.*Records of occurrence.* Distributed all along the pacific coasts of southern Japan, from Sagami Bay (KÜKENTHAL & GORZAWSKY) to Hongkong (HEDLUND), rather commonly on shallower basin than on offshore basin. At living state, the extended polyps are beautifully colored purple.6. *Acalycigorgia irregularis* KÜKENTHAL & GORZAWSKY, 1908

(Pl. VII, fig. 1)

*Acalycigorgia irregularis* KÜKENTHAL & GORZAWSKY, 1908, p. 42, textfigs. 38-40, pl. 3, fig. 15; KÜKENTHAL, 1924, p. 238, fig. 138; STIASNY, 1947, p. 23 (listed only).*Material.* One specimen. Off Tanabe Bay. II-1949. Collector unrecorded.*Description.* The specimen is small, about 9 cm high, branched irregularly, almost in one plane.

The axis with a membranously expanded base is uniformly slender, brownish in color and issues alternately primary branches, and then a few secondary branches. The polypiferous branches are slender all throughout, about 2 mm in diameter.

The polyps are all small, closely disposed on all sides of the axis. They are constricted at tip and usually wider than high at a contracted state, showing a diameter of about 1 mm. The spicules are generally smaller than those of the preceding *inermis*.*Record of occurrence.* Hitherto known only from the type locality (Sagami Bay).7. *Acanthogorgia japonica* KÜKENTHAL & GORZAWSKY, 1908

(Pl. VII, fig. 2)

*Acanthogorgia japonica* KÜKENTHAL & GORZAWSKY, 1908, p. 53, textfigs. 47-50, pl. 3, fig. 18; KÜKENTHAL, 1924, p. 249, fig. 143.*Paracanthogorgia japonica* STIASNY, 1947, p. 59 (listed only).

*Material.* 1) A fragment. Off Minabe. II-1949. Collector unrecorded.

2) One specimen. Off Minabe. 4-V-1958. K. MIHASI coll.

*Description.* As shown by a color photograph of a complete colony obtained in Ise Bay (UTINOMI, 1956, pl. 9, fig. 7), the colony is rather ramose, not branching in one plane and dirty yellowish brown in color. The branches arise approximately at right angles and bear many large polyps on all sides. They are about 7-12 mm in diameter, when the polyps around the axis are combined together. Each polyp is about 3 mm high and 1.5 mm wide. The axis is robust, horny and dark brown. Details of the spiculation agree well with the original description.

*Record of occurrence.* Hitherto known only from the type locality (Sagami Bay, 80-250 m).

### Family Paramuriceidae BAYER

#### 8. *Discogorgia dendritica* (NUTTING), 1910

(Fig. 3; pl. VII, fig. 4)

*Placogorgia dendritica* NUTTING, 1910a, p. 79, pl. 12, figs. 1-1a, pl. 22, fig. 6.

*Discogorgia dendritica* KÜKENTHAL, 1924, p. 214; BAYER, 1956, p. F 203, fig. 2a-d.

*Material.* 2 specimens. 23 km west of Setozaki, 80-150 m. 28-XI-1957. E. HARADA coll.

*Description.* Both specimens, 9 cm and 12 cm respectively in height, are attached by a membranous base to a broken shell, and loosely branched in one plane. The colony is generally pale brown, but the polyps appear purplish brown. The lower part of the main stem and lower branches lacks the calicles, and about 2 mm in diameter.

The calicles are closely arranged in four longitudinal rows, about 2 mm apart, though somewhat twisted here and there.

The individual calicles are rather high cones, averaging about 1.5 mm high and 1.5-1.8 mm in basal diameter. Their walls appear quite smooth at a glance, but they are really ornamented with small, thorn-scales bearing jagged margins or foliaceous projections, compactly packed together.

The retractile polyps rest above the calicles, about 0.5 mm high and 1.2 mm wide, are armed with about 4 or 5 transverse rows of small collaret spicules, 8 points of larger spicules, and each a small intermediate spicule between the points.

In the rind of the basal part of the stem there found no thorn-scales as seen in the calicles and upper rind.

Details of spicules and their measurements (in mm) are:

Calicles and upper rind—thorn-scales of irregular shape, with jagged margins and often foliaceous wide projections.  $0.32 \times 0.14$ ,  $0.35 \times 0.12$ ,  $0.35 \times 0.03$ ,  $0.45 \times 0.3$

Sterile basal rind and axial sheath—mostly thorny spindles and derivatives.

$0.038 \times 0.035$ ,  $0.12 \times 0.05$ ,  $0.26 \times 0.05$ ,  $0.23 \times 0.17$ ,  $0.35 \times 0.07$

Points and collarets—feebly warted spindles.  $0.3 \times 0.03$ ,  $0.62 \times 0.08$ ,  $0.9 \times 0.09$

Tentacles—flattened rods.  $0.17 \times 0.01$

*Record of occurrence.* Hitherto known only from the type locality (Kwandang Bay entrance 80 m and Buton Island 75–94 m, Malay Archipelago).



Fig. 3. *Discogorgia dendritica* (NUTTING).

*a*, Tip of calicle with extended polyp; *b*, thorny scales from stem rind and calicular wall; *c*, spicules of various shape from sterile basal part of stem rind; *d*, anthocodial spicules.

[*a*,  $\times 33$ ; *b-d*,  $\times 80$ .]

### 9. *Muricella abnormalis* NUTTING, 1912

(Fig 4; Pl. VII, fig. 3)

*Muricella abnormalis* NUTTING, 1912, p. 79, pl. 11, figs. 3–3a, pl. 20, fig. 6; KÜKENTHAL, 1924, p. 174; BAYER, 1956, p. F206, fig. 149 (1).



*Material.* 1) One broken specimen. Off Minabe, 100–200 m. III–1944. S. SAKAGUCHI coll.

2) One specimen. Off Tanabe Bay. III–1949. Collector unrecorded.

*Description.* Both specimens are scantily branched in one plane, with a slightly expanded base. They are 6 cm long and 12 cm long respectively. The axis is yellowish brown, rather stout, though slender in branches of a smaller colony.

The cortex is generally thin all throughout and the calicles are scattered on all sides of the stem and branches. The individual calicles vary in size, but a

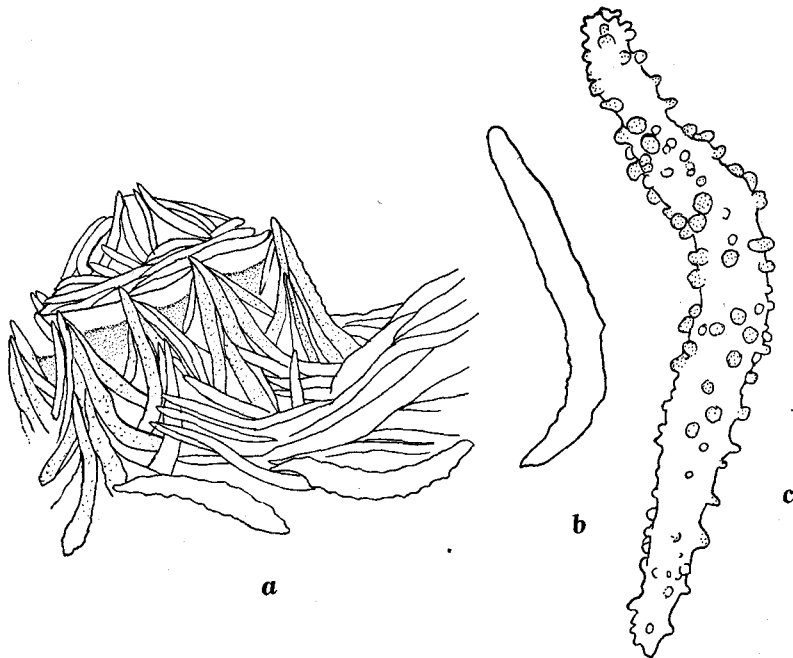


Fig. 4. *Muricella abnormalis* NUTTING.

a, Details of polyp; b, anthocodial spicule; c, calicular spicule.  
[a,  $\times 33$ ; b–c,  $\times 80$ .]

typical one is a low truncated cone, about 2 mm in height and so in diameter. Their walls consist of eight triangles which stand vertically above the spicules of the coenenchyma. Each of the triangles is composed of about 8 spindles converging towards the margin of the calice and slightly projecting above the upper margin: between them there is a wide naked area above.

The polyps, when partially extended or retracted, are rather wider than high and armed with three transverse rows of collaret spindles and eight points each of which is formed of a pair of spindles. Their measurements (in mm) are:

Calicle and cortex—tuberculate spindles.  $0.55 \times 0.08$ ,  $0.77 \times 0.11$ ,  $0.88 \times 0.11$ ,  $1.0 \times 0.16$

Collarets—nearly smooth spindles.  $0.22 \times 0.02$ ,  $0.44 \times 0.05$ ,  $0.55 \times 0.06$

Points—nearly smooth spindles.  $0.2 \times 0.02$ ,  $0.4 \times 0.05$

*Record of occurrence.* Hitherto known only from the type locality (Osezaki, Suruga Bay, Japan, 108 fms.).

# 10. *Muricella nitida* (VERRILL), 1868

(Fig. 5; Pl. VIII, fig. 5)

*Muricea nitida* VERRILL, 1868, p. 412.

*Muricella nitida* VERRILL, 1869, p. 450; WRIGHT & STUDER, 1889, p. 127; GERMANOS, 1896, p. 181, pl. 10, fig. 4; THOMSON & HENDERSON, 1905, p. 302; THOMSON & SIMPSON, 1909, p. 245 (no new record); KÜKENTHAL, 1924, p. 172, fig. 112.

*Material.* One specimen. Off Minabe, 100–200 m. III–1944. S. SAKAGUCHI coll.

*Description.* The specimen consists of the basal part of a colony, about 57 mm in length, with two branches (40 mm long and 65 mm long respectively) arising at right angles from one side of the stem. Each of the two branches bears one branchlet, and they spread in one plane.

The calicles are mostly placed laterally, alternate in position at distances of about 1–3 mm; some of them are sometimes distorted somewhat obliquely to the plane of branching. The individual calicles are usually placed perpendicularly and large, fairly cylindrical in form, about 1.5–2 mm high and 1.2–18 mm in basal diameter. Their walls are filled with red spicules vertically disposed, indistinctly converging into eight point at their tip.

The polyps, when extended, are generally longer than wide and armed with eight points forming of 2 or 3 pairs of white spicules; the collarets at base, however, seem to be indistinct, though some smaller spicules may be obliquely disposed below.

The cortex is rather thick and closely packed longitudinally with stout tuberculate spindles; those on the surface layer are much larger than those of the calicles, bright red in color, while those of the deeper layer are smaller and pink in color. The axis is horny, flexible and yellowish brown.

The measurements of spicules (in mm) are:

Stem cortex—tuberculate spindles, carmin-red in outer layer and pink in deeper layer.  $1.2 \times 0.3$ ,  $2 \times 0.35$

Calicles—tuberculate spindles, carmin-red.  $0.5 \times 0.07$ ,  $0.7 \times 0.07$ ,  $0.8 \times 0.1$ ,  $1.0 \times 0.12$

Points—tuberculate spindles narrowing downwards, yellowish or pure white.  $0.6 \times 0.06$ ,  $0.7 \times 0.07$ ,  $0.8 \times 0.1$

Tentacles—curved rods, colorless. 0.12–0.15 long

*Records of occurrence.* Ebon Island in the Central Pacific (type locality); Sagami Bay, 345 fms., Japan (WRIGHT & STUDER); Ternate Inland, Malay Archipelago (GERMANOS); Ceylon Seas (THOMSON & HENDERSON).

*Remarks.* As to the coloration of *Muricella nitida* (VERRILL), the present specimen differs somewhat from the notes given by earlier authors, viz. the calicles and coenenchyma are reported as purplish red (VERRILL), coral red (WRIGHT & STUDER; THOMSON & HENDERSON) or yellowish red (GERMANOS).

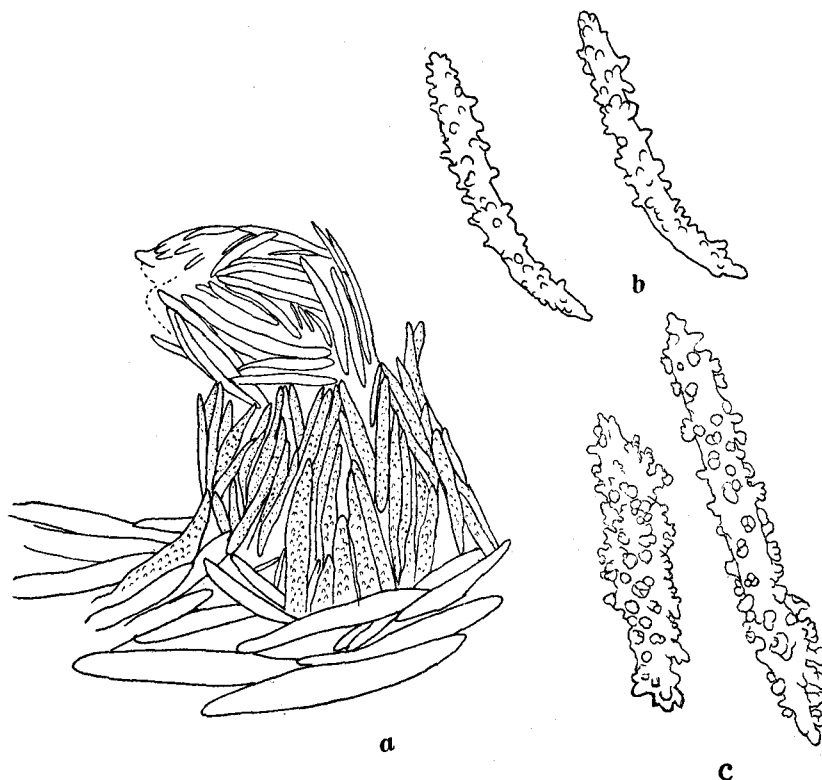


Fig. 5. *Muricella nitida* (VERRILL).

*a*, Details of calicle and extended polyp; *b*, anthocodial spicules; *c*, calicular spicules.  
[*a*,  $\times 18$ ; *b-c*,  $\times 80$ .]

However, color is not always a reliable feature since it may vary within the species, sometimes due to longterm preservation, but is a useful secondary character.

# 11. *Muricella magna* n. sp.

(Fig. 6; Pl. VIII, figs. 6-7)

*Material.* One specimen (SMBL Type 185). Off Minabe, 100-200 m. III-1944. S. SAKAGUCHI coll.

*Description.* This new species is represented by a beautiful nearly unbranched colony, light purplish red in color.

The colony, about 10 cm in total height, is nearly unbranched, bearing only three short branchlets near the distal part, about 6 mm, 7 mm and 25 mm respectively in length.

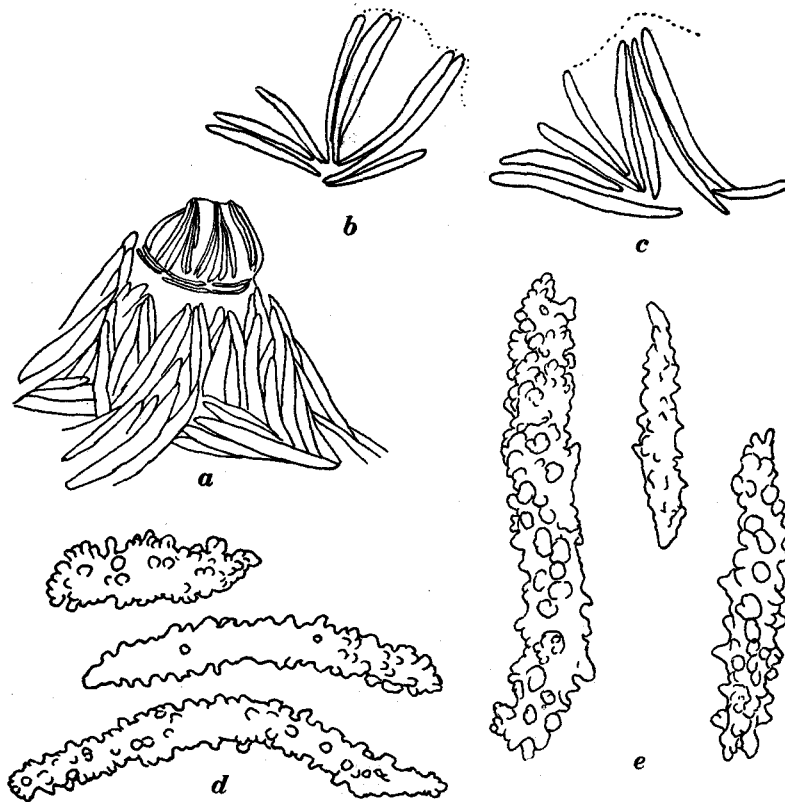


Fig. 6. *Muricella magna*, n. sp.

*a*, Details of polyp and calicle; *b-c*, arrangement of anthocodial spicules; *d*, anthocodial spicules; *e*, calicular spicules.

[*a*,  $\times 12$ ; *b*,  $\times 25$ ; *c*,  $\times 33$ ; *d-e*,  $\times 80$ .]

tively in length. The base of the main stem is expanded with a spread of about 1 cm across. For a distance of about 1 cm just above the basal disk, the stem is cylindrical, with a diameter of about 4 mm and devoid of calicles. In the remaining part of the stem and branchlets, the coenenchyma is flattened in the plane of branching, and their terminal ends are thickened with 3 calicles.

The coenenchyma is fairly thick and compactly filled with light purplish red

tuberculate spindles. The calicles are irregularly distributed on all sides of the coenenchyma, usually 2 mm apart. The individual calicles are quite large, crater-like in form, with a round opening, about 1.5 mm in height and 3 mm in diameter at tip. Their walls are gradually sloped around and filled with spindles similar to those of the coenenchyma, distinctly converging into eight points at tip.

The polyp body is armed with vertical spindles, forming an eight-pointed prominent operculum. The collaret is formed of only two circlets of spindles which are obliquely or transversely disposed below the operculum. These polypal spicules are heavily tuberculate spindles bluntly ended and colored light purplish red like those of the calicles. The retractile neck portion of the polyps is also furnished with a number of pinkish rodlets.

The axis is rather robust, horny, brown in color, and 1 cm in diameter at the end of the branchlets.

Measurements of spicules (in mm) are:

Calicles—tuberculate spindles, roundly ended, light purplish red.  $0.5 \times 0.06$ ,  $0.7 \times 0.2$ ,  $0.8 \times 0.1$ ,  $0.8 \times 0.1$ ,  $1.35 \times 0.3$

Points—tuberculate spindles, curved and roundly ended, light purplish red.  $0.18 \times 0.035$ ,  $0.26 \times 0.05$ ,  $0.35 \times 0.06$ ,  $0.4 \times 0.07$

Tentacle—curved rod, colorless. 0.1–0.2 long

Neck portion of polyp—slender rodlets or spindles, pinkish.  $0.07 \times 0.03$ ,  $0.1 \times 0.01$ ,  $0.17 \times 0.02$

*Remarks.* The present specimen is apparently related to *Muricella rubra* THOMSON and *M. perramosa* RIDLEY in coloration, but differs from them in the scanty branching, the polypal arrangement and the thick flattened coenenchyma.

## 12. *Astrogorgia rubra* THOMSON & HENDERSON, 1906

(Fig. 7; Pl. VIII, fig. 8)

*Astrogorgia rubra* THOMSON & HENDERSON, 1906, p. 69, pl. 5, fig. 10; KÜKENTHAL, 1924, p. 235, fig. 137.

? *Callistephanus koreni* THOMSON & HENDERSON, 1906, p. 79.

*Material.* A portion of a reddish colony. Off Minabe, 100–200 m. III–1944. S. SAKAGUCHI coll.

*Description.* The specimen is represented only by a part of a beautiful coral red colony, about 4 cm long, missing both ends. Superficially it resembles *Callistephanus* (= *Swiftia*) *koreni* WRIGHT & STUDER of the Paramuriceidae or *Nicella*-species of the Ellisellidae, but may be referable to *Astrogorgia rubra* THOMSON & HENDERSON, previously known only from the type locality.

The coenenchyma is uniformly coral red in color, granular on surface and fairly thick. The stem is somewhat flattened and the verrucae are arranged alternately on lateral sides, the distance between two verrucae on the same side

being about 2–3 mm, but some of the verrucae are somewhat turned to the other sides. The diameter of the stem where the verrucae are absent is about 1.5 mm.

The verrucae are dome-shaped, about 1.3–2 mm across at apex and about 1 mm in height. Their apical margin is marked by eight obtuse points.

The coenenchyma is fairly thick and its surface is thickly covered by small warty spindles or clubs, about  $0.09 \times 0.05$  mm, perpendicularly to the surface, giving the surface a granular appearance. The inner spicules arranged longitudinally are rather longer warty spicules, or sometimes club-like gradually

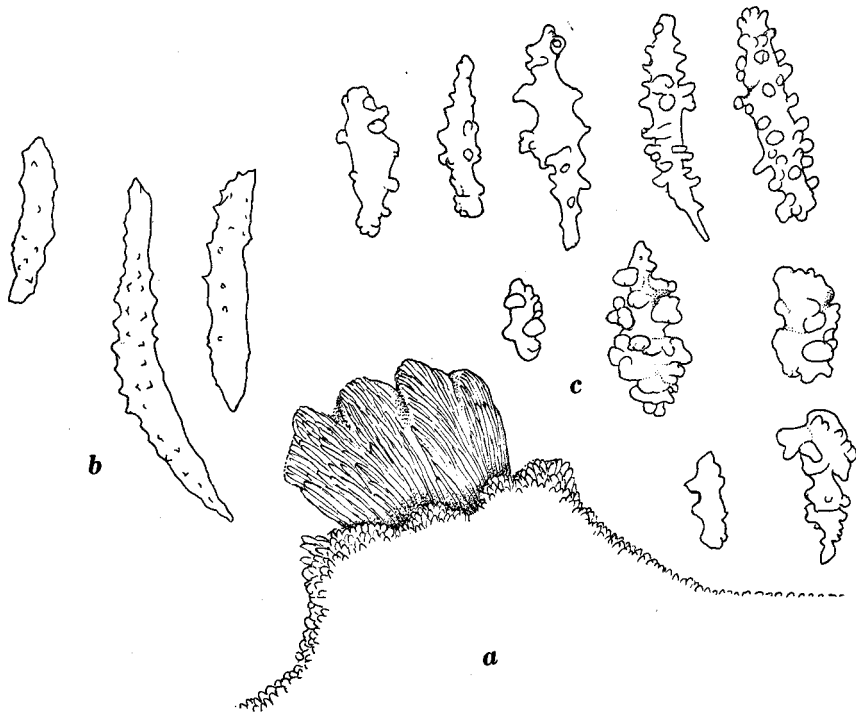


Fig. 7. *Astrogorgia rubra* THOMSON & HENDERSON.

*a*, Details of polyp extended above calicle; *b*, anthocodial spicules; *c*, coenenchymal spicules.

[*a*,  $\times 27$ ; *b*-*c*,  $\times 140$ .]

tapering to one end. These spicules are all coral red and measure in mm:

$0.07 \times 0.02$ ,  $0.12 \times 0.05$ ,  $0.16 \times 0.035$ ,  $0.18 \times 0.035$ ,  $0.19 \times 0.07$

The polyps are completely retractile and their tip, when the tentacles are wholly withdrawn, is marked by eight rounded points like the verrucae. The anthocodial spicules are closely crowded longitudinally and light red with some grayish yellow thorny spindles, as measuring about 0.2–0.25 mm in length and 0.035 mm in width.

The axis is apparently horny, brown and about 0.5 mm in diameter.

*Record of occurrence.* Hitherto known only from the Indian Ocean ( $6^{\circ} 55' 6''$  N,  $72^{\circ} 55'$  E, 210 fms.).

*Remarks.* The genus *Astrogorgia* was established by VERRILL (1868, p. 413; 1869, p. 43) for a unique species *Muricea sinensis* VERRILL (1865, p. 187, pl. 5, figs. 5-5a) from Hongkong. According to VERRILL's original and emended descriptions, the verrucae of the type species *sinensis* are scattered on all sides and the coenenchyma is granular on surface and deep red in color. In the second species *rubra*, however, the verrucae are said to be disposed in a regularly alternate manner and on larger branches they are almost opposite and the spiral twisting of the axis makes it appear as if the verrucae occurred on all the four sides; the spicules, not figured by them, are said to be all of a pink color, diverse in shape.

In all probability these specimens seem to represent a single species, when any more complete specimens would be found in the future. Furthermore, it is necessary to re-examine the type specimens of both species of *Astrogorgia* to reappraise their position in respect to its affinity with the related genus *Swiftia* DUCHASSAINIG & MICHELOTTI.

### 13. *Menella indica* GRAY, 1870

(Fig. 8; Pl. VIII, fig. 9)

*Menella indica* GRAY, 1870a. p. 407; NUTTING, 1912, p. 86; KÜKENTHAL, 1924, p. 184; UTINOMI, 1958, p. 105.

*Echinomuricea*? sp. UTINOMI & HARADA, 1958, p. 388 (listed only).

*Material.* One specimen. 23 km west of Setozaki, 80-150 m. 28-XI-1957. E. HARADA coll.

*Description.* The specimen is represented by a very long filiform colony, 50 cm in total length, only giving off a shorter simple branch, 11 cm long, at a right angle in the middle. There is no expanded base which occurs in the related species *Menella rubescens* NUTTING.

The stem and branch are very slender, flexible, totally filiform and bluntly pointed at the ends. The diameter of the stem is the widest in the middle where a single branch is given off, namely 1.1 mm, and gradually decreases distally where it is only 0.7 mm. The diameter of the branch is likewise 0.7 mm.

The color of the colony is pale brown. The axis is woolly horny, very flexible, about 0.7 mm in diameter in the middle and almost black.

The polyps are irregularly scattered on all sides, and deeply sunken into their cavities usually opened in the center of low verrucae and usually lengthened along the axis.

Each of the verrucal cavities is about 1 mm in long diameter and about 0.5 mm deep, and they are about 1-2 mm apart.

The coenenchyma, including the verrucal swellings, is evenly spiculate on

surface and moderately thick. Their spicules are mostly of the *Echinomuricea*-type, namely thorny scales with a prominent projecting smooth spike and a few thorny basal processes, which are narrower than those of *M. rubescens* NUTTING,

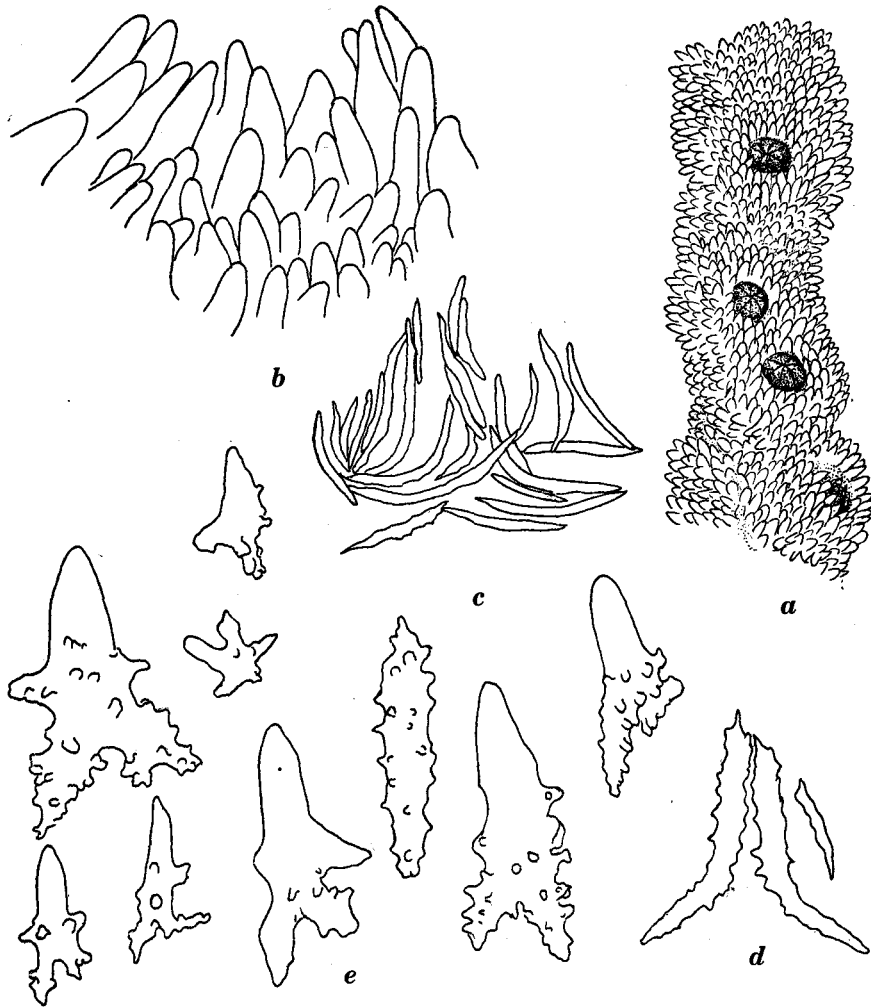


Fig. 8. *Menella indica* GRAY.

*a*, Part of stem, with 4 polyps sunken into calicular cavities; *b*, details of a part of calicular margins; *c*, arrangement of anthocodial spicules; *d*, a pair of point spicules; *e*, coenenchymal spicules.

[*a*,  $\times 18$ ; *b-c*,  $\times 80$ ; *d-e*,  $\times 150$ .]

as figured by NUTTING (1910a, pl. 22, fig. 13) and BAYER (1959, p. 56, fig. 1A) and those of *Echinomuricea peterseni* HEDLUND, as figured by HEDLUND (1890, pl. 3) and AURIVILLIUS (1931, p. 173, fig. 33). Between these thorny scales, larger thorny



spindles are sporadically interspersed, filling up the intervening spaces in the deeper layer. However, there is no lobated scales basally.

The polyps are wholly retractile and all sunken deeply below the verrucal margins. The operculum consists of eight converging points and 2-3 collaret rows of slender spicules.

Measurement of these spicules (in mm) are:

Verrucal and coenenchymal thorny scales.  $0.16 \times 0.04$ ,  $0.18 \times 0.16$ ,  $0.2 \times 0.18$ ,  $0.21 \times 0.13$

Interspersing coenenchymal thorny spindles.  $0.23 \times 0.03$ ,  $0.3 \times 0.05$ ,  $0.33 \times 0.07$ ,  $0.33 \times 0.08$

Anthocodial, slightly thorny or smooth, slender spindles.  $0.11 \times 0.01$ ,  $0.13 \times 0.018$ ,  $0.16 \times 0.016$ ,  $0.19 \times 0.02$ ,  $0.2 \times 0.16$

Tentacle and pinnule spicules. 0.05-0.08 long

*Records of occurrence.* Back Bay, Bombay, west coast of India (type locality); 2.6 miles off Osezaki Light, Suruga Bay, Japan, 57 fms. (NUTTING); Tosa Bay, Japan (UTINOMI).

*Remarks.* In a review of the genus *Placogorgia* STUDER, BAYER (1959a) generically distinguished *Menella* from *Echinomuricea* by the shape of the calicular thorny scales, based on the examination of spicules of two species, *Menella rubescens* NUTTING and *Echinomuricea indomalaccensis* RIDLEY. Among the three species described by NUTTING (1908 and 1910a), *M. grandiflora* from Hawaiian Islands is clearly a member of the stoloniferan genus *Clavularia* (cf. BAYER, 1952, p. 129). On the other hand, *M. rubescens* from Malay Archipelago seemingly approaches to *Echinomuricea* and *M. grayi* from Malay Archipelago approaches to *Muriceides* rather than to *Menella indica* in respect to their spiculation and mode of life (or growth form of the colony).

In comparison with *Echinomuricea*-species, *Menella indica*, type of the genus, is unbranched or only scantily branched, with thick coenenchyma. Calicles are very low, elliptical in cross section, thickly covered by thorny scales similar to those of the surrounding cortex which are composed of a single broad smooth projecting spike and a few thorny basal branches. Polyps, when retracted, are deeply sunken below calicular margins.

#### 14. *Filigella mitsukurii* KINOSHITA, 1909

(Figs. 9 and 10; Pl. IX, figs. 10-11)

*Filigella mitsukurii* KINOSHITA, 1909b, p. 1, pl. 1, fig. 1 and pl. 2, figs. 7-9; AURIVILLIUS, 1931, p. 129, textfig. 25, pl. 3, figs. 3-4; BAYER, 1956, p. F206, fig. 148 (3); UTINOMI & HARADA, 1958, p. 388 (listed only).

*Elasmogorgia mitsukurii* KÜKENTHAL, 1924, p. 149, fig. 104.

? *Elasmogorgia filiformis* NUTTING, 1912, p. 85.

*Material.* 5 unbranched and scantily branched specimens. Sta. 1, 23 km west of Setozaki, 120 m. Bottom : pure sand. 8-XII-1957. E. HARADA coll.

*Description.* This is also a very slender filiform gorgonid, not forming any ordinary attachment disk.

The unbranched forms measure 20 cm, 30 cm, 31 cm and 38 cm in length respectively. The bifurcate form is likewise a single whiplike stem, about 17 cm long, with a longer branch, about 22 cm long, arising near its base broken off.

In all these specimens, both the ends are slightly swollen and bluntly pointed like an arrow-head (Fig. 9, *a-d*). In the presumably lower part, the stem measures about 1 mm in diameter, but in the remaining parts it is less than 1 mm in diameter all throughout, mostly 0.5 mm. The color is dirty white.

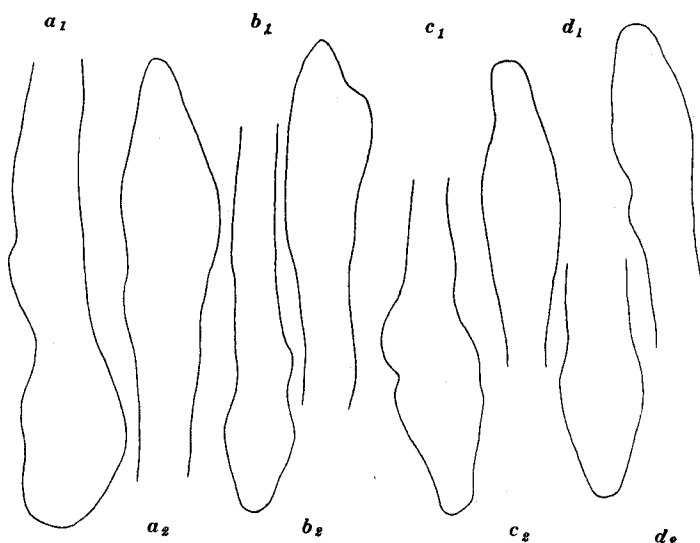


Fig. 9. *Filigella mitsukurii* KINOSHITA.  
Outline of both ends of four colonies (*a-d*).  
[ $\times 12$ .]

The verrucae, which are low cones when viewed from sides, are scattered on all sides, but tend to be lateral and alternate. They are about 0.5-2 mm apart, averaging 1 mm. The axis is very flexible, about 0.25 mm in diameter and yellowish brown.

The coenenchyma is thin and covered with fusiform spicules about 0.2-0.3 mm long. These spicules are generally arranged longitudinally, but around the orifice of the verrucae somewhat radially, not in chevrons.

These coenenchymal spicules are somewhat larger in the surface layer than in the deeper layer, but similarly all short tuberculate spindles bluntly ended,

with smooth or slightly roughened warts. They measure in mm as follows:

$0.13 \times 0.033$ ,  $0.19 \times 0.05$ ,  $0.25 \times 0.07$ ,  $0.3 \times 0.08$ ,  $0.33 \times 0.082$

The operculum of the anthocodiae consists of eight points longitudinally disposed and 2 or 3 transverse rows of collarets. These are slightly thorny

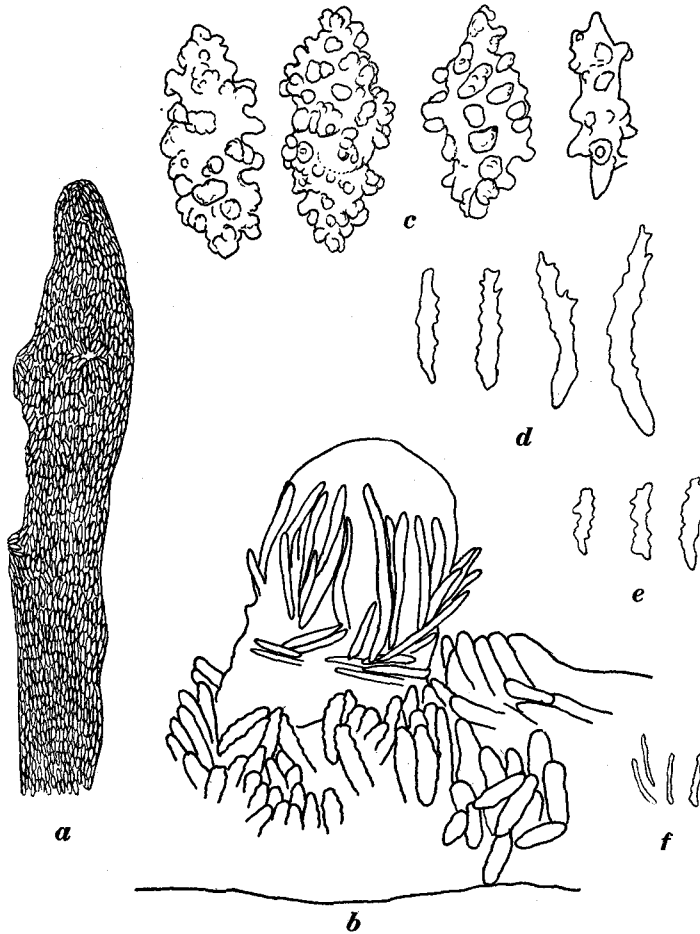


Fig. 10. *Filigella mitsukurii* KINOSHITA.

*a*, End of colony; *b*, details of polyp partially extended out of calicle; *c*, coenenchymal spicules; *d*, anthocodial spicules; *e*, tentacle spicules; *f*, pinnule spicules.

[*a*,  $\times 12$ ; *b*,  $\times 67$ ; *c-f*,  $\times 97$ .]

spindles and measure in mm as follows:

$0.16 \times 0.02$ ,  $0.19 \times 0.03$ ,  $0.21 \times 0.025$ ,  $0.25 \times 0.032$

Tentacle spicules are all flattened rods, as measuring in mm:

$0.082 \times 0.016$ ,  $0.114 \times 0.032$

Pinnule spicules are slender rodlets, about 0.033–0.082 mm long.

*Records of occurrence.* South of Jogashima (=Zyôgasima), Sagami Bay, 70 fms. (type locality), Sagami Bay 400–450 m and west of Kyusyu 160–200 m (AURIVILLIUS).

*Remarks.* As we have seen, most of the genus *Filigella* or *Elasmogorgia* and also *Filigorgia*<sup>1)</sup> (STIASNY, (1939, p. 301) are unbranched or scantily branched, filiform gorgonid, usually lacking the ordinary basal disk like the preceding *Menella*. As suggested originally by GRAY (1868, p. 443) and by KINOSHITA (1909b, p. 1) and later by AURIVILLIUS (1931, pp. 126–143), the genus *Filigella*, with which *Elasmogorgia* are synonymous, may be designated as follows:

Colony filiform, simple or scantily branched, free or fixed according to the bottom nature of its habitat; distal end slightly swollen and bluntly pointed; proximal end rounded and either free or with a small attachment disk; axis horny, very flexible; coenenchyma thin, formed of small colorless warty spindles; calicles only low mounds irregularly or alternately disposed on coenenchyma, their spiculation not specialized.

Recently BAYER (1958, p. 50; 1959b, p. 17, for *Filigella gracilis*) synonymized the two genera *Filigella* GRAY and *Elasmogorgia* WRIGHT & STUDER with the West Atlantic genus *Thesea* DUCHASSAING & MICHELLOTTI, and transferred to the family Plexauridae from the family Paramuriceidae. So far as I examined on specimens or in the literature, the coenenchyma of *Filigella* seems to be not so thick and two-layered as in most plexaurids, and the anthocodial armature is more powerful so as to form the operculum typical of paramuriceids. So it seems better to retain the genus name under the Paramuriceidae than to unite with the plexaurid *Thesea*.

### Family Plexauridae GRAY

#### 15. *Euplexaura attenuata* (NUTTING), 1910

(Fig. 11; Pl. IX, fig. 12)

*Plexaura attenuata* NUTTING, 1910b, p. 5, pl. 1, figs. 2–2a, pl. 1, figs. 2–2a, pl. 4, fig. 2.

*Euplexaura attenuata* KÜKENTHAL, 1924, p. 100; STIASNY, 1935, p. 13, textfig. B, pl. 1, fig. 2;

UTINOMI & HARADA, 1958, p. 388 (listed only).

*Material.* 1) One large specimen, 55 cm long, with 2 branches arising perpendicularly. Tanabe Bay, probably 20–30 m (obtained by a lobster-net). 18-I-

- 1) Very recently I have had an opportunity to examine the type specimens of *Filigorgia saharensis* and *F. ridouroi* from West Africa (STIASNY, 1939) through the courtesies of Drs. VERSEVELDT, VERVOORT and STOCK. On examination I have recognized *Filigorgia* as a valid genus of the Paramuriceidae related to *Filigella*, and the latter species as a synonym of the former type species, *F. saharensis*, having only a slight difference in size of spicules. In both species, the coenenchyma is yellow or dirty white, while the biserially arranged anthocodiae are beautifully purple.

1955. T. YAMAMOTO coll.

2) 4 specimens. Southwest of Minabe, 80-150 m. 28-XI-1957. E. HARADA coll.

3) One specimen, 27 cm long, with a bifurcate branch. Off Nada near Gobō City (obtained by a lobster-net). 28-V-1958. T. YAMAMOTO coll.

*Description.* The colonies of this plexaurid are all straight, simple or scantily branched. The second materials are all young form, attached to gastropod shells. They vary from 20 cm to 55 cm in height and from 1.2 mm to 2.8 mm in diameter. The largest one of the first material (dried when examined) shows only a narrow dark brown axis, and its diameter is 2.5 mm basally and terminates to 2 mm.

The coenenchyma is dirty white in alcohol, but when living brown. The calices are evenly distributed on all sides, about 1.5 mm apart. They are hardly raised above the general level of the coenenchyma, and almost all polyps are partially extended.

The calicular orifice distributed on the narrower distal part of the stem is, when viewed from above, somewhat lengthened along the axis, oval in outline, about 1 mm in longest diameter and one-half in shortest diameter. The polyps are completely retractile and deeply sink almost to the horny axis.

The coenenchymal spicules are all colorless, small spindles with multituberculate warts symmetrically arranged usually in 4 girdles. They measure in mm as follows:

$0.1 \times 0.017$ ,  $0.14 \times 0.017$ ,  $0.16 \times 0.07$

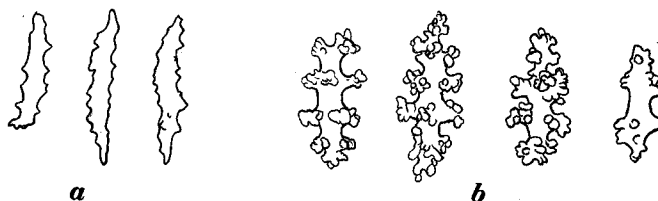


Fig. 11. *Euplexaura attenuata* (NUTTING).  
a, Anthocodial spicules; b, coenenchymal spicules.  
[a-b,  $\times 150$ .]

The anthocodial spicules are all colorless, slightly thorny spindles, as measuring in mm:

$0.1 \times 0.07$ ,  $0.14 \times 0.017$ ,  $0.16 \times 0.02$

*Records of occurrence.* Malay Archipelago (NUTTING, STIASNY); Amoy, China (STIASNY). About 20-200 m in depth.

#### Family Chrysogorgiidae VERRILL

#### 16. *Chrysogorgia rotunda* KINOSHITA, 1913

(Fig. 12)

*Chrysogorgia rotunda* KINOSHITA, 1913, p. 11, textfigs. 6-8, pl. 2, fig. 2; KÜKENTHAL, 1924, p. 390, fig. 190.

*Material.* One complete colony. Off Minabe, depth unrecorded. 1938.

*Description.* The present specimen is larger than the type specimen (11.5 cm long, 7.5 cm wide) described and figured by KINOSHITA (1913). It is attached to a stone by a flat, expanded, white calcareous basal disk, 5 cm across. Its total height is 14.5 cm and the cylindrical polyparium is about 8 cm in spread.

The stem gives off successive spirals of branches at short intervals (about 5 mm below and higher up). For a distance of about 4 cm on the lowest portion, the branches are broken off where the stem is about 3 mm in diameter. In the

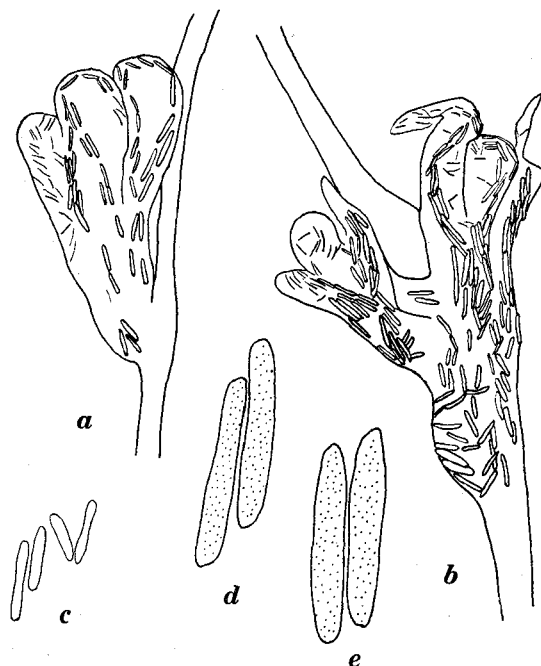


Fig. 12. *Chrysogorgia rotunda* KINOSHITA.

*a-b*, Polyps; *c*, pinnule spicules; *d*, tentacle spicules; *e*, polyp body spicules.

[*a-b*,  $\times 33$ ; *c-e*,  $\times 150$ .]

upper portion, the branches subdivide dichotomously many times, each almost in a horizontal plane, so that the colony forms a cylindrical shape.

The polyps occur on branches at intervals of about 2-3 mm on terminal twigs. They are all small, about 1 mm long and 0.3-0.5 mm wide.

Polypal body spicules are elongate flattened rods with a granular surface, about 0.18-0.5 mm long and 0.02 mm wide. Tentacle spicules are similar in shape, and longitudinally disposed on the dorsal side, about 0.1-0.18 mm long and 0.02-

0.05 mm wide. Pinnule spicules are tiny rodlets, about 0.035 mm long.

The coenenchyma is very thin, easily rubbed off and devoid of spicules and nematozooids. The axis is straw yellow, showing golden iridescence, while the polyps wholly white.

*Record of occurrence.* Hitherto known only from the type locality (Sagami Bay, down to 400 fms.)

### Family Primnoidae GRAY

#### 17. *Plumarella cristata* KÜKENTHAL & GORZAWSKY, 1908

(Fig. 13; Pl. IX, fig. 13)

*Plumarella cristata* KÜKENTHAL & GORZAWSKY, 1908, p. 16, textfigs. 14-17, pl. 1, fig. 1; KÜKENTHAL, 1924, p. 258, fig. 147; AURIVILLIUS, 1931, p. 241, textfig. 47 (1).

*Plumarella carinata* KINOSHITA, 1908a, p. 17, textfig. 3, pl. 1, fig. 8 and pl. 5, fig. 41; KINOSHITA, 1908b, p. 523, textfig. 6, pl. 17, fig. 4; NUTTING, 1912, p. 64.



Fig. 13. *Plumarella cristata* KÜKENTHAL & GORZAWSKY.

Polyp in side view.

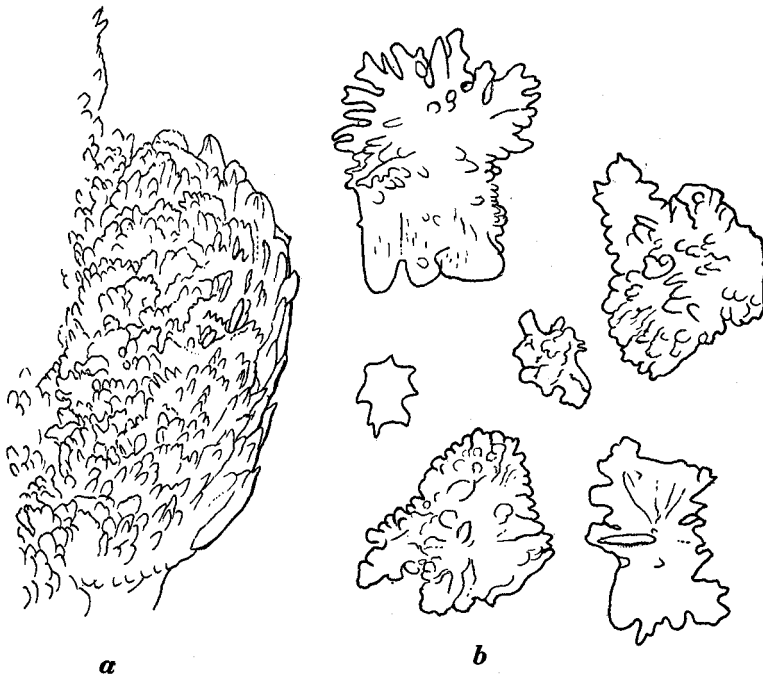
[ $\times 80$ .]

*Material.* Two specimens, missing the base, 8 cm long and 12 cm long respectively. III-1950. M. OZAKI coll.

*Records of occurrence.* Sagami Bay, 80-600 m (KÜKENTHAL & GORZAWSKY; AURIVILLIUS); Kōzu Island, south of Izu Peninsula (KINOSHITA); Osezaki, Suruga Bay, 95-106 fms. (NUTTING).

14. *Plumarella sarta* KÜKENTHAL & GORZAWSKY, 1908

(Fig. 14; Pl. IX, fig. 14)

*Plumarella sarta* KÜKENTHAL & GORZAWSKY, 1908, p. 14, textfigs. 11-13, pl. 1, fig. 4; KÜKENTHAL, 1924, p. 259.*Material.* Three fragments. Off Minabe, 100-200 m. III-1844. S. SAKAGUCHI coll.*Description.* Three terminal branches here examined are as usual pinnately branched in one plane, at intervals of about 5 mm. Their stem is about 1.2-1.5 mm in diameter and the side branches are about 0.18 mm in diameter.*a**b*Fig. 14. *Plumarella sarta* KÜKENTHAL & GORZAWSKY.*a*, Polyp in side view; *b*, thorny scales from polypal body wall.[*a*,  $\times 80$ ; *b*,  $\times 150$ .]

The polyps are regularly distributed on each side and usually crowded in parts. They are small, stout, club-shaped, usually 0.9-1.5 mm in height and 0.3 mm wide.

Polypal body spicules are closely warted, often nearly smooth, scales with strongly jagged margins. There are often dorsal cristae, which are not so distinct as in the preceding *cristata*. They measure in mm as follows:

0.09 $\times$ 0.018, 0.1 $\times$ 0.07, 0.1 $\times$ 0.018, 0.18 $\times$ 0.12, 0.25 $\times$ 0.18, 0.3 $\times$ 0.2

*Record of occurrence.* Hitherto known only from the type locality (Sagami Bay, 80-250 m).



19. *Thouarella hilgendorfi* (STUDER), 1878

*Plumarella hilgendorfi* STUDER, 1878, p. 648, pl. 2, fig. 15.

*Thouarella hilgendorfi* WRIGHT & STUDER, 1889, p. 62, pl. 21, fig. 4; VERSLUYS, 1906, p. 24, pl. 1, fig. 4 and pl. 2, fig. 7; KINOSHITA, 1908a, p. 21, pl. 5, fig. 42; NUTTING, 1912, p. 66; KÜKENTHAL, 1924, p. 293; AURIVILLIUS, 1931, p. 248, textfig. 48, pl. 5, fig. 8.

*Material.* Three specimens, 8-11 cm long. Off Minabe, 100-200 m. III-1944. SAKAGUCHI coll.

*Records of occurrence.* Widely distributed in Malayan waters and Japan such as Jeddobay (=Tokyo Bay) (type locality), Sagami Bay, Suruga Bay and west of Kyusyu, 100-2200 m.

## PENNATULACEA

## Suborder SESSILIFLORAE

## Family Veretillidae HERKLOTS

20. *Cavernularia obesa* MILNE EDWARDS & HAIME, 1857

For description and synonyms see KÜKENTHAL & BROCH, 1911, p. 181.

*Material.* One specimen, 15 cm long, contracted. Off Minabe. III-1950.

*Records of occurrence.* Indian Ocean, Malay Archipelago, Australia and Japan, usually in shallow seas.

## Family Echinoptilidae HUBRECHT

21. *Echinoptilum macintoshi* HUBRECHT, 1885

*Echinoptilum macintoshi* HUBRECHT, 1885, p. 512, 2 pls.; BALSS, 1910, p. 38, pl. 2, figs. 1-3 and pl. 5, figs. 3-5; NUTTING, 1912, p. 48; THOMSON & RENNET, 1927, p. 121, pl. 9, fig. F; UINOMI & HARADA, 1958, p. 388 (listed only).

*Material.* 1) 2 specimens. 23 km west of Setozaki, 80-150 m. 28-XI-1957. E. HARADA coll.

2) One specimen. 8 miles southwest of Kirimezaki, 150 m. 16-XII-1957. M. OZAKI coll.

*Records of occurrence.* Hitherto known commonly from deep water of Japan; for example Kumanonada, 34° 11' N, 136° E, 130 m (type locality), Sagami Bay, (BALSS; THOMSON & RENNET), Dōgo Island, Zapan Sea (NUTTING), Prov, Rikuzen and Uraga Channel (THOMSON & RENNET). Further recorded from Hawaiian waters (NUTTING, (1908, p. 561).

## Family Kophobelemnidae GRAY

22. *Sclerobelemnon burgeri* (HERKLOTS), 1858

For description and synonyms see BALSS, 1910, p. 27 and HICKSON, 1916, p. 77.

*Material.* One large specimen, 20 cm long and 1.5 cm wide. Off Tanabe Bay. III-1950.

*Record of occurrence.* Known from Japan and Indo-Malayan waters, in 150-180 m in depth.

## Family Funiculinidae GRAY

23. *Funiculina quadrangularis* (PALLAS), 1766

For description and synonyms see KÖLLIKER, 1870, p. 191 and p. 590, and BALSS, 1910, p. 33.

*Material.* One specimen, 47 cm long and 2.5 cm wide at base. 23 km west of Setozaki, 80-150 m. 28-XI-1957. E. HARADA coll.

*Record of occurrence.* Apparently cosmopolitan, 18-2600 m (BALSS).

## Family Stachyptilidae KÖLLIKER

24. *Stachyptilium dofleini* BALSS, 1909

(PI. X, figs. 15-16)

*Stachyptilium dofleini* BALSS, 1909, p. 427.

*Stachyptilium superbum* BALSS, 1910, p. 36 (not STUDER); KÜKENTHAL & BROCH, 1911, p. 261, figs. 84-91; THOMSON & RENNET, 1927, p. 129, pl. 9, figs. B-C; KUMANO, 1947, p. 1551, fig. 4361.

*Stachyptilium dofleini* KÜKENTHAL, 1913, p. 262 (emend.).

*Material.* One specimen. Off Minabe. Depth unrecorded. III-1950.

*Description.* The specimen is represented by a single large colony, about 19 cm long, of which the polyparium is about 12 cm long and the sterile stalk is about 7.5 cm, thus the ratio of length between the polyparium and stalk is roughly 1.6:1. The maximum width of the polyparium is about 4 mm and the diameter of the stalk is about 3 mm in its collapsed condition.

The polyparium is grayish, while the stalk is reddish brown, darker towards the lowest end.

The autozooids are arranged laterally in oblique rows, about 33 in total number, and at the same time 4-6 on one oblique-transverse row, decreasing in number towards up and down. Each of the autozooid calices in the middle portion is about 4 mm long and 0.7 mm wide, and armed with a number of needles on the outer side; the distal margin is less spinose, usually only one tooth some-

what conspicuous on both sides, though never so spine-like as in the real *St. superbum* as figured by NUTTING (1908, pl. 87, fig. 9) and by KÜKENTHAL (1913, pl. 8, fig. 9). The scale-like siphonozooids occur laterally on the rachis in triangular clusters, leaving a dorso-median streak free.

*Records of occurrence.* Hitherto known only from Japan, especially Sagami Bay, 90–150 m (BALSS), 80–350 fms. (THOMSON & RENNET), littoral to 150 m. (KÜKENTHAL). According to KUMANO (1947), younger specimens, about 10 cm long, occur abundantly on sandy mud basin in the depths of 3–75 m around the coast of the same bay.

*Remarks.* As emended by KÜKENTHAL (1913), the relative length of the parapodium and stalk and the less spinose calicular margins may serve to separate the Japanese form from the type species *St. superbum* STUDER (1894) endemic to the Pacific coast of the central and north America.

### Suborder SUBSELLIFLORAE

#### Family Pennatulidae EHRENBERG

#### 25. *Leioptilus fimbriatus* (HERKLOTS), 1858

(Pl. X, figs. 17–18)

*Pennatula fimbriata* HERKLOTS, 1858, p. 18, pl. 3, fig. 3 and pl. 4, fig. 1.

*Leioptilus fimbriata* GRAY, 1860, p. 22.

*Leioptilus fimbriatus* GRAY, 1870b, p. 21.

*Pennatula fimbriata* KÖLLIKER, 1872, p. 137.

*P. sulcata* KÖLLIKER, 1880, p. 8, pl. 2, figs. 3–4.

*P. fimbriata* BALSS, 1910, p. 55, pl. 1, figs. 6 & 11, pl. 4, fig. 3; KÜKENTHAL & BROCH, 1911, p. 376, figs. 171–176; HICKSON, 1916, p. 184, textfig. 36; THOMSON & RENNET, 1927, p. 131; KUMANO, 1947, p. 1548, fig. 4353.

*Ptilosarcus brevicaulis* NUTTING, 1912, p. 26, pl. 4, figs. 3–3a (after DEICHMANN, 1941).

*Leioptilus fimbriatus* DEICHMANN, 1941, p. 12 (footnote).

*Material.* 1) One specimen, Off Minabe. III–1950.

2) Two specimens. 4 miles southwest of Susami, 250–270 m. 19–IV–1957. M. OZAKI coll.

3) One specimen. 8 miles southwest of Kirimezaki, 150 m. 16–XII–1958. M. OZAKI coll.

4) Five small specimens. Stations 1, 2 & 4, 23 km west of Setozaki, 120–150 m. 8–XII–1957. E. HARADA coll.

5) One specimen. 10 miles southwest of Minabe, 150 m. 10–I–1960. M. OZAKI coll.

*Description.* This well known pennatulid has often been described in detail by many earlier authors, so that further description of the structure may be unnecessary. But only given here are the measurements of some specimens for comparison.

|                                         | Mat. (4) |    |    |    |    | Mat. (2) |    | Mat. (5) |
|-----------------------------------------|----------|----|----|----|----|----------|----|----------|
| Total length (mm)                       | 45       | 57 | 60 | 70 | 80 | 64       | 65 | 130      |
| Length of rachis (mm)                   | 28       | 36 | 37 | 42 | 50 | 40       | 43 | 90       |
| Length of stalk (mm)                    | 15       | 21 | 23 | 25 | 30 | 23       | 25 | 40       |
| Width of rachis (mm)                    | 14       | 20 | 17 | 30 | 25 | 17       | 17 | 38       |
| Number of leaves                        | 17       | 15 | 18 | 26 | 20 | 20       | 20 | 29       |
| Length of dorsal<br>margin of leaf (mm) | 10       | 12 | 8  | 17 | 19 | 10       | 10 | 20       |

Among these specimens, the largest one, 130 mm long, only shows a flat bare median streak on the ventral side of the rachis between the leaves, while in all the other smaller specimens, ranging from 45 to 80 mm in total length, an open channel-like deep groove is formed continually from up to down on the ventral side, and without exceptions a couple of the anomuran crab *Uroptychus scandens* BENEDICT<sup>1)</sup> reside commensally within the groove, as noticed by HICKSON (1916, p. 185).

*Records of occurrence*<sup>2)</sup>. Japan, 190–730 m (BALSS, etc.); Philippines, 18–36 m (KÖLLIKER); Kei Islands, 112–397 m (HICKSON).

#### Family Pteroeididae KÖLLIKER

#### 26. *Pteroeides breve* KÖLLIKER, 1872

(Pl. X, figs. 19–20)

*Pteroeides breve* KÖLLIKER, 1872, p. 79, pl. 4, figs. 31–32.

*Material*. One specimen, Off Minade. Depth unrecorded. III–1950.

*Description*. This specimen, having a short rachis, about 4 cm long and a plump stalk, about 5.2 cm long and 2 cm wide, may be identified with a little-known species *Pteroeides breve* KÖLLIKER by its shortened tip slightly projecting at the base of terminal leaves. The stem is short but very thick, and the leaves, 18 on each side of the rachis, are directed almost laterally.

A larger leaf is elongate triangular, about 28 mm long and 14 mm wide, with a median siphonozooid plate and 10–12 spicular rays marginally projecting. The colony in alcohol is uniformly flesh-colored.

*Record of occurrence*. Hitherto known only from the type locality (Bohol Island, Philippines, 6–10 fms.).

- 1) BALSS (1913) later recorded this crab from Dr. DOFLEIN's collection but did not mention as to its habitat whatever.
- 2) *Pennatulula fimbriata*, as reported from the coral reef of Koror Island, Palau (UTINOMI, 1956a, p. 240), a photograph of which is further reproduced in my book (UTINOMI, 1956b, pl. 10, fig. 5), is unexpectedly a mistaken identity, although it may also occur there. It should be corrected to *Pteroeides lacazii* var. *spinosum* KÖLLIKER.

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## EXPLANATION OF PLATES VII-X

### PLATE VII

- Fig. 1. *Acalycigorgia inermis* (HEDLUND).  $\times 1$   
Fig. 2. *Acanthogorgia japonica* KÜKENTHAL & GORZAWSKY.  $\times 1$   
Fig. 3. *Muricella abnormalis* NUTTING.  $\times 5/3$   
Fig. 4. *Discogorgia dendritica* (NUTTING).  $\times 4/5$

### PLATE VIII

- Fig. 5. *Muricella nitida* (VERRILL).  $\times 1$   
Fig. 6. *Muricella magna* n. sp. (Holotype)  $\times 1$   
Fig. 7. Distal part of the same, magnified.  $\times 2$   
Fig. 8. *Astrogorgia rubra* THOMSON & HENDERSON.  $\times 2$   
Fig. 9. *Menella indica* GRAY.  $\times 1$

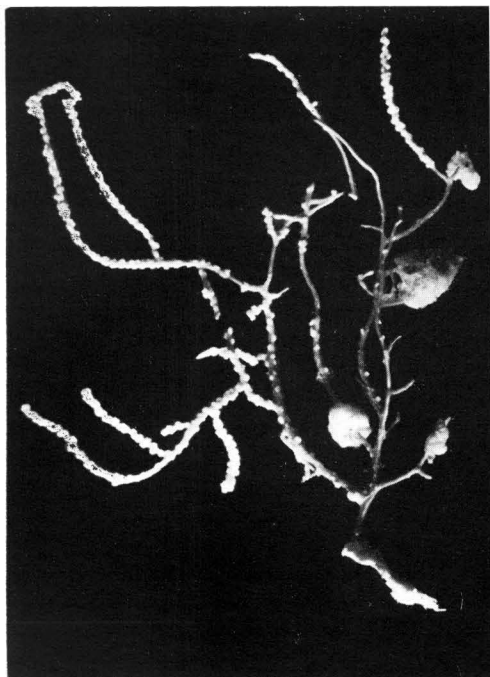
### PLATE IX

- Figs. 10-11. *Filigella mitsukurii* KINOSHITA.  $\times 2/5$   
Fig. 12. *Euplexaura attenuata* (NUTTING).  $\times 1/2$   
Fig. 13. *Plumarella cristata* KÜKENTHAL & GORZAWSKY.  $\times 1$   
Fig. 14. *Plumarella sarta* KÜKENTHAL & GORZAWSKY.  $\times 1/2$

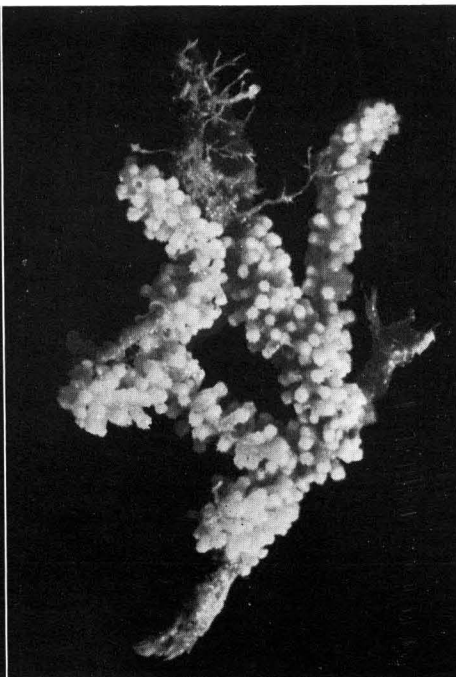
### PLATE X

- Fig. 15. *Stachyptilum dofleini* BALSS.  $\times 3/5$   
Fig. 16. Part of rachis of the same, magnified.  $\times 3$   
Fig. 17. *Leipterus fimbriatus* (HERKLOTS), dorsal side.  $\times 1$   
Fig. 18. The same with a median groove, ventral side.  $\times 1$   
Fig. 19. *Pteroeides breve* KÖLLIKER, dorsal side.  $\times 2/3$   
Fig. 20. The same, ventral side.  $\times 2/3$

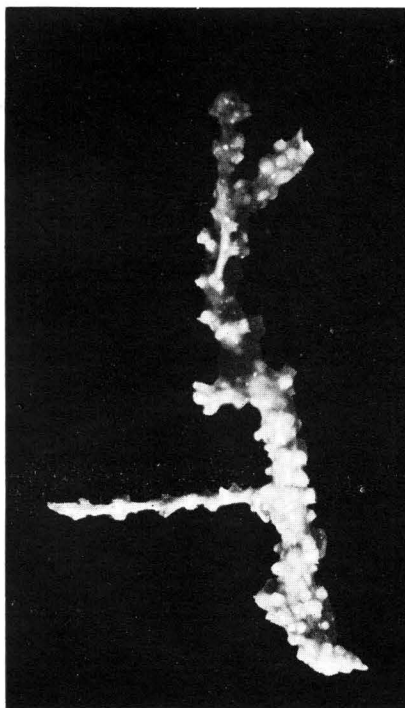




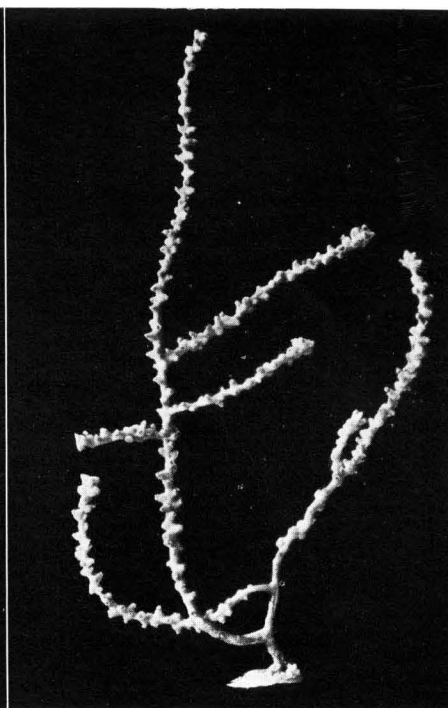
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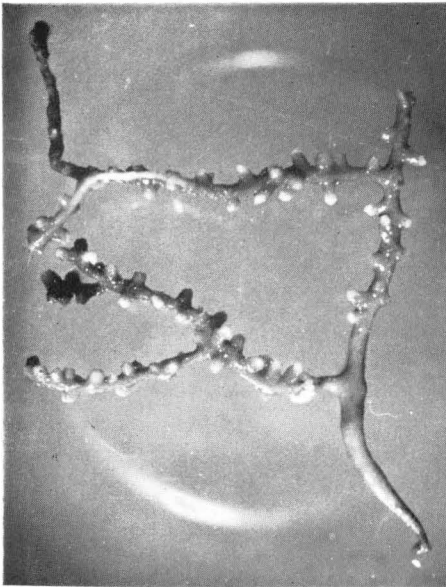
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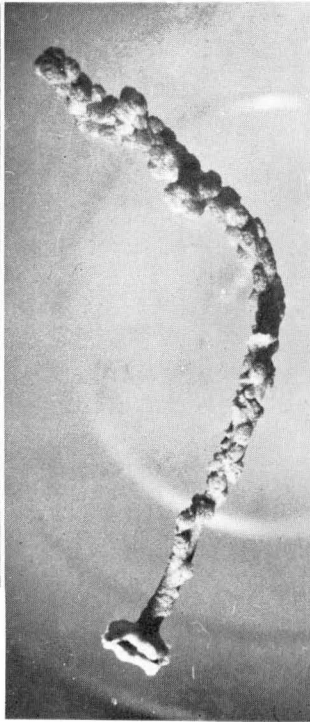
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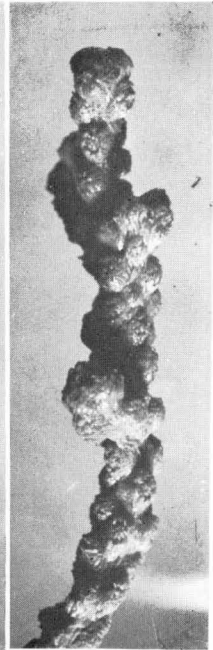
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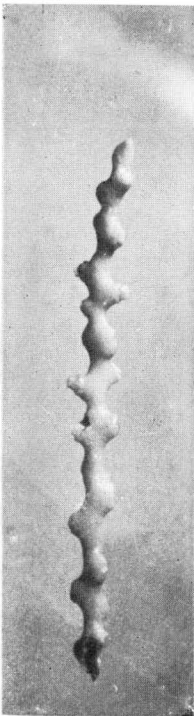
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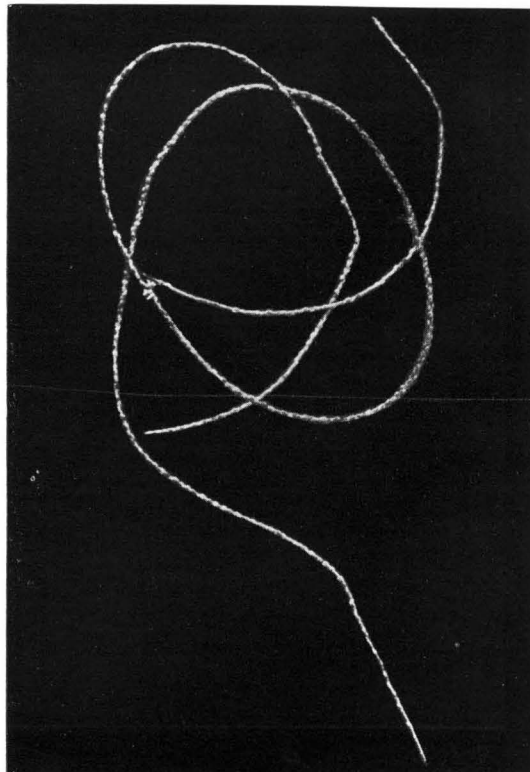
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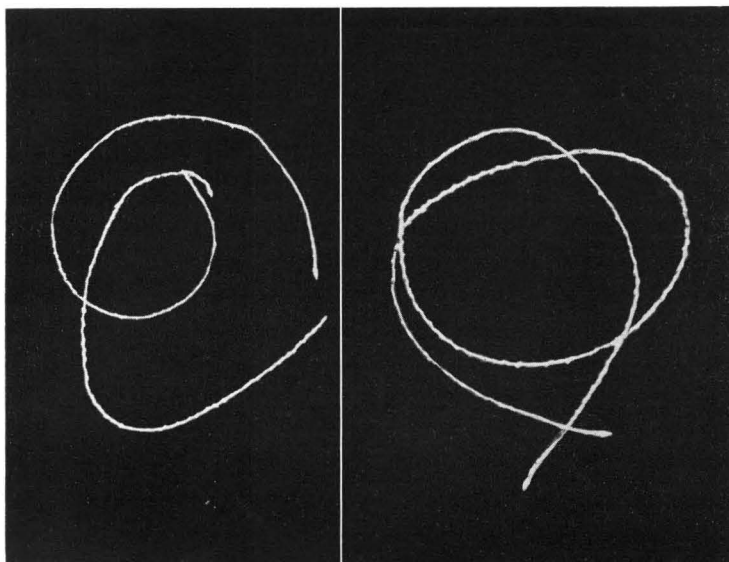
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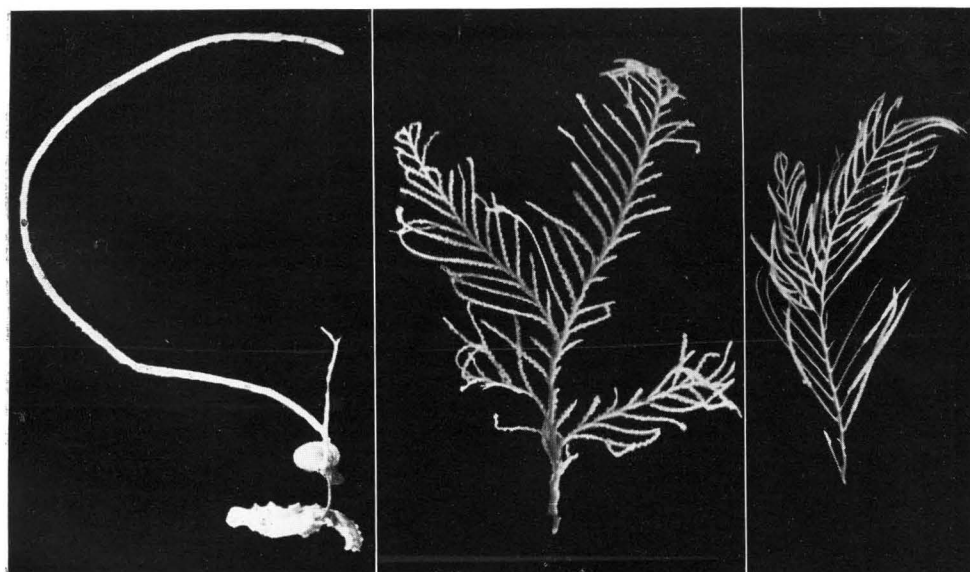


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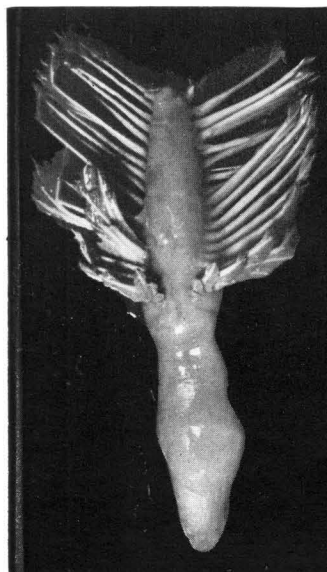
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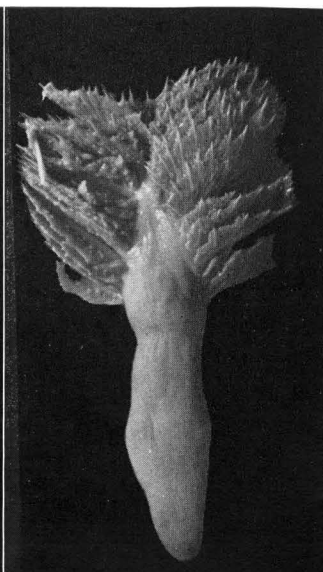
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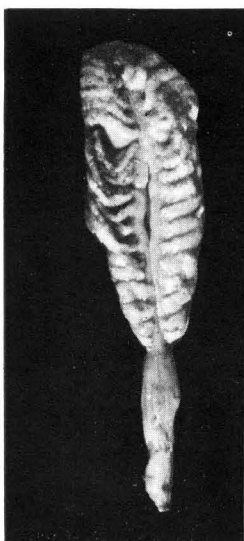
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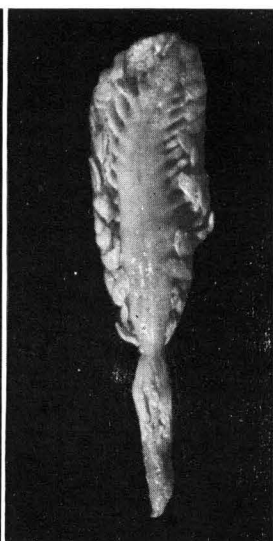
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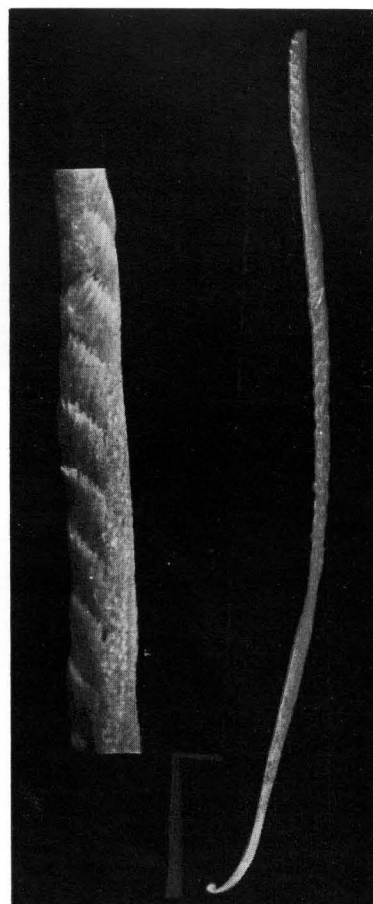
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