

Abstract

A small collection of octocorals was made by the Japanese Antarctic Research Expedition Research Ship SOYA and her consort UMITAKA-MARU of the Tokyo University of Fisheries, in the Antarctic waters off Prince Harald Coast near the Syowa Base during the 1957-1958 cruises.

Among the collected specimens only four species mentioned below were identified.

Alcyonium clavatum (PFEFFER)

Acanthogorgia incrustata KÜKENTHAL

Malacogorgia capensis HICKSON

Thouarella (*Thouarella*) *longispinosa* KÜKENTHAL

The first species, *Alcyonium clavatum*, has hitherto been recorded only from South Georgia and Falkland, South America, and the third *Malacogorgia capensis* has been known only from South Africa. Both species are morphologically and systematically of great interest, and their occurrence in Antarctica is also significant from a biogeographical viewpoint.

I. INTRODUCTION

The octocoral specimens dealt with here were collected mainly by R. S. SOYA of the Second Japanese Antarctic Research Expedition 1957/58 (with biologist Dr. Riozo YOSII aboard), and partly by T. S. UMITAKA-MARU of the Tokyo University of Fisheries (with biologist Dr. Jiro SENÔ aboard) during her observation cruise to the Antarctic Sea, 1956/57, accompanying the SOYA. All the specimens were obtained in the sea off Cape Cook on the Prince Harald Coast near the Japanese Antarctic Syowa Base.

The former group of specimens is now deposited in the Biological Laboratory of the Imperial Household and the National Science Museum, Ueno Park, Tokyo. The latter is in the museum of the Tokyo University of Fisheries, Minato-ku, Tokyo.

In addition to the above, I have examined for comparison some specimens of the large collection of octocorals from the Ross Sea which was made by the members of the New Zealand Oceanographic Institute, Wellington and was later placed at my disposal for study.

The material to be described is represented only by the following 4 species:

Alcyonium clavatum (PFEFFER)

Acanthogorgia incrustata KÜKENTHAL

Malacogorgia capensis HICKSON

Thouarella (*Thouarella*) *longispinosa* KÜKENTHAL

In spite of the small number of the identified species, the material revealed the most noticeable fact, that is, this is the first record of occurrence of a unique non-spiculiferous gorgonid *Malacogorgia capensis* HICKSON hitherto known only from South Africa.

II. DESCRIPTION OF THE SPECIES

ALCYONACEA LAMOUROUX

Family Alcyoniidae LAMOUROUX, 1812

Alcyonium clavatum (PFEFFER)

(Figs. 1-3; Plate I, fig. 1)

- 1889 *Metalcyonium clavatum* PFEFFER: Jahrb. Hamburg. Wiss. Anstalt, **6**, (2), p. 49.
 1899 *Metalcyonium clavatum* MAY: Ergebn. Hamburger Magelh. Sammelreise, **1**, p. 8, fig. 2.
 1900 *Metalcyonium clavatum* MAY: Fauna Arctica, **1**, p. 403.
 1906 *Alcyonium (Metalcyonium) clavatum* KÜKENTHAL: Wiss. Ergebn. Deutsch. Tiefsee-Expedit., **13** (1), p. 45.
 1929 *Alcyonium clavatum* MOLANDER: Further Zool. Res. Swedish Antarctic Expedit., **2** (2), p. 52, pl. 4, fig. 9.
 1890 Non *Alcyonium clavatum* STUDER: Mém. Soc. Zool. de France, **3**, p. 90.
 1901 Non *Alcyonium clavatum* STUDER: Rés. Camp. Sci. Prince de Monaco, **10**, p. 23, pl. 2, figs. 1-4.
 1910 Non *Metalcyonium clavatum* St. THOMSON: Trans. Roy. Soc. Edinb., **47** (19), p. 556.
 1936 Non *Alcyonium clavatum* DEICHMANN: Mem. Mus. Comp. Zool. Harvard Coll., **53**, p. 51.

Material examined: Off Cape Cook (67° 51'5 S, 33° 13'5 E), depth 630-680 m, a single specimen. Dr. J. SENÔ coll. 7-II-1957.

Description: A single colony (Fig. 1a) of short cylindrical outline, measuring about 26 mm in height and about 14 mm in diameter, is provided with only 10 polypal verrucae. The basal part attached to a stone is slightly expanded, forming a thin membrane of 13 × 9 mm in size. The lowest sterile part just above the basal attachment is slightly constricted around. The colour of the colony is uniformly dull brown.

The surface between the polypal verrucae is strongly wrinkled transversely and the wall of verrucae is corrugated longitudinally, but apparently non-spiculiferous. In all probability the spicular covering may have been dissolved due to an inferior fixative or preservative before received by myself for examination. In fact, the thin epidermal covering the surface is torn off in places, especially around the tip of verrucae.

The polypal verrucae, *i. e.* the volcano-like calyces in which the anthocodiae

are totally withdrawn, are about 2-3 mm in apical diameter and are approximately the same in height. The retracted anthocodiae bear 8 non-spicular tentacles, apparently with at least 4 pairs of pinnules.

The outer cortical layer is leathery in texture but rather flaccid. The inner coenenchymal canal-walls are devoid of spicules.

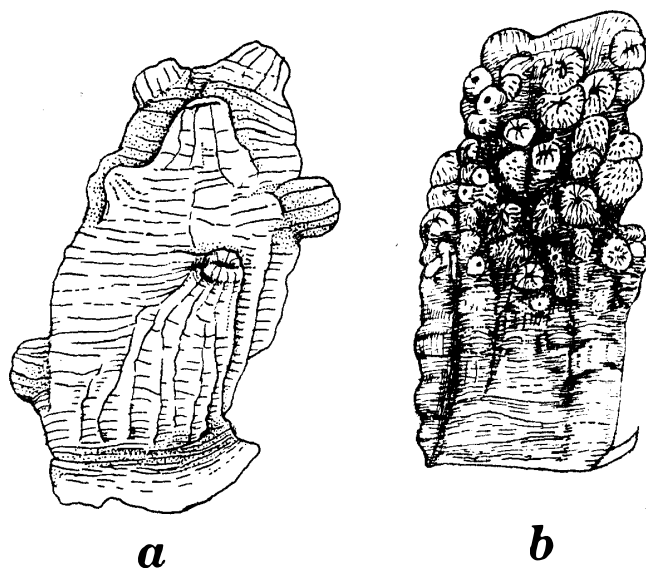


Fig. 1. *Alcyonium clavatum* (PFEFFER).

- a. A specimen from off Cape Cook, collected by Dr. J. SENÔ. $\times 2.3$
 b. A specimen from Ross Sea, St. A 520, collected by the members of N. Z. Oceanographic Institute. $\times 2.3$

Additional specimens of the N. Z. Oceanographic Institute from the Ross Sea: Among the extensive collection of the New Zealand Oceanographic Institute are found three small specimens of yellowish-brown coloration apparently referable to the same species.

These specimens were obtained from the Pennell Bank, Ross Sea (stations A520, 527 and 528), at the respective depths of 201-205 m, 337-358 m and 265-274 m. Of these, a complete colony obtained at Station A520 ($74^{\circ} 20' S$, $179^{\circ} 30' E$) is illustrated herein for comparison (Fig. 1b).

This specimen, the largest of all three colonies, is 25 mm high, 16 mm wide, and forms an erect rigid lobe with calyces, about 35 in number, arranged lengthwise at various heights. The lower one-third is quite sterile, although the boundary with the upper polyp-bearing part is obscure. The base is membranous.

The surface is mostly corrugated and deeply furrowed longitudinally, suggesting a sign of growing into lobes or branches at a later stage. The calyces are mostly 1.5 mm high and 2 mm wide. Their apical rim is generally 8-lobed and densely protected by large, robust and almost smooth spicules; those smooth spicules measure up to 0.5-0.6 mm long and 0.05-0.09 mm wide (Fig. 3b). Between

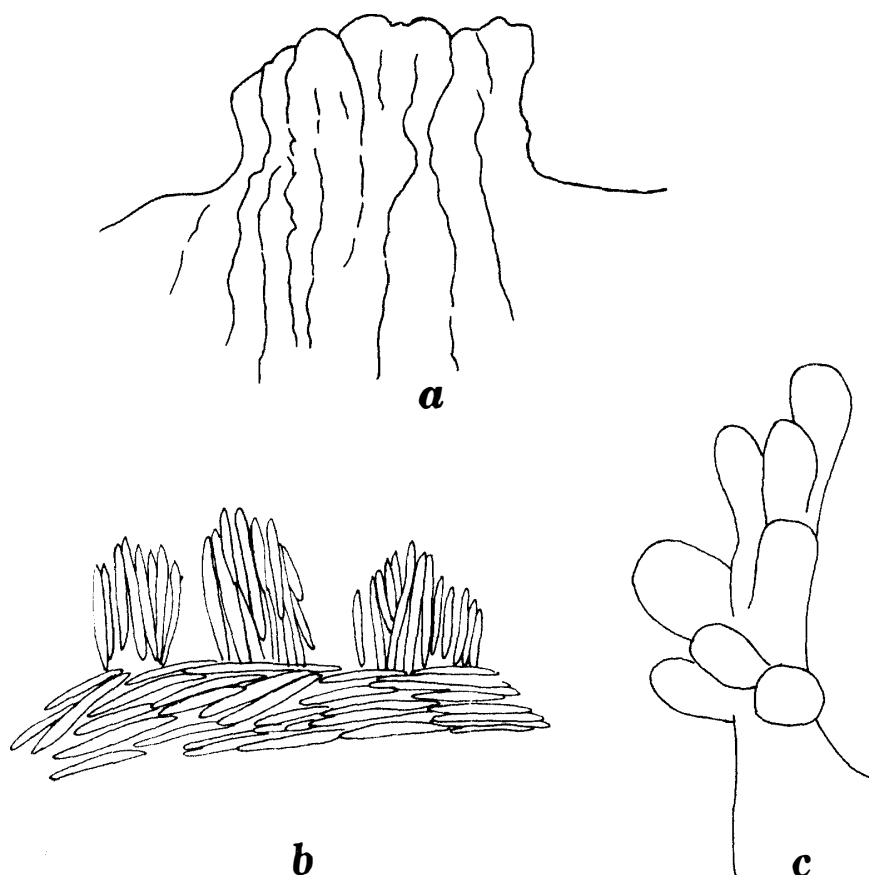


Fig. 2. *Alcyonium clavatum* (PFEFFER).

- a. Calyces of a specimen from off Cape Cook, lateral view. $\times 12$
 b. Arrangement of spicules in a retracted anthocodia. $\times 21$
 c. Retracted tentacle. $\times 67$

them many smaller spiny spindles are scattered, measuring up to 0.4 mm long and 0.05 mm wide (Fig. 3c). On the basal membrane much larger spindles, measuring up to 1 mm long and 0.09 mm wide, are often found (Fig. 3a), coated with minute spinules arranged in whorls or irregularly, and their axis is darkened.

The retracted anthocodiae (Fig. 2b) are armed with 8 rays and a collaret, consisting of small spiny spindles up to 0.4 mm long and 0.05 mm wide (Fig. 3d). All these spicules are semitransparent and colourless. No club-shaped spicules are met with anywhere. The inner coenenchyma is apparently devoid of spicules, as noticed by MAY (1899).

Hitherto known distribution: South Georgia and Falkland.

Remarks: On account of its external resemblance I was at first inclined to refer it to STUDER's *Bellonella variabilis* or *Alcyonium compressum* from North Atlantic, both being, according to MOLANDER (1919) and DEICHMANN (1936), identical with a less-known North Atlantic species *Alcyonium glomeratum* (HASSALL), but an

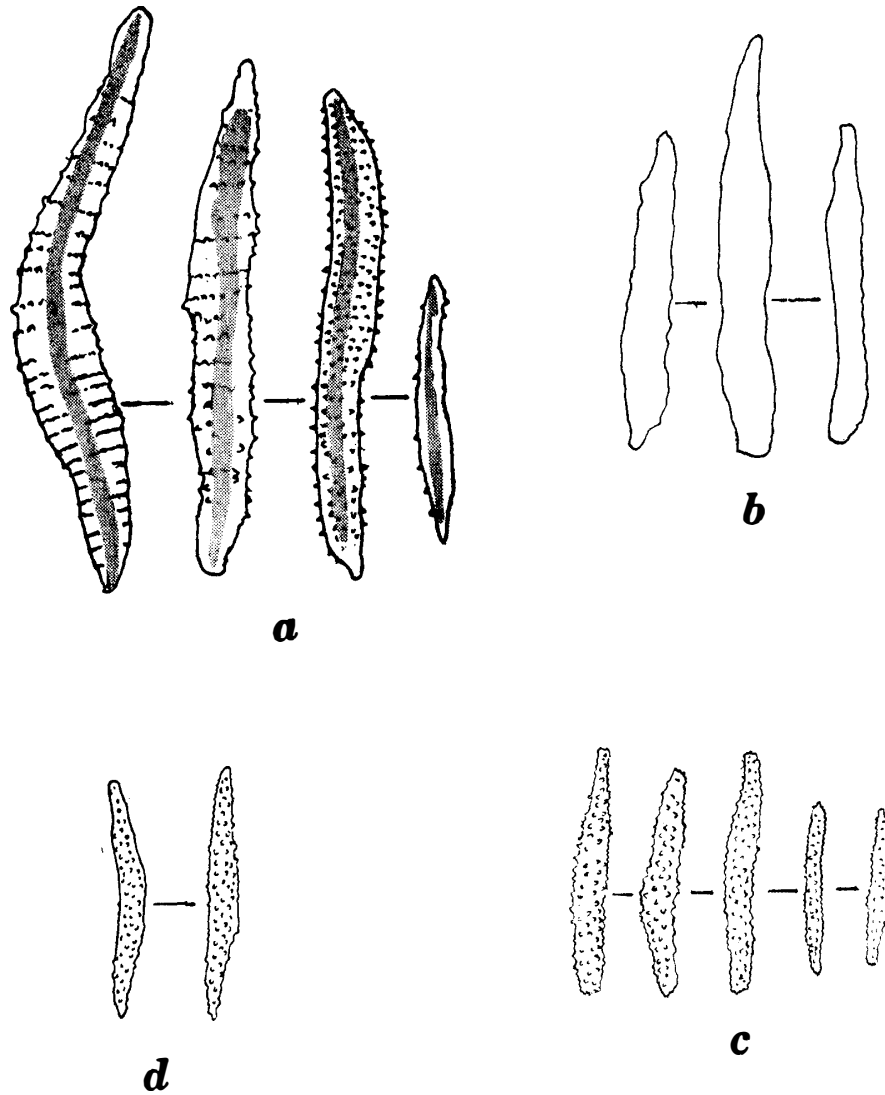


Fig. 3. *Alcyonium clavatum* (PFEFFER) from Ross Sea.

- a. Spicules from basal membrane.
- b. Smooth large spicules from tip of calyces.
- c. Ordinary cortical spicules coated with minute spines.
- d. Anthocodial spicules.

All $\times 80$

internal examination revealed that the interior of the body lacks spicules and the outer cortical spicules are exclusively slender spiny spindles. Therefore, I regard the specimens tentatively as *Alcyonium clavatum* (PFEFFER), following MOLANDER (1929, p. 52).

As I have pointed out (UTINOMI, 1958, p. 111), PFEFFER's *clavatum* only is definitely different from another species *capitatum* and later species regarded to *Metalcyonium* PFEFFER in the growth form. When PFEFFER (1889) established the genus *Metalcyonium*, he included only two species, *M. clavatum* and *M. capitatum*, without designating either of both as the type species, giving an obscure and inadequate definition:—"Polypenstock eine Keule von nicht bilateralem Bau. Basal Theil hautartig verbreitert. Steriler Stiel im Alter kurz. Fertiler Theil als gestreckte Keule oder Kopf ausgebildet, oft mit hervorragenden Warzen bedeckt, in die Polypenköpfe zurückgezogen werden können. Kein Dimorphismus der Personen. Coenenchymspicula verschieden. Polypenspicula schlanke, bedornete Spindeln" (MAY emend.) Later KÜKENTHAL (1906, p. 43) designated *Metalcyonium* solely as "Alcyonien von unverzweigter, walzenförmiger oder konischer Körperform", treating it as a subgenus of *Alcyonium*.

In order to validate the status of *Metalcyonium*, it seems better to restrict the genus to mushroom-like or capitate, unlobular alcyoniids with a spherical or semispherical polyp-bearing capitulum distinctly separated from a sterile stalk. *M. capitatum* PFEFFER is to be designated as type species of the genus. A South African spiculeless genus *Malacacanthus* St. THOMSON (1910) seems to be a closest akin to *Metalcyonium*.

Order GORGONACEA LAMARCK

Suborder HOLAXONIA STUDER

Family Acanthogorgiidae GRAY, 1859

Acanthogorgia incrustata KÜKENTHAL

(Fig. 4; Plate I, figs. 2-3)

1919 *Acanthogorgia incrustata* KÜKENTHAL: *Ergebn. Deutsch. Tiefsee-Exped.*, **13** (2), p. 229, figs. 151-154, pl. XXX, fig. 4.

1924 *Acanthogorgia incrustata* KÜKENTHAL: *Das Tierreich*, Lief. **47**, p. 246.

Material examined: West of Cape Cook, 590 m. Sandy mud bottom. A small colony attached to a stone. Dr. R. YOSHII coll. 1-II-1958.

Depository of material: National Science Museum, Tokyo.

Description: The specimen is very young, its total length being only 11 mm. It is composed of a main stem about 1.5 mm wide at the base and a short branch, carrying about 10 polyps. It is purely white in alcohol, but the axis is brown and horny.

The polyps are cylindrical, becoming wider distalwards and measuring about 3 mm long and 1.5 mm wide at the apex.

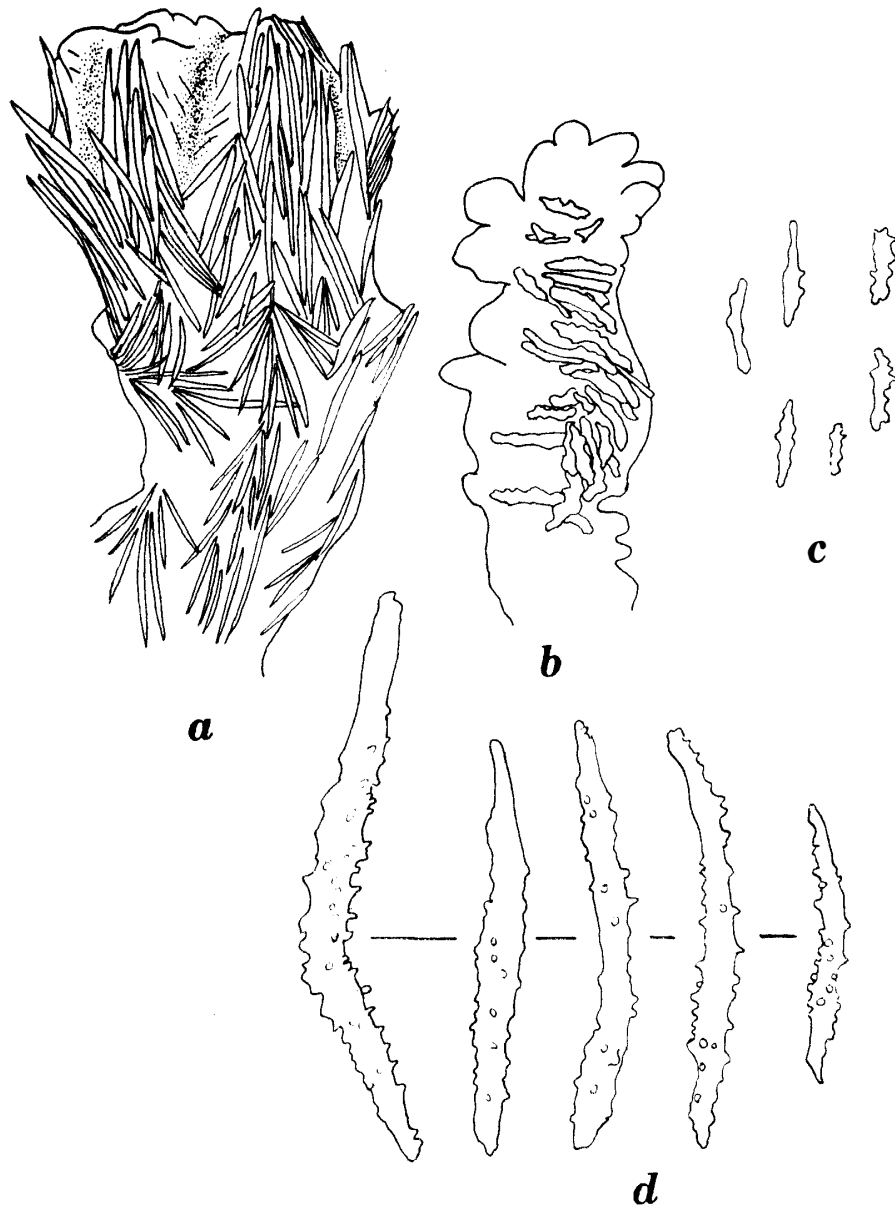


Fig. 4. *Acanthogorgia incrustata* KÜKENTHAL.

- a. Polyp, lateral view. $\times 21$
- b. Retracted tentacle armed with spicules. $\times 80$
- c. Rind spicules. $\times 80$
- d. Polypal wall spicules. $\times 80$

The polypal wall is usually provided with 8 distinct ridges of obliquely upward-slanting spicules, about 0.35-0.44 mm long. The distal crown spicules are not very prominent.

The tentacles bear numerous rod-shaped spicules, about 0.09 mm long, transversely.

The rind contains spinose rod-shaped spicules, about 0.09-0.2 mm long.

Hitherto known distribution: East of Bouvet Island, 567 m.

Remarks: In the general appearance of the colony and polyps, this specimen, though young, may be referable to the above-mentioned species than to any other species of the genus hitherto recorded from the Antarctic waters as well as from the adjacent waters.

Family Malacogorgiidae HICKSON, 1904

Malacogorgia capensis HICKSON

(Fig. 5; Plate II, figs. 4-5)

- 1904 *Malacogorgia capensis* (n. g. et n. sp.) HICKSON: Mar. Invest. S. Africa, **3**, p. 226, pl. VII, fig. 5 and pl. VIII, figs. 10-11.
 1911 *Malacogorgia capensis* St. THOMSON: Proc. Zool. Soc. Lond., 1911, p. 884.
 1919 *Trichogorgia capensis* (HICKS.) KÜKENTHAL: Ergebn. Deutsch. Tiefsee-Expedit., **13** (2), p. 499.
 1923 *Malacogorgia capensis* St. THOMSON: Trans. Roy. Soc. S. Africa, **11** (1), p. 77.
 1924 *Trichogorgia capensis* KÜKENTHAL: Das Tierreich, Lief. **47**, p. 384.

Material examined: 1) Gunnerus Bank, 590 m. 2 bifurcated colonies, 4-7 mm long (B. L. I. H. *Coel.* 740). Dr. R. YOSHI coll. 1-II-1958:

2) Gunnerus Bank, 590 m. A bifurcated colony with an 8 mm long stem and a 110 mm long branch (B. L. I. H. *Coel.* 741). Dr. R. YOSHI coll. 1-II-1958.

3) Off Cape Cook, 500 m. A colony, 20 mm long (Nation. Sci. Mus. Tokyo Collection). Dr. R. YOSHI coll. 27-I-1958.

4) Gunnerus Bank, 590 m. 6 branched and unbranched colonies, 2.5-4.5 cm in total length (National Science Mus. Tokyo Collection). Dr. R. YOSHI coll. 1-II-1958.

Description: All the specimens from Antarctica are attached to stones together with the creeping bryozoans* such as *Hippothoa divaricata* and *Aetea anguina*. Although the specimens are all young forms, they correspond unquestionably to a peculiar gorgonid *Malacogorgia capensis* which was originally described by HICKSON (1904) from Algoa Bay, South Africa, at the depth of 25 fathoms, and later by J. Stuart THOMSON (1911, 1923) from various places of South Africa.

The colony consists generally of a slender main stem (with a slightly expanded basal attachment) which divides at some distance from the base into two primary branches which may give rise to three or more secondary branches as it grows;

* Identification of these bryozoans is due to Dr. Shizuo MAWATARI.

however, any multibranching colonies as originally figured were not found in the present collection.

The axis is slender, flexible and apparently horny. It is yellowish brown, becoming darker toward the basal part. The coenenchyma as well as polyps is white, semitransparent and entirely devoid of spicules. There is no sign of any dissolution as originally pointed out by HICKSON.

The polyp-bearing branches are uniformly slender, and the polyps are biserially arranged at intervals of about 1-2 mm, either alternate or opposite. They bear no armature to form a calyx characteristic to ordinary gorgonids, thus being not retractile but always exposed like xeniids, and are exceedingly large as compared with the stem. The maximum length, including the fully extended tentacles, is 3.3 mm and the maximum diameter is 0.9 mm. When contracted, they may be 1.2 to 1.8 mm in length. The tentacles are elongate in form, carrying up to 15

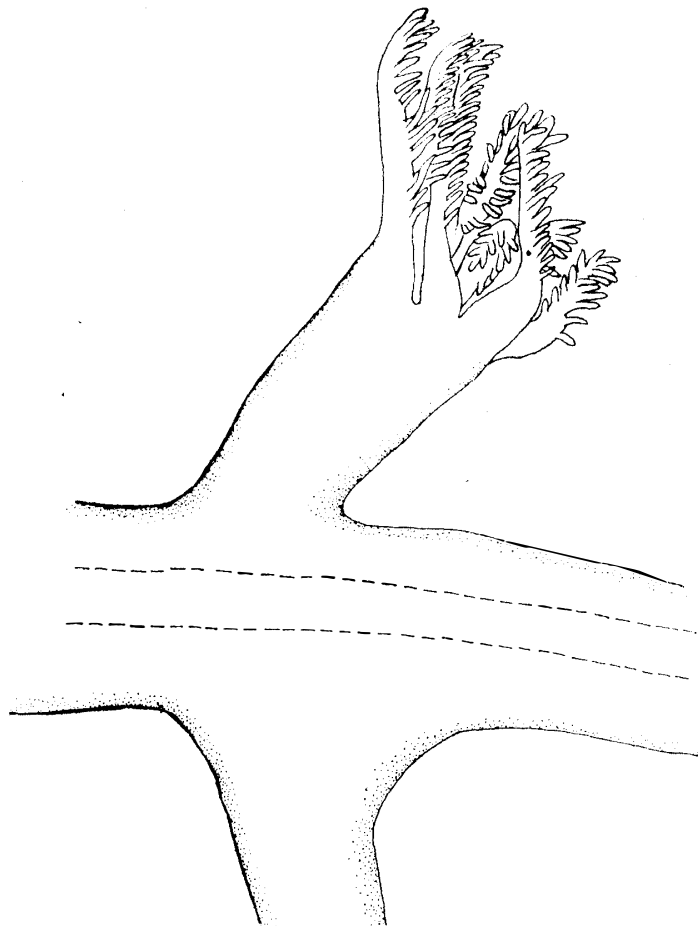


Fig. 5. *Malacogorgia capensis* HICKSON.

Polyp with part of branch. The broken line indicates the position of axis. $\times 14$

pairs of pinnules each of which is about 0.2 mm long.

Hitherto known distribution: From Algoa Bay to False Bay, South Africa.

Remarks: KÜKENTHAL (1919, 1924), in his monograph of the Gorgonacea, merged this genus *Malacogorgia* with HICKSON's another South African *Trichogorgia* (type species *T. flexilis* HICKSON) and regarded both as belonging to the Chrysogorgiidae. KÜKENTHAL had, of course, no access to HICKSON's material. However, as diagnosed by HICKSON as "Colony slightly branched and upright. Axis slender, horny. Spicules and all other calcareous matter absent", this genus seems better be referred to a unique family rather than to any other known families.

The genus *Malacogorgia* is apparently related to Primnoidae in its pinnate plan of branching, but since no calcareous deposit is found in the axis and coenecyema, it would be best to treat it as an independent family, as done by HICKSON originally. I reject KÜKENTHAL's systematization placing it in Chrysogorgiidae, regarding it as a member of *Trichogorgia* with a number of calcareous overlapping scale-like spicules around the polyps which are common to Chrysogorgiidae.

Family Primnoidae GRAY, 1857

Thouarella (*Thouarella*) *longispinosa* KÜKENTHAL

(Fig. 6; Plate. II, figs. 6-7)

- 1911 *Thouarella longispinosa* KÜKENTHAL: Deutsch. Südpolar-Exped. 13 (1), p. 299, text-figs. 1-3, pl. XX, fig. 1.
- 1914 *Thouarella longispinosa* GRAVIER: Deuxième Exped. Antarctique Franç., Alcyonaires, p. 61, text-figs. 73-76; pl. VII, figs. 35-36.
- 1919 *T. (Euthouarella) longispinosa* KÜKENTHAL: Ergebn. Deutsch. Tiefsee-Exped., 13 (2), p. 415, fig. 181.
- 1924 *T. (Euthouarella) longispinosa* KÜKENTHAL: Das Tierreich, Lief. 47, p. 292.
- 1931 *T. longispinosa* THOMSON & RENNERT: Australasian Antarctic Exped. Sci. Rep. Ser. C, 9 (3), p. 24, pl. IX, figs. 1-3, pl. XII, fig. 1.

Material examined: Gunnerus Bank, 590 m. A small colony (B. L. I. H. *Coel.* 738). Dr. R. YOSII coll. 1-II-1958.

Description: A single specimen herein examined is entirely white in alcohol and flexible. The main stem is 46 mm in height and the base does not form any expanded disc, being only 0.7 mm in diameter. The axis is quite horny and yellow with a golden lustre on the surface. It is slender and 0.18 mm in diameter at the lower part.

Of the stem, the upper one-third (about 20 mm long) gives off simple side branches (2-6 mm long) on all sides, somewhat obliquely upward-slanting in longer ones. The median part (16 mm long) bears only polyps in whorls or in pairs. The lower part (20 mm long) is quite free from polyps. Thus the general

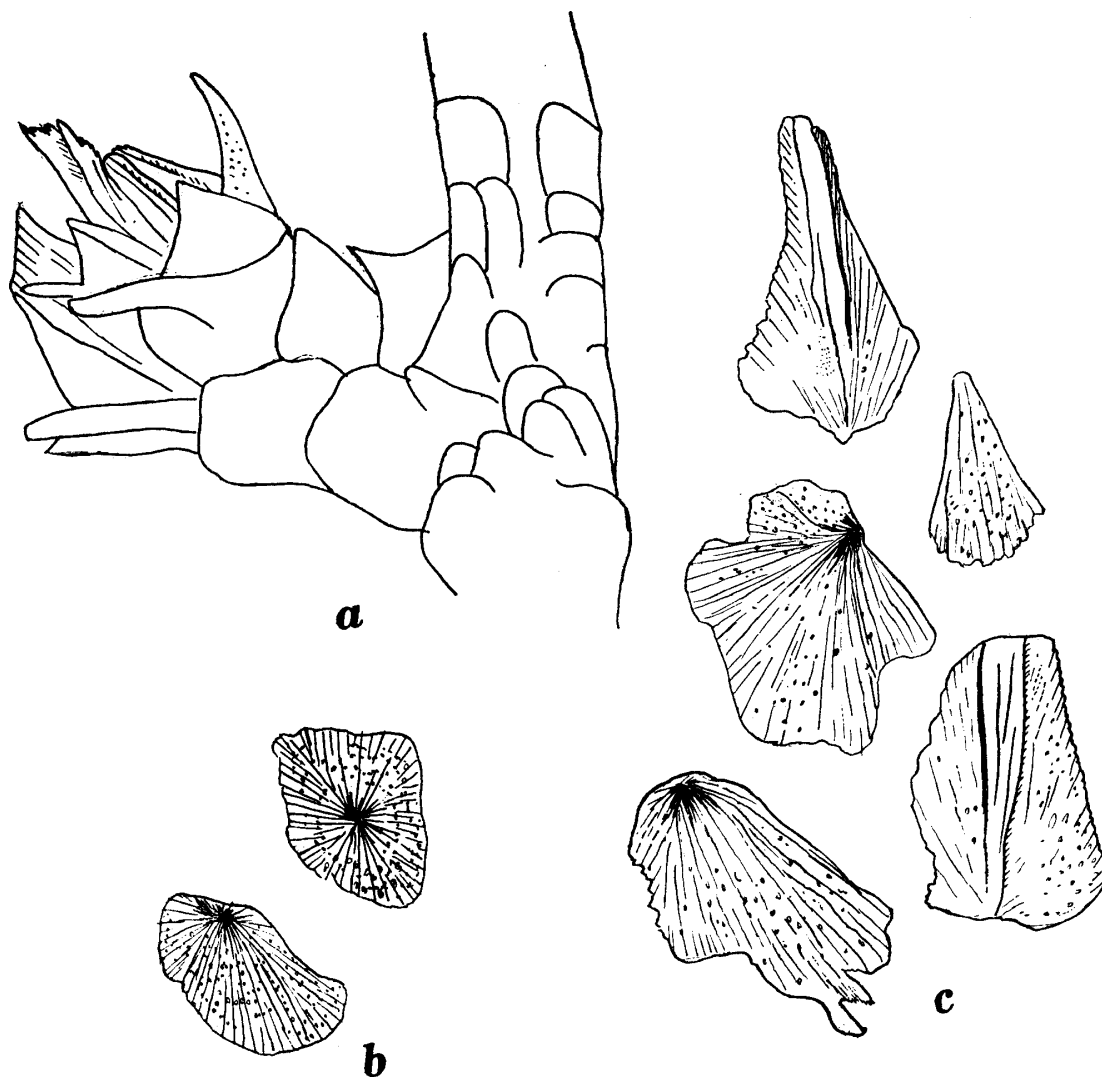


Fig. 6. *Thouarella (Thouarella) longispinosa* KÜKENTHAL.

a. Polyp with part of branch, lateral view. $\times 67$

b. Cortical scales from stem. $\times 150$

c. Scales of polypal body, partly mutilated. $\times 150$

appearance of the colony is an elongated bottle-brush type.

On the branches of the median part of the stem, polyps occur generally in pairs or alternately, but not in whorls (probably due to younger stage).

The polyps are somewhat trumpet-shaped and adaxially incurved. Around the polyp occur about 3-4 scales, including suboperculars in the abaxial row. The subopercular scales bear exceedingly long spines which overtop the operculars and project at various angles; they are often 4 or 5 in number. The operculars are very fragile, narrow triangular scales. On the surface of the stem and branches the cortical scales are almost reduced, but when present they are arranged longitudinally in patches. They are much smaller than the polypal body scales and greatly variable in outline.

Hitherto known distribution: Antarctic waters only.

Acknowledgments

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