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NEW SPECIES OF ALCYONACEA (OCTOCORALLIA) FROM THE GREAT BARRIER REEF, SOUTH-EAST ASIA, AND THE RED SEA

by

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With 4 text-figures and 2 plates

Abstract

In this paper four new alcyonaceans are described. They are *Alcyonium monticulum* from the Great Barrier Reef, *Cladiella steineri* from Thailand, *Lemnalia benayahui* from the Red Sea, and *Siphonogorgia lobata* from Taiwan.

Introduction

During the last few years I received several collections, which usually contained known species only. But occasionally there was a colony which proved to belong to a new species. In this paper four of them are described; they are:

Family Alcyoniidae Lamouroux, 1812. — *Alcyonium monticulum* sp. nov; *Cladiella steineri* sp. nov.; *Lemnalia benayahui* sp. nov.

Family Nidaliidae Gray, 1869 (emend. Utinomi, 1958). — *Siphonogorgia lobata* sp. nov.

The specimens are kept in the following institutions: the Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands (RMNH), the museum of the California Academy of Sciences, San Francisco, California, U.S.A. (CAS), and the Zoological Museum, Department of Zoology, Tel-Aviv University, Tel-Aviv, Israel (ZMTA).

I wish to express my gratitude to Dr. Terence Done, James Cook University of North Queensland, Australia, to Dr. Dustin D. Chivers, California Academy of Sciences, San Francisco, U.S.A. and to Mr. Yehuda Benayahu, Tel-Aviv University, Israel, for entrusting to me the examination of the material.

Thanks are also due to Mr. W. ter Spill for his critical reading of the English text, and to Mr. G. J. Vrijmoeth for making the photographs.

TAXONOMIC REPORT

Alcyonium monticulum sp. nov.
(fig. 1, pl. 1 fig. 1)

Material. — John Brewer Reef, near Townsville, Great Barrier Reef, on SE outer slope, depth 10 m, 2-6.xi.1976. Dr. Terence Done no. V602. Nine colonies: the specimen represented in fig. 1c is holotype (RMNH Coel. no. 13904), the other specimens are paratypes (RMNH Coel. no. 13905). Fieldnote: "Aggregate encrusting fragments to 3 cm diameter, linked by stolons. Colony dark grey-blue, with light grey-blue polyps".

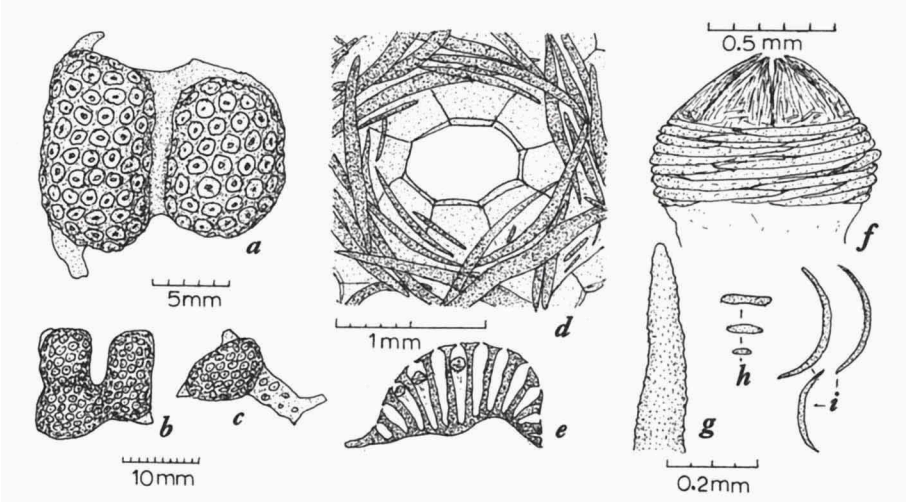


Fig. 1. *Alcyonium monticulum* sp. nov., Done V602; a, b, paratypes; c, holotype; d, opening in surface of the colony, giving entry to the gastral cavity; e, diagrammatic section through a colony; f, anthodocia; g, part of a coenenchymal sclerite; h, spicules from a tentacle; i, crown sclerites. Enlargement of a, e indicated by 5 mm scale at a; that of b, c by 10 mm scale at b; that of d, i by 1 mm scale at d; that of f by 0.5 mm scale above f; that of g, h by 0.2 mm scale at g.

Description. — The colonies consist of one (fig. 1c), two (fig. 1a) or three (fig. 1b) hillock-like thickenings or knobs, usually oval in shape (pl. 1 fig. 1). The smallest one measures 7 x 5 mm, the height is 5 mm. The largest one has diameters of 13 and 9 mm, the height is 8 mm. The base is often concave. When the colony consists of two or three knobs, the latter may be connected one with the other by a thin membrane (fig. 1a) or by a lowering between the knobs like a pass between two hillocks (fig. 1b). Membrane-like offshoots are usually short; in one case it is longer, and it bears a few polyps (fig. 1c, to the right).

The surface of the colonies shows a honeycomb-like structure, just like that of *Parerythropodium fulvum* (Forskål, 1775). The anthocodiae are all retracted into the gastral cavities, a lot of them up to a depth of 0.60 to 0.80 mm below the surface. Fig. 1e is an outline drawing of a longitudinal section through a colony. The gastral cavities run on right to the base. In three of them the retracted anthocodiae have been drawn. Outwards the gastral cavities are closed by a mem-

brane, with an octogonal opening, with diameters of 0.60-0.80 x 0.30-0.50 mm (fig. 1d). The membrane, in which eight septa are visible, may contain a few small spicules.

The anthocodiae are 0.80 to 0.90 mm wide (fig. 1f). The armature consists of crown and points. The crown, six to ten rows deep, has slender, sickle-shaped, smooth spicules (fig. 1i). The points contain a great many, nearly straight spindles, densely arranged in a longitudinal direction. In the tentacles there are small, smooth rods, 0.04 to 0.10 mm long (fig. 1h).

In the spaces between the membranes around the openings of the gastral cavities and in the septa between the gastral cavities lie curved, pointed spicules, up to 2.60 mm long and 0.20 mm wide; they are covered with very tiny spines (fig. 1g). They closely resemble those of *Parerythropodium fulvum.*

Colour. — In alcohol the colonies are light-brown.

Remarks. — Instantly, upon the first examination, the shape of the colonies struck me, as being that of small hillocks, which reminded me strongly of those in *Parerythropodium fulvum.* Also the honeycomb-like structure of the surface and the size and shape of the sclerites reminded me of the species just mentioned. However, according to Kükenthal's (1916: 461) diagnosis the genus *Parerythropodium* is characterized by colonies forming membranous covers, which may form thickenings in special places. But our new species shows the inverse situation: the membranous part is very small, the thickenings form the main item of the colony. That is why the specimens cannot be referred to the genus *Parerythropodium*, they must be applied to the genus *Alcyonium.*

The specific name *monticulum*, diminutive of the Latin word montis = mountain, refers to the hillock-like shape of the colonies.

Geographical distribution. — Great Barrier Reef.

Cladiella steineri sp. nov.
(fig. 2, pl. 1 fig. 3)

Material. — Koh Si-chang (small island SSE of Bangkok), Thailand, 1971. F. B. Steiner, collector. CAS 8-1, holotype; RMNH Coel. no. 12920, paratype.

Description of the holotype. — The weak colony (pl. 1 fig. 3) consists of a sterile stalk, at one side up to 45 mm high, and a number of crowded primary lobes, up to 35 or 45 mm high. These lobes redivide into numerous secondary and tertiary lobules of different lengths. In many cases the terminal lobules are largest, 15 to 20 mm long and 5 to 6 mm wide at the base. They taper distally, and end in a point.

Most of the polyps are not completely retracted. They project for a distance of 0.40 mm above the surface of the lobe. The tentacles are contracted to small knobs. At the height of these tentacles the width of the polyp is 0.80 to 0.90 mm. On the distal parts of the lobes the centres of the polyps are 0.80 to 1.20 mm apart; towards the base they are less crowded.

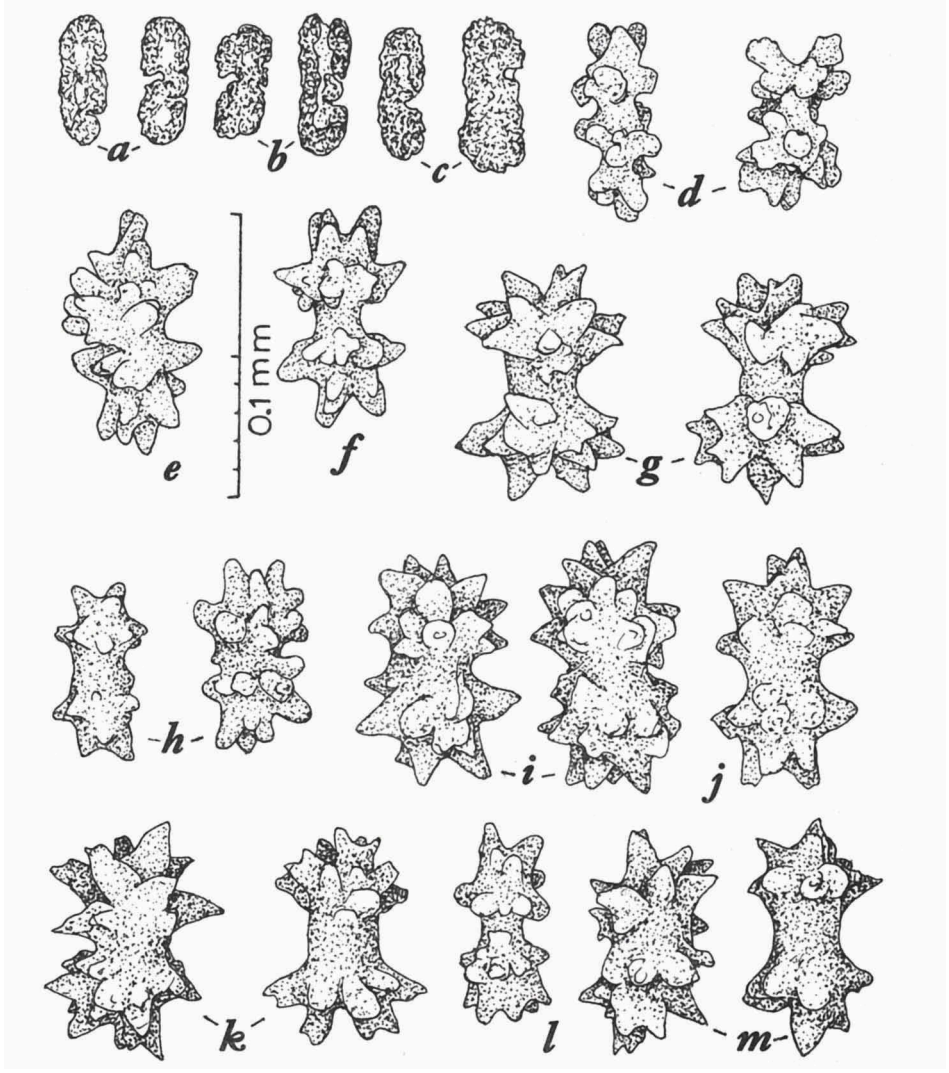


Fig. 2. *Cladiella steineri* sp. nov., holotype, CAS 8-1; a-c, sclerites from tentacle; d-f, sclerites from surface layer of a lobe; g, sclerites from interior of a lobe; h-j, sclerites from surface layer of the sterile stalk; k-m, sclerites from interior of the stalk. All enlargements are the same; scale 0.1 mm.

The polyps are devoid of sclerites, except for the distal parts of the tentacles. Here a varying number of flat scales are present (fig. 2a-c). They are 0.045 to 0.050 mm long, a few are slightly longer. Especially with low degree of magnification one or two light spots may be visible. Some of the scales are slightly figures-of-eight-like, others are oval, or they have irregular indentations; they all are opaque owing to minute asperities.

The sclerites in the surface layer and in the coenenchyme of lobes and stalk are nearly the same everywhere. The smaller (younger?) ones, 0.06 to 0.075 mm long, are more or less cylindrical, sometimes with a relatively long waist region, and bearing round prominences, especially on the less expanded heads (fig. 2d-f, h, l). The larger sclerites are capstans, 0.075 to 0.082 mm long, sometimes 0.087 mm long. They usually have a distinct waist. The heads are composed of long, pointed processes (fig. 2g, i-k, m).

Colour. — In alcohol the colony is cream-coloured.

Remarks. — The species is characterized by the long, weak, pointed lobes and lobules, by the smallness of the sclerites, and by the pointed roughnesses of the heads of the sclerites.

I name the species after Mr. Franz B. Steiner, collector of the specimens. Mr. Steiner was a radio officer for the American President Shipping Lines. He was an avid shell collector, but he also collected large series of benthic invertebrates for the Department of Invertebrate Zoology of the California Academy of Sciences, San Francisco.

Geographical distribution. — Thailand.

Lemnalia benayahui sp. nov.
(fig. 3, pl. 2)

Material. — Sheik Riach, Gulf of Suez, depth 5 m, 18.xi.1977. Y. Benayahu, collector. ZMTA NS16168, one colony, holotype.

Ras Garah, Gulf of Suez, depth 2 m, 25.ix.1974. L. Fishelson, collector. RMNH Coel. no. 12818, two small colonies, paratypes.

Description of the holotype. — The colony measures 52 mm in height and in breadth (pl. 2). The stem, 20 to 25 mm high, gives off some wide primary branches, which divide into short secondary branches and twigs. The latter are 5 to 8 mm long (but shorter ones also occur), the width is 1.60 to 1.90 mm (without the polyps).

The polyps are irregularly distributed. They are scattered singly or in very small groups on the branchlets and basal parts of the twigs, and closely set on the distal parts. At their base the anthocodiae are about 1 mm wide; distally they narrow, the width is about 0.60 mm (fig. 3a, b). Proximally the polyp-wall is densely armoured with spindles and needles, up to 0.35 mm long, lying irregularly, and bearing few, low spines.Distally the sclerites are clubs, 0.09 to 0.16 mm long (fig. 3h-j), rarely as long as 0.21 mm (fig. 3k), with a pointed head. They are longitudinally arranged, their heads are directed upwards. The incurved tentacles contain irregular sclerites, 0.03 to 0.10 mm long (fig. 3c-g).

In the surface layer of the branches and the distal part of the stem there are slender, usually curved spindles, 0.23 to 0.29 mm long, with inconspicuous, blunt spines (fig. 3l), and shorter, wider, curved spindles bearing larger spines and small warts (fig. 3n); the prominences in the middle are largest and they often form two girdles. Pseudo-clubs may be found too (fig. 3m). The sclerites in

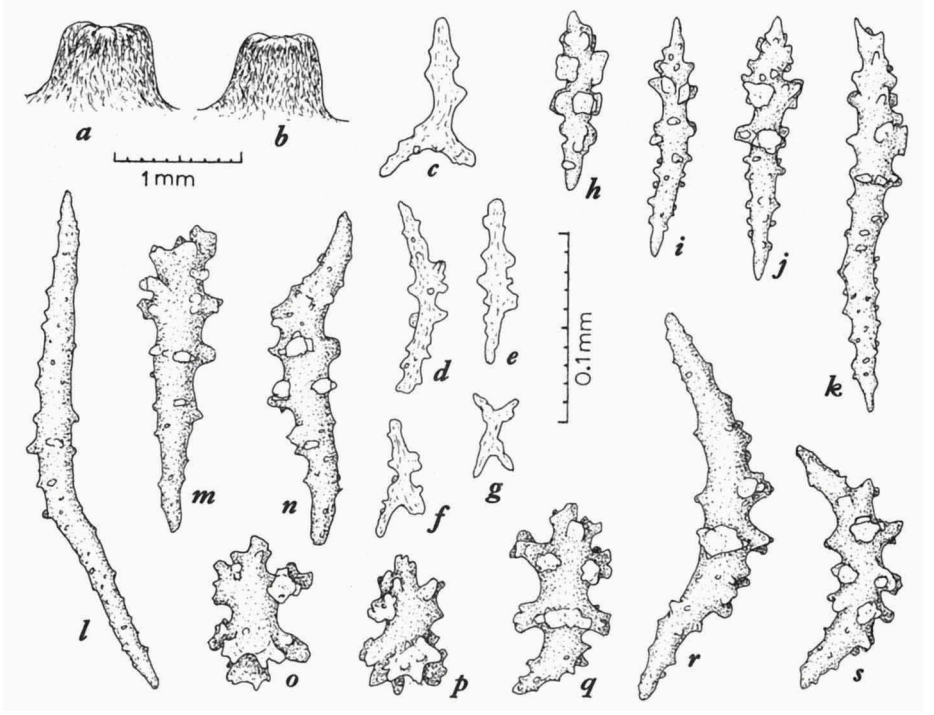


Fig. 3. *Lemnalia benayahui* sp. nov., holotype, ZMTA, NS16168; a, b, polyps; c-g, sclerites from tentacles; h-k, clubs from polyp-wall; l-n, sclerites from surface layer of a branch; o-s, sclerites from surface layer of the base of the stem. Enlargement of a, b indicated by 1 mm scale at a; that of c-s by 0.1 mm scale at e.

the surface layer of the basal part of the stem are of three types: (1) small double-stars (captans) 0.07 to 0.09 mm long, with a median constriction and two heads of warty prominences (fig. 3p); (2) pseudo-clubs about 0.10 mm long (fig. 3q); they may be taken for intermediate forms to (3) crescents, 0.16 to 0.21 mm long (fig. 3r, s).

The coenenchymal spicules are curved, slender spindles, up to 0.50 mm long; they bear few, low spines.

Colour. — In alcohol the colony is creamy white.

Variability. — The paratypes are small; they measure 25 and 34 mm in height.

Remarks. — This species is named after Mr. Yehuda Benayahu, Tel-Aviv University, who collected the holotype. It is the first *Lemnalia* species found in the Red Sea.

Siphonogorgia lobata sp. nov.
(fig. 4, pl. 1 fig. 2)

Material. — South China Sea, Taiwan, 1972. F. B. Steiner, collector. CAS 2-3, one colony, holotype; RMNH Coel. no. 12919, one colony, paratype.

Description of the holotype. — Since the base of attachment is absent, it is not clear whether we have to do with a fragment of with a nearly complete colony (pl. 1 fig. 2). The specimen consists of a stem, which divides into two branches. The stem is 18 mm high and 4.5 mm wide; it has deep longitudinal grooves. In the interior there are wide canals, separated by thin septa. The branches are 30 and 13 mm long. At a height of about 15 mm the stem gives off three twigs. The branches bear many twigs, which arise perpendicularly or at an acute angle obliquely upwards. The twigs are finger-shaped lobes, 5 to 9 mm long and 2.5 to 3.5 mm wide (calyces included).

The polyps are arranged on the twigs and on the distal part of the branches; for the rest stem and branches are barren. The anthocodiae are completely retracted within cone-shaped calyces; their closed apices are pointing upwards (fig. 4a). The cones are about 1 mm high, and 1 mm wide at the base.

The anthocodiae are 0.80 to 0.90 mm wide (fig. 4b). The armature consists of a crown of about 10 rows of curved spindles (fig. 4g) and points with three to four pairs of bent sclerites arranged en chevron. The larger point sclerites are up to 0.40 mm long (fig. 4c). The anthocodial sclerites are covered with rounded prominences; in the distal parts of the larger point sclerites they are directed obliquely towards the tip (fig. 4d). In the interstices between the points lie four to five intermediate sclerites.

The tentacles contain two types of sclerites: scales and pseudo-clubs. The former are 0.12 to 0.20 mm long and 0.04 to 0.05 mm wide (fig. 4e, f). Some of them have roughly the shape of a parallelogram. The edge is sinuate, the flat sides have warts, which are placed obliquely, and in this direction they are drawn-out. In each tentacle these scales are densely arranged in two rows. The pseudo-clubs are irregularly shaped, more or less clavate sclerites, placed at equal intervals, and about 18 in a row (fig. 4h). It is no easy matter to examine the place of these two types of sclerites in the tentacle. Possibly the scales are placed in the axis of the tentacle, and the pseudoclubs in the pinnules, but this is merely a vague indication.

The sclerites in the surface layer of stem and branches, and also those in the thin canal-walls are needles, up to 2 mm long and 0.15 mm wide; in the branches they are slightly thinner (fig. 4i, j). They bear few, tiny, truncated cones and simple warts, 0.01 to 0.02 mm, rarely up to 0.03 mm in diameter (fig. 4 m). At the ends of the spicules these prominences are more accumulated, and directed obliquely towards the tips (fig. 4k, l). In addition to these needles the canal-walls contain small, thin, pointed needles or spindles, 0.15 to 0.30 mm long, with few spines.

Colour. — In alcohol the specimen is light-brown.

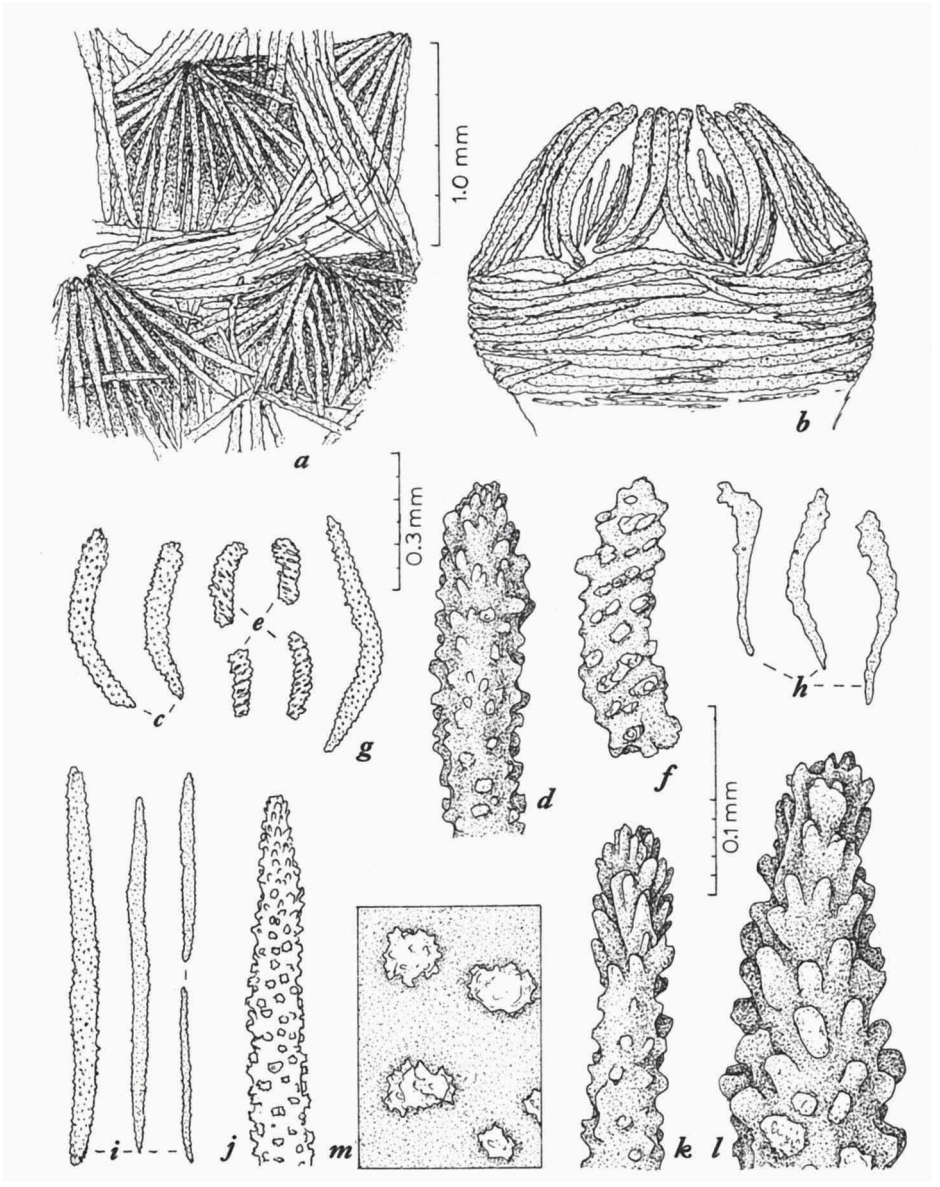


Fig. 4. *Siphonogorgia lobata* sp. nov., holotype, CAS 2-3; a, surface of a twig with a few calyces; b, anthocodia; c, point sclerites from anthocodia; d, distal part of a point sclerite; e, f, scales from tentacles; g, sclerite from anthocodial crown; h, pseudoclubs from tentacle; i, j, sclerites from surface layer of the stem; k, l, extreme points of the latter sclerites; m, prominences on sclerite from surface layer of the stem. Enlargement of a indicated by 1.0 mm scale to the right above a; that of b, c, e, g, i by 0.3 mm scale above g; that of d, f, h, j-m by 0.1 mm scale at f.

Remarks. — The species shows the following characteristics: (1) polyps only on the lobe-shaped twigs and the distal part of the branches; (2) polyps entirely retracted within cone-shaped calyces; (3) the crown has 10 rows, the points consist of 3 to 4 pairs of sclerites; (4) sclerites in stem and branches are thin needles.

The specific name refers to the lobe-like form of the twigs. In other *Siphonogorgia* species the polyps may also be arranged in such lobe-shaped twigs, e.g. in *S. splendens* Kükenthal, 1906.

Geographical distribution. — South China Sea.

Reference

Kükenthal, W., 1916. Die Gorgonarien Westindiens. — Zool. Jahrb., Suppl. 11.

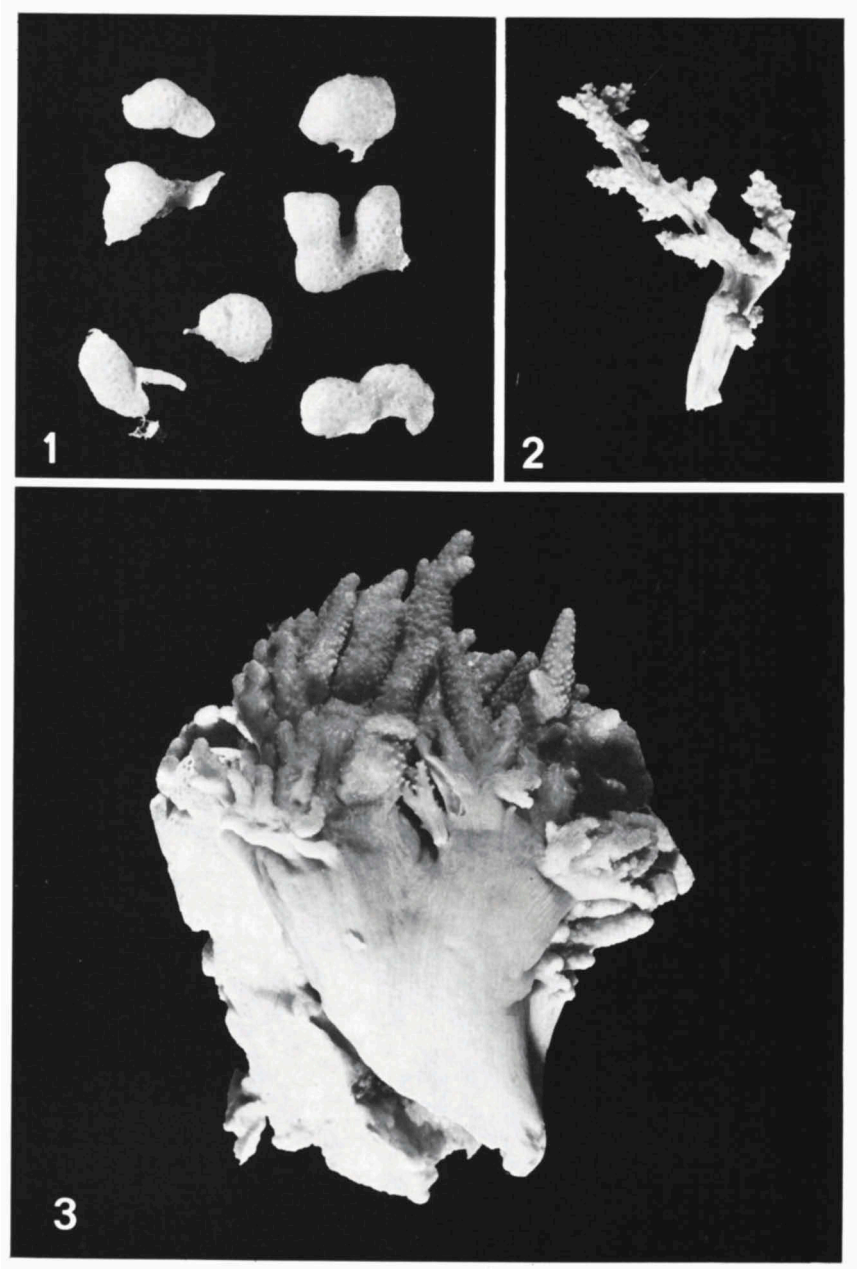
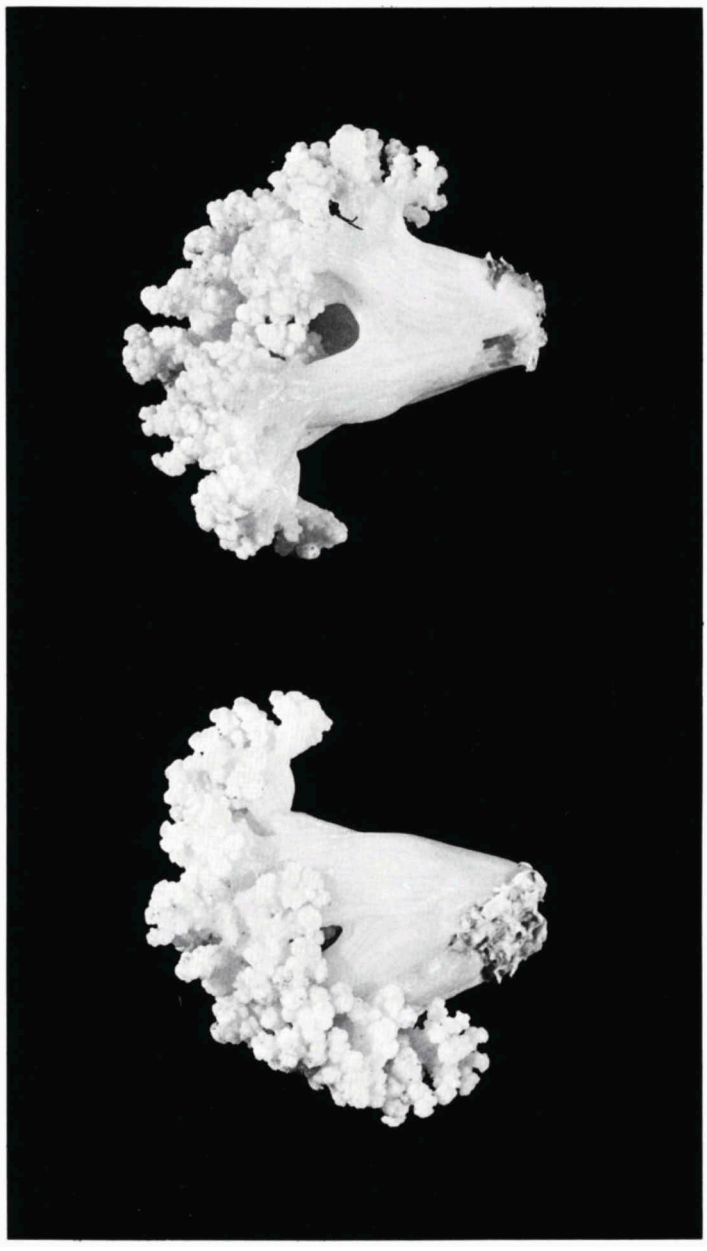


Fig. 1. *Alcyonium monticulum* sp. nov., holotype and paratypes, RMNH Coel. no. 13904 and 13905; × 1. Fig. 2. *Siphonogorgia lobata* sp. nov., holotype, CAS 2-3; × 1. Fig. 3. *Cladiella steineri* sp. nov., holotype, CAS 8-1; × 1.



Lemnalia benayahui sp. nov., holotype, ZMTA, NS 16168; × 1.