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DESCRIPTIONS OF ONE OLD AND FIVE NEW SPECIES OF ALCYONACEA (COELENTERATA: OCTOCORALLIA) FROM THE RED SEA

by

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With 8 text-figures and 5 plates

Abstract

Five new species of octocorals (Coelenterata) are described from the Red Sea and the Gulf of Elat. One previously described species, *Stereonephthya imbricans* Thomson & Dean, 1931, is discussed and compared with *Coronephthya* (*Stereonephthya*) *macrospiculata* Thomson & Dean, 1931.

Introduction

During the first weeks of 1977 the junior author (Y.B.) visited the senior author (J.V.) in Zwolle, The Netherlands, and during that time they investigated together a number of samples of alcyonaceans the junior author had brought with him. Part of these specimens had been collected by him during SCUBA dives, and were studied by him as part of a doctoral thesis on the ecology of alcyonaceans in the Gulf of Elat and the Northern Red Sea. Additional material had been collected by Dr. Ch. Lewinsohn of the Department of Zoology, Tel-Aviv University, and Miss N. Gunderman of the H. Steinitz Marine Biology Laboratory, Elat.

The whole collection comprised thirty-one species. Eleven of these had been previously recorded from the Red Sea. Fourteen previously described

species are now reported for the first time from the Red Sea. They are (with the localities added in parentheses): *Cladiella elongata* (Tixier-Durivault, 1944) (Ras Muhammed, Red Sea, reef flat); *Cladiella latissima* (Tixier-Durivault, 1944) (Ras Muhammed, Red Sea, depth 8 m; Strait of Tiran, Gordon Reef, depth 55-82 m, leg. Ch. Lewinsohn); *Cladiella variabilis* (Tixier-Durivault, 1944) (Abu Durba, Gulf of Suez, depth 6 m; Gabel Tanaka, Gulf of Suez, depth 3 m); *Sarcophyton decaryi* Tixier-Durivault, 1946 (the reef near the km 207 mark on the highway to Sharm esh Sheikh, reef flat); *Sinularia humesi* Verseveldt, 1968 (Coral Island, Gulf of Elat, depth 6 m; Ras el Burqa', Gulf of Elat, depth 8 m); *Sinularia minima* Verseveldt, 1971 (Muqebla', Gulf of Elat, reef flat); *Sinularia notanda* Tixier-Durivault, 1966 (Coral Island, Gulf of Elat, depth 3 m); *Sinularia simpsoni* Tixier-Durivault, 1945 (Sharm esh Sheikh, Red Sea, depth 10 m); *Sinularia terspilli* Verseveldt, 1971 (Marine Laboratory, Elat, depth 10 m; Ras el Burqa', Gulf of Elat, depth 10 m); *Dendronephthya* (*Morchellana*) *curvata* Kükenthal, 1905 (Nature Reserve, Gulf of Elat, depth 29 m; Sharm esh Sheikh, Red Sea, depth 25 and 30 m); *Stereonephthya bellissima* Thomson & Dean, 1931 (Ras el Kanisa, Gulf of Suez, depth 10 m, leg. N. Gunderman); *Stereonephthya imbricans* Thomson & Dean, 1931 (see below); *Stereonephthya unicolor* (Gray, 1862) (Gabel Tanaka, Gulf of Suez, reef flat, depth 4 m); *Xenia membranacea* Schenk, 1896 (Muqebla', Gulf of Elat, depth 4 m).

Among the specimens collected by the junior author and by Dr. Ch. Lewinsohn there are five new species, namely *Cladiella arbusculoides* sp.n., *Sarcophyton auritum* sp.n., *Sarcophyton gemmatum* sp.n., *Sarcophyton pauciplicatum* sp.n., and *Scleronephthya lewinsohni* sp.n. They are described below.

The study of colonies found in the Strait of Tiran, and identified with *Stereonephthya imbricans* Thomson & Dean, 1931, led to a renewed investigation of colonies collected (a) during the Siboga Expedition and referred to *Stereonephthya imbricans* by Thomson & Dean (1931: 145), and (b) during the Snellius Expedition and referred to *S. macrospiculata* by Verseveldt (1966: 83-87). The results are recorded in this paper.

The material investigated is kept partly in the Zoological Museum, Department of Zoology, Tel-Aviv University, Tel-Aviv, Israel (the register numbers are preceded by the abbreviation NS), and partly in the Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands (the register numbers are preceded by the abbreviation RMNH). The holotypes are all kept in the Zoological Museum, Department of Zoology, Tel-Aviv University.

The present paper may be considered a continuation of the senior

author's publications on octocorals from the Red Sea; see Verseveldt (1974: 3, 37).

Taxonomic report

Cladiella arbusculoides sp. nov. (fig. 1, pl. 1 figs. 1, 2)

Material. — Sharm esh Sheikh, Red Sea, depth 3 m, 7 September 1976, leg. Y. Benayahu. NS 13272, one colony, holotype; RMNH Coel. no. 12294, one colony, paratype.

Description of the holotype. — The total height and maximum width of the colony is 37 mm; it is slightly flattened laterally (pl. 1 figs. 1, 2). The sterile stalk is low, oblique, at one side 18 mm high. From the upper surface of the stalk primary lobes arise. The smallest are knobs, two or three mm high, bearing a few polyps. The largest are up to 20 mm high, up to 8 mm wide at the base, sometimes flattened laterally, and arborescent. The secondary lobes vary in length from tiny knobs to fingerlike branches, 5 to 10 mm long.

The lobes and lobules are turned to one side of the colony, and, consequently, the polyps are denser on this side, the front of the colony. The back of the colony only shows two or three lobes, with few polyps on the lobules.

The polyps, 0.80 mm wide at the base, are partly retracted: the tentacles protrude above the surface. Sometimes they are folded inward over the

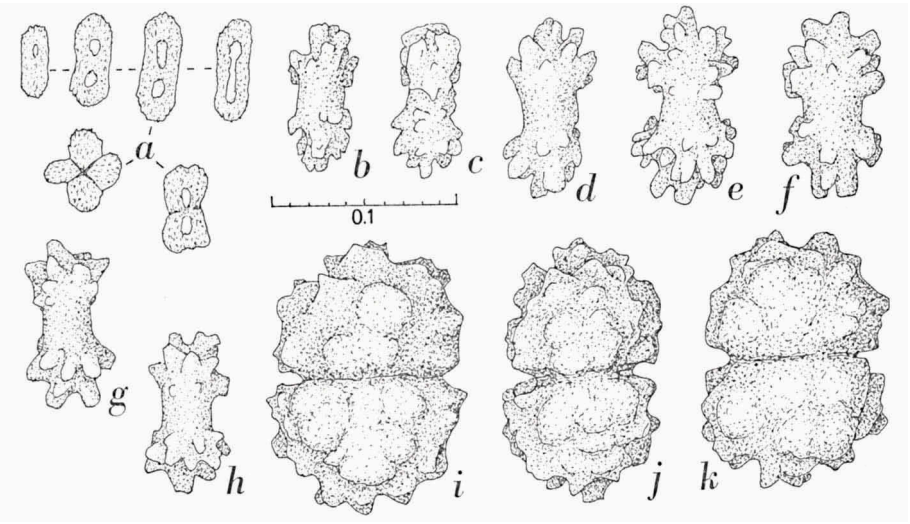

Fig. 1. *Cladiella arbusculoides* sp. nov., holotype, Sharm esh Sheikh, NS 13272. *a*, polyp sclerites; *b-d*, sclerites from surface layer of a lobe; *e*, *f*, sclerites from interior of a lobe; *g*, *h*, sclerites from surface layer of the sterile stalk; *i-k*, sclerites from coenenchyme of the sterile stalk. All figures with the same enlargement; 0.1 mm scale at *b*.

mouth, in other cases they are expanded, the length is up to about 0.80 mm. The polyps are unequally distributed, more crowded in the distal parts of the branches; the centres are about 1 mm apart. The outer surface of the tentacles is heavily armed with minute, finger-biscuit-like sclerites, 0.035 to 0.070 mm long; the waist is absent or ill-defined. They are opaque, but usually show two light spots. Crosses are common (fig. 1*a*).

In the surface layer of the lobes there are the same elliptical sclerites, and, besides, elongate dumb-bells 0.08 to 0.10 mm long; the heads bear blunt processes (fig. 1*b-d*). In the interior of the lobes the same sclerites occur, but they may be slightly longer, about 0.11 mm (fig. 1*e, f*). Also in the surface layer of the sterile stalk such sclerites are found, 0.085 to 0.120 mm long (fig. 1*g,h*). The interior of the sterile stalk contains relatively big sclerites, 0.110 to 0.145 mm long. In many cases the waist of the dumb-bells is reduced to a mere line; the heads are hemispherical with low, undulating processes (fig. 1*i-k*).

Colour. — In alcohol the colony is white.

Variability. — The paratype is a little smaller. It also has a front and a back, but it is not flattened laterally.

Remarks. — There are about ten *Cladiella* species possessing coenenchymal sclerites with a length of 0.12 mm or more. But with none of these the specimens described above agree.

The specific name *arbusculoides* refers to the treelike shape of the lobes.

Sarcophyton auritum sp. nov. (fig. 2, pl. 1 fig. 3)

Material. — Muqebla', Gulf of Elat, depth 3 m, 28 February 1977, leg. Y. Benayahu. NS 13280, one colony, holotype.

Description. — The colony measures 120 mm in total height. The disc hardly projects out of the stalk, and shows a folding at the periphery only. These folds, seven in number, vary in height from 25 to 70 mm. They have thick edges, the largest ones look like thick, erect rabbit-ears (pl. 1 fig. 3).

The funnel-shaped sterile stalk, 45 mm wide at the base and 40 to 60 mm high, is irregularly, but chiefly longitudinally grooved.

The retracted autozooids are 0.60 mm in diameter; the centres are 1.40 to 1.80 mm apart. Between them there are one or two siphonozooids.

The sclerites in the surface layer of the disc are clubs, 0.09 to 0.15 mm long, with heads composed of big, rounded prominences; the handles have few blunt spines, often arranged in girdles (fig. 2*a-f*). In addition there are longer clubs, up to 0.23 mm long, with narrow heads and slender handles (fig. 2*g, h*). In the surface layer of the sterile stalk the clubs, 0.09 to 0.12

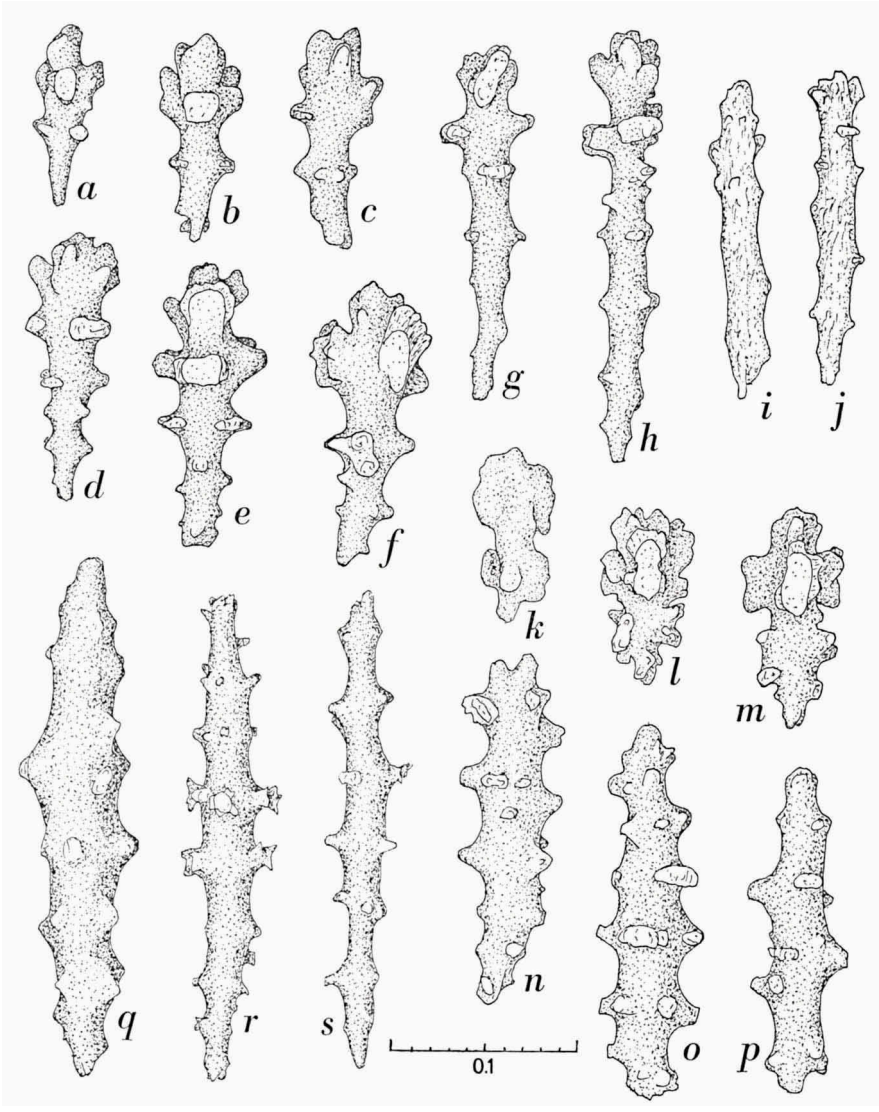

Fig. 2. *Sarcophyton auritum* sp. nov., holotype, Muqebla', NS 13280. *a-h*, sclerites from surface layer of the disc; *i, j*, sclerites from interior of the disc; *k-p*, sclerites from surface layer of the sterile stalk; *q-s*, sclerites from interior of the sterile stalk. All figures with the same enlargement; 0.1 mm scale at *n*.

mm long, are wider, the heads have big warts, sometimes the prominences seem to be more foliaceous (fig. 2*k-m*). Longer clubs and rods, up to 0.19 mm long, have the wartlike processes on transverse rows (fig. 2*n-p*).

The coenenchyme of the disc contains few sclerites, 0.14 to 0.20 mm long.

Some of them are nearly smooth rods, others have a few small, rounded prominences, sometimes accumulated at one end; many of these are striated longitudinally (fig. *2i, j*). In the interior of the sterile stalk lie thin or wider spindles, 0.20 to 0.34 mm long, with cone-shaped or small wartlike processes, usually in girdles (fig. *2q-s*).

Colour. — In alcohol the colony is grey.

Remark. — The specific name *auritum* (Latin *auritus* = having ears) refers to the remarkable shape of the marginal folds.

Sarcophyton gemmatum sp. nov. (fig. 3, pl. 2, pl. 3 fig. 1)

Material. — Muqebla', Gulf of Elat, depth 3 m, 4 September 1976, leg. Y. Benayahu. NS 13281, a fragment of a colony, holotype.

The same locality, date and collector, but depth 4 m. RMNH Coel. no. 12296, a fragment of a colony, paratype.

Sharm esh Sheikh, Red Sea, depth 6 m, 6 September 1976, leg. Y. Benayahu. RMNH Coel. no. 12295, a complete colony, paratype.

Description of the holotype. — The specimen is one half of a colony. The upper side of the disc is flat (pl. 2 fig. 2), but towards the edge the disc passes into a number of strongly folded, overhanging lobes (pl. 2 fig. 1), which project far beyond the sterile stalk. The disc and the marginal folds are weak, in consequence of the absence of sclerites in the coenenchyme. The sterile stalk is short, 15 mm high, and wide, 55 mm in diameter; it is hard owing to the numerous sclerites in the interior.

From the stalk a bud arises, 10 × 15 mm in diameter and 10 mm high. It bears autozooids and siphonozooids just like the disc and the folds; it is hidden from view by these overhanging folds.

The autozooids are retracted; the diameter is 0.80 mm. On the edge of the disc the centres are 1.00 to 1.60 mm apart; between them there is only one siphonozooid. Towards the centre of the disc the distance between the autozooids increases, and so do the number of siphonozooids between them: in the middle of the disc-surface the centres of the autozooids are 2.90 to 4.80 mm apart, and there are up to about ten siphonozooids between them.

The walls of the (retracted) autozooids contain eight double rows of chevroned, nearly smooth, often slightly curved needles and rods, 0.20 to 0.32 mm long, but distally they are smaller, about 0.10 mm long (fig. *3a-c*). In each row there are ten to twelve sclerites. Proximally they are more or less transversely placed, without forming a distinct crown.

The surface layer of the disc has clubs 0.07 to 0.20 mm long (fig. *3d-g*). They are opaque, striated longitudinally; the heads are weakly developed, the handles are nearly smooth. These sclerites are numerous in the folded mar-

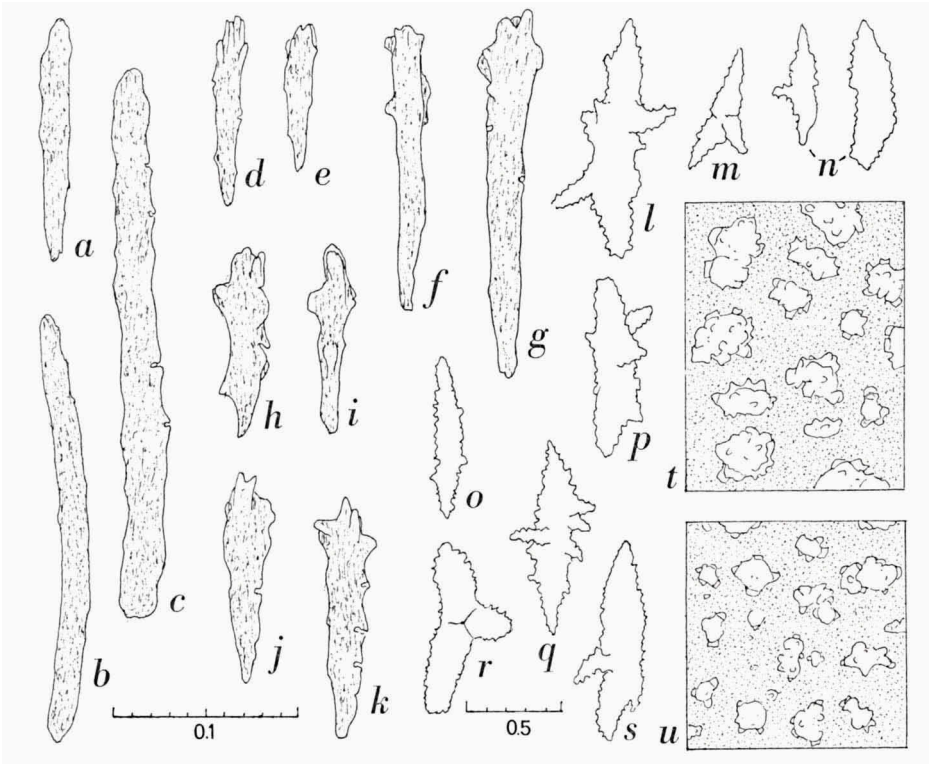

Fig. 3. *Sarcophyton gemmatum* sp. nov., holotype, Muqebla', NS 13281. *a-c*, polyp sclerites; *d-j*, sclerites from surface layer of the edge of the disc; *h-k*, sclerites from surface layer of the sterile stalk; *l-s*, sclerites from coenenchyme of the sterile stalk; *t, u*, warts on coenenchymal sclerites from the sterile stalk. Enlargement of *a-k* and *t, u*, indicated by 0.1 mm scale at *j*; that of *l-s* by 0.5 mm scale at *r*.

ginal lobes, but scarce in the central part of the disc. The surface layer of the sterile stalk has the same opaque clubs, usually 0.08 to 0.12 mm long, a few are up to 0.15 mm long (fig. 3*h-k*).

In the coenenchyme of the disc and of the marginal folds sclerites are absent, but the sterile stalk contains numerous, irregularly shaped sclerites, up to 1.30 mm long; the principal form is the spindle (fig. 3*l-s*). They are covered with small warts, which are sometimes densely arranged (fig. 3*t-u*).

Colour. — In alcohol the colony is brown.

Variability. — The specimen RMNH Coel. no. 12296 is a slightly smaller fragment, greyish brown in colour. The coenenchymal sclerites in the sterile stalk are more fusiform; their warts are transversely arranged. The still smaller specimen RMNH Coel. no. 12295 has three buds arising from the sterile stalk. In pl. 3 fig. 1 two buds are visible.

Remarks. — The species is characterized by the strongly folded edge of the disc, the absence of coenenchymal sclerites in the disc, the bizarre forms of the coenenchymal sclerites in the sterile stalk, and, in many cases, by the presence of buds on the sterile stalk. (*Sarcophyton portentosum* Tixier-Durivault, 1970, also has buds on the sterile stalk). The specific name *gemmatum* (Latin *gemma* = bud) refers to this character.

Sarcophyton pauciplicatum sp. nov. (fig. 4, pl. 4)

Material. — Sharm esh Sheikh, Red Sea, depth 3 m, 7 September 1976, leg. Y. Benayahu. NS 13287, one colony, holotype.

Description. — The colony is 50 mm high. The oval, hollow disc has diameters of 80 and 60 mm. It shows only one marginal fold (pl. 4 fig. 1). The thick edge does not extend beyond the sterile stalk. The latter is funnel-shaped, wrinkled, 60 × 35 mm wide at the base.

The autozooids are completely retracted, leaving shallow pits, 0.45 to 0.60 mm in diameter. At the periphery of the disc the centres are about 0.80 mm apart, with one siphonozooid between them. In the middle of the disc the distance is 1.50 to 2.50 mm, and there are two to four siphonozooids between them. A good many autozooids are arranged in parallel rows. In the polyp walls sclerites are absent.

The surface layer of the disc has clubs 0.12 to 0.27 mm long. The smaller ones, 0.12 to 0.19 mm long, have few warts, in many cases a central wart is present (fig. 4*a-d*). The longer clubs have little developed heads, the handles bear cone-shaped processes (fig. 4*e-h*). The longest and thinnest clubs approach certain coenenchymal spicules in form. The clubs in the surface layer of the sterile stalk do not differ much from those in the disc; they are 0.09 to 0.19 mm long (fig. 4*i-m*).

The coenenchymal sclerites in the disc are slender needles, 0.20 to 0.43 mm long (fig. 4*n, o*). Some of them bear few spines, others are nearly smooth. In the interior of the sterile stalk lie: (a) spindles 0.31 to 0.37 mm long, with hemispherical prominences arranged in transverse rows (fig. 4*p*), and (b) slender spindles or needles 0.38 to 0.46 mm long, with higher, blunt-ended cones, spines, or simple warts (fig. 4*q*).

Colour. — In alcohol the colour is grey.

Remarks. — As to the shape and the size of the coenenchymal sclerites in the stalk the new species agrees with other *Sarcophyton* species with relatively short spindles, such as *S. molle* Tixier-Durivault, 1946, *S. moseri* Roxas, 1932, *S. ehrenbergi* Von Marenzeller, 1886, and *S. acutangulum* Von Marenzeller, 1886. But there are also clear differences.

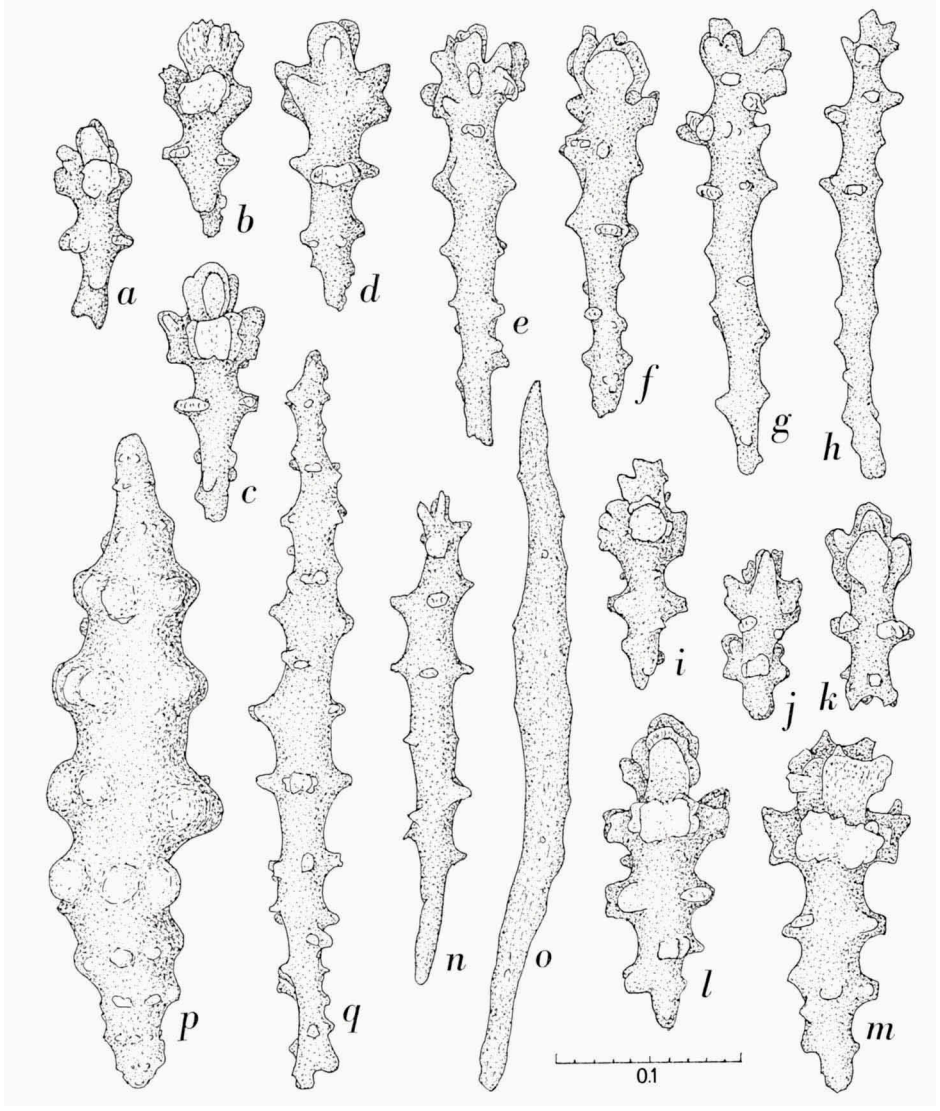

Fig. 4. *Sarcophyton pauciplicatum* sp. nov., holotype, Sharm esh Sheikh, NS 13287. *a-h*, sclerites from surface layer of the disc; *i-m*, sclerites from surface layer of the sterile stalk; *n*, *o*, sclerites from interior of the disc; *p*, *q*, sclerites from interior of the sterile stalk. All figures with the same enlargement; 0.1 mm scale at *l*.

The specific name *pauciplicatum* (Latin *paucus* = few, little, and *plico* = fold) refers to the paucity of folds in the disc.

Scleronephthya lewinsohni sp. nov. (fig. 5, pl. 5)

Material. — Gordon Reef, Strait of Tiran, Red Sea, depth 55-82 m, 7 October 1969, leg. Ch. Lewinsohn. NS 13278a, holotype; NS 13278b, paratype; RMNH Coel. no. 12297, paratype.

Description of the holotype. — The total height of the colony is 56 mm, the maximum width is 43 mm; it is slightly flattened in one plane (pl. 5 fig. 1). It has an oblique basal attachment; apparently the substratum made an acute angle with the growing-direction of the colony; this base measures 25 × 30 mm in diameter. From the base a few stems arise: the smallest one is 10 mm high, and unbranched, the largest one is 40 to 45 mm long and 13 mm wide at its base. This largest stem gives off many branches, which strongly vary in length; the longest are 20 mm long.

A few polyps occur singly or in small groups of two to four on the main stem. Most polyps appear as if clustered on the branches. They are not densely placed; sometimes they form small groups of three or four individuals, like initial stages of twigs.

The polyps are not retracted. They have a short, often slightly curved stalk, about 0.5 mm long. The distal part may be slightly wider; it measures 0.80 mm to 1.00 mm in width and in length (fig. 5*a*, *b*). It is armed with eight double rows of four to seven or more spindles arranged en chevron. Proximally there are some irregularly placed spindles, which do not form a crown. The anthocodial spicules are curved spindles, usually 0.35 to 0.40 mm long; they bear low, rounded knobs. In the tentacles there are tiny scales, 0.04 to 0.08 mm long (fig. 5*c*).

In the middle part of the stem the surface layer has more or less straight, blunt-ended rods, 0.14 to 0.60 mm long, and provided with many knotty prominences (fig. 5*d-f*). In the basal expansion these sclerites are shorter, up to 0.30 mm long. The coenenchyme of the middle part of the stem contains blunt rods or cylinders up to 1.30 mm long, covered with simple, low warts (fig. 5*g*). In the base of the colony these sclerites are also shorter, up to 0.60 mm.

Colour. — The whole colony is creamy-white.

Variability. — The paratypes are more flattened laterally (pl. 5 fig. 2). In one of the paratypes the anthocodial armature is weakly developed: in the basal part of the polyp there are only few sclerites, and each point consists of not more than four pairs of spindles. One of the colonies is yellowish, the other one is creamy-white.

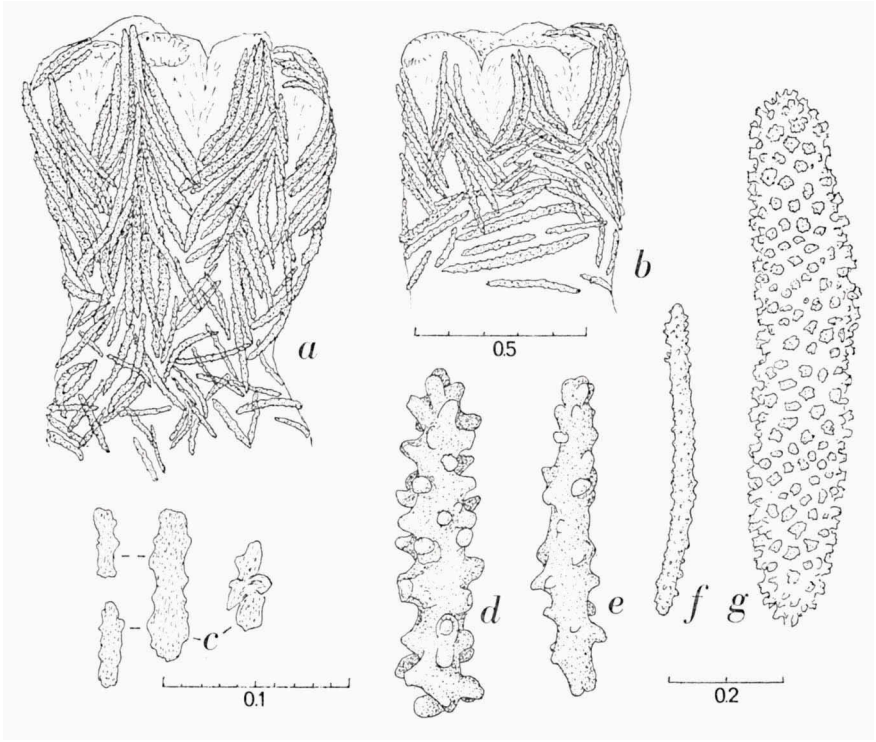

Fig. 5. *Scleronephthya lewinsohni* sp. nov., holotype, Gordon Reef, Strait of Tiran, NS 13278a. *a*, *b*, polyps; *c*, sclerites from tentacles; *d-f*, sclerites from surface layer of the middle part of the stem; *g*, sclerite from interior of the stem. Enlargement of *a* and *b* indicated by 0.5 mm scale at *b*; that of *c-e* by 0.1 mm scale at *c*; that of *f* and *g* by 0.2 mm scale at *f*, *g*.

Remarks. — The senior author described *Scleronephthya corymbosa*, also from the Red Sea (see Verseveldt, 1971: 58-59). But this species has the following characters: (a) the polyps are sessile (in a preserved state of the colony), and dome-shaped when contracted; (b) the polyps are arranged in small cone-shaped clusters, not distributed over long branches; (c) the anthocodial armature has a crown, about six rows deep, superposed by eight points of only two to three pairs of chevroned spindles; and (d) the sclerites in surface layer and coenenchyme seem to be more spindle-shaped; the coenenchymal spicules are longer, up to 2 mm.

We name the new species after Dr. Ch. Lewinsohn, Department of Zoology, Tel-Aviv University, and collector of the specimens.

Stereonephthya imbricans Thomson & Dean, 1931 (figs. 6-8, pl. 3 figs. 2, 3)

Stereonephthya imbricans Thomson & Dean, 1931: 145, pl. 7 figs. 7, 9.
Stereonephthya macrospiculata, Verseveldt, 1966: 83-87, fig. 46, pl. 13 fig. 1 (non *Stereonephthya macrospiculata* Thomson & Mackinnon, 1910: 186).

Material. — Siboga Expedition: Sta. 164, between Misoöl I. and New Guinea, 1° 42.5'S 130° 47.5'E, small stones and shells, depth 32 m, 1 specimen; Sta. 310, NE of Sumbawa, 8° 30'S 119° 7.5'E, sand with few pieces of dead coral, depth 73 m, 4 specimens; Sta. 315, anchorage east of Sailus Besar, Paternoster Is., coral and Lithothamnion, depth up to 36 m, 2 fragments; all specimens: AMS Coel. no. 3451. They have been identified with *S. imbricans* n.sp. by Thomson & Dean, 1931: 145.

Snellius Expedition: Sta. 104*, Aru Is., 5° 50.0'S 134° 04.0'E, depth 100 m, 15 October 1929; RMNH Coel. no. 2234. One colony, identified with *S. macrospiculata* by the senior author (Verseveldt, 1966: 83).

Gordon Reef, Strait of Tiran, Red Sea, depth 55-82 m, 7 October 1969, leg. Ch. Lewinsohn. NS 13293, one colony; RMNH Coel. no. 12298, two colonies.

Preliminary note. — In 1966 the senior author (J.V.) published a paper on the Octocorallia from the Malay Archipelago (part II). In this paper he described (p. 83) a coral collected by the Snellius Expedition, which he identified with *Stereonephthya macrospiculata* Thomson & Mackinnon, 1910, although with some hesitation.

In the same year Utinomi (1966) published the results of his valuable investigation of a fragment of the type specimen of *Dendronephthya magnacantha* Nutting, 1912, and of other colonies from Japanese waters, referable to this species. Utinomi pointed out that this species has been described before by Thomson & Mackinnon in 1910 under the name *Stereonephthya macrospiculata*, and that, consequently, the specific name must be *macrospiculata*. Instead of the generic names *Dendronephthya* and *Stereonephthya* Utinomi proposed the new name *Coronephthya*.

From Utinomi's publication it appears that the senior author's identification of the coral collected by the Snellius Expedition with this *Coronephthya macrospiculata* was not correct. A renewed examination by the senior author showed that this coral must be referred to *Stereonephthya imbricans* Thomson & Dean, 1931.

These authors figured two colonies of this species (pl. 7 figs. 9, 10). Unfortunately they did not represent polyps. Also in other respects their description deserves supplementation. Thomson & Dean's description is apparently based on the largest specimen from Sta. 310, labelled as "type"; it has been figured by Thomson & Dean (1931, pl. 7 fig. 9). A supplementary description of this holotype follows now.

Description of the holotype of *Stereonephthya imbricans* Thomson & Dean. — The total height of the stiff and hard colony is 53 mm. At a height

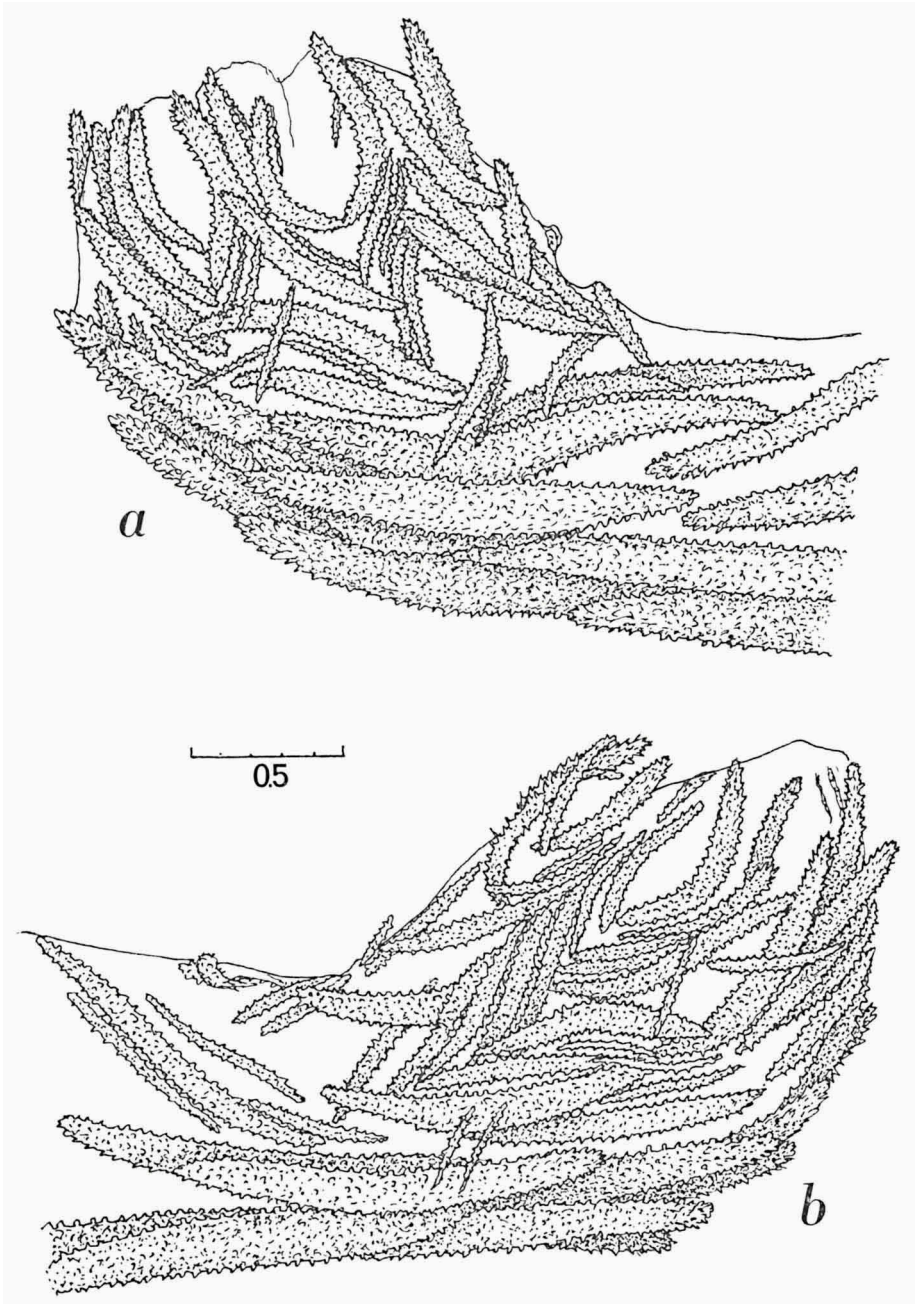

Fig. 6. *Stereonephthya imbricans* Thomson & Dean, holotype, Siboga Exp. Sta. 310. *a*, *b*, polyps. Both figures with the same enlargement; scale 0.5 mm.

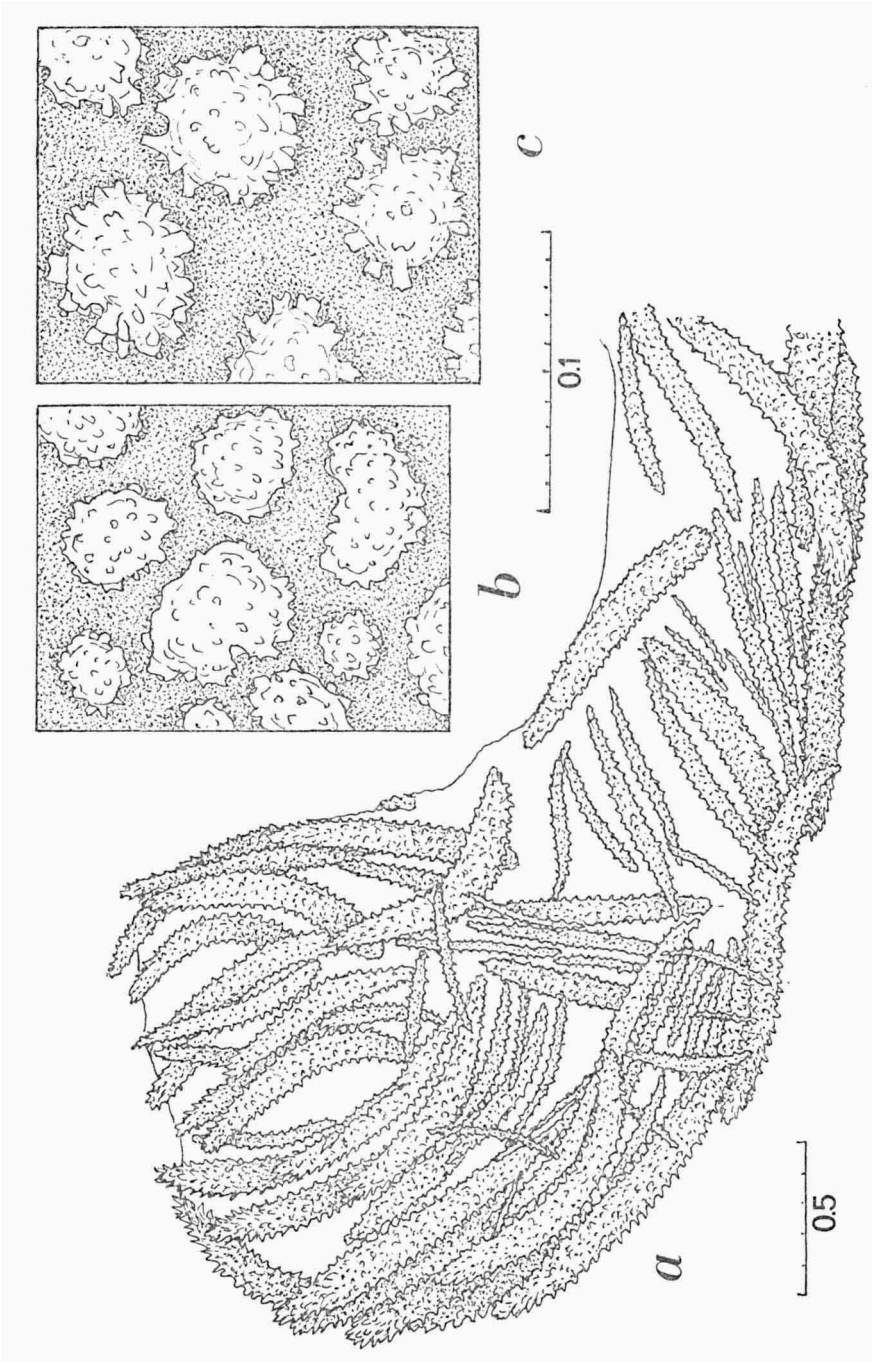

Fig. 7. *Stereonephthya imbricans* Thomson & Dean, holotype, Siboga Exp. Sta. 310. *a*, polyp; *b*, warts on sclerite from surface layer of the distal part of the sterile stalk; *c*, warts on a sclerite from interior of the sterile stalk. Enlargement of *a* indicated by 0.5 mm scale at *a*; that of *b* and *c* by 0.1 mm scale at *b*, *c*.

of 35 mm it passes into an indistinct stem, which gives off some short branches. The polyps arise singly from the branches. The anthocodiae, 1.50 to 1.75 mm wide, make obtuse angles with the stalks, which are about 1.20 mm long. The armature is variable (figs. 6, 7). Sometimes there are eight double rows of chevroned, curved, spiny spindles, three to six in a row, the uppermost more or less predominating over the others. In other cases there is no regular arrangement en chevron, the sclerites may be longitudinally or obliquely placed, especially at the asulcal ("dorsal") side. The retracted tentacles are armed with spindles 0.15 to 0.30 mm long. The supporting bundle is strong; it consists of a number of spiny spindles, about 1.50 to 2.00 mm long.

The surface layer of the stem and the distal part of the sterile stalk contains two types of sclerites:

a. Spiny or warty, usually slender spindles, up to 2.30 mm long and 0.33 mm wide. The warts are round, 0.03 to 0.04 mm in diameter, but smaller and larger ones also occur; they bear tiny cones (fig. 7*b*).

b. Thin, spiny needles, 0.30 to 0.60 mm long.

In the coenenchyme of the stem and the distal part of the sterile stalk the spindles are thinner, and up to 2 mm long; the prominences are blunt spines, not closely set. In the basal part of the sterile stalk the surface layer is absent. The interior consists of numerous, longitudinally arranged, curved, pointed spindles, up to 5.50 mm long and 0.50 mm wide. They bear crenellated tubercles, 0.05 to 0.07 mm in diameter (fig. 7*c*).

Colour. — In alcohol the colony is pinkish-brown (the colour of the colony pictured by Thomson & Dean (1931, pl. 7 fig. 7) is too red).

Variability and remarks. — The other colonies identified by Thomson & Dean with *S. imbricans* are smaller. That from Sta. 164 has been represented in Thomson & Dean's pl. 7 fig. 11 (in alcohol the colour is slightly darker creamy). The specimens from Sta. 315, labelled "syntype", are two fragments: a small colony missing the basal part of the sterile stalk, and a basal part of a stalk attached to and passing into a quantity of large spindles, solidly stuck together, and about 5 mm long. The two fragments are possibly parts of one colony.

Remarks on the colonies from Gordon Reef, Strait of Tiran, collected by Ch. Lewinsohn, and referable to *Stereonephthya imbricans*. — The largest specimens are 80 and 90 mm high (pl. 3 figs. 2, 3). It is a remarkable fact that in the basal part of the sterile stalk the surface layer seems to have disappeared, just as in the holotype described above. This part consists of closely parked large spindles, up to 5.20 mm long, a phenomenon that seems typical of the species. Most branches are curved downwards. The tentacles

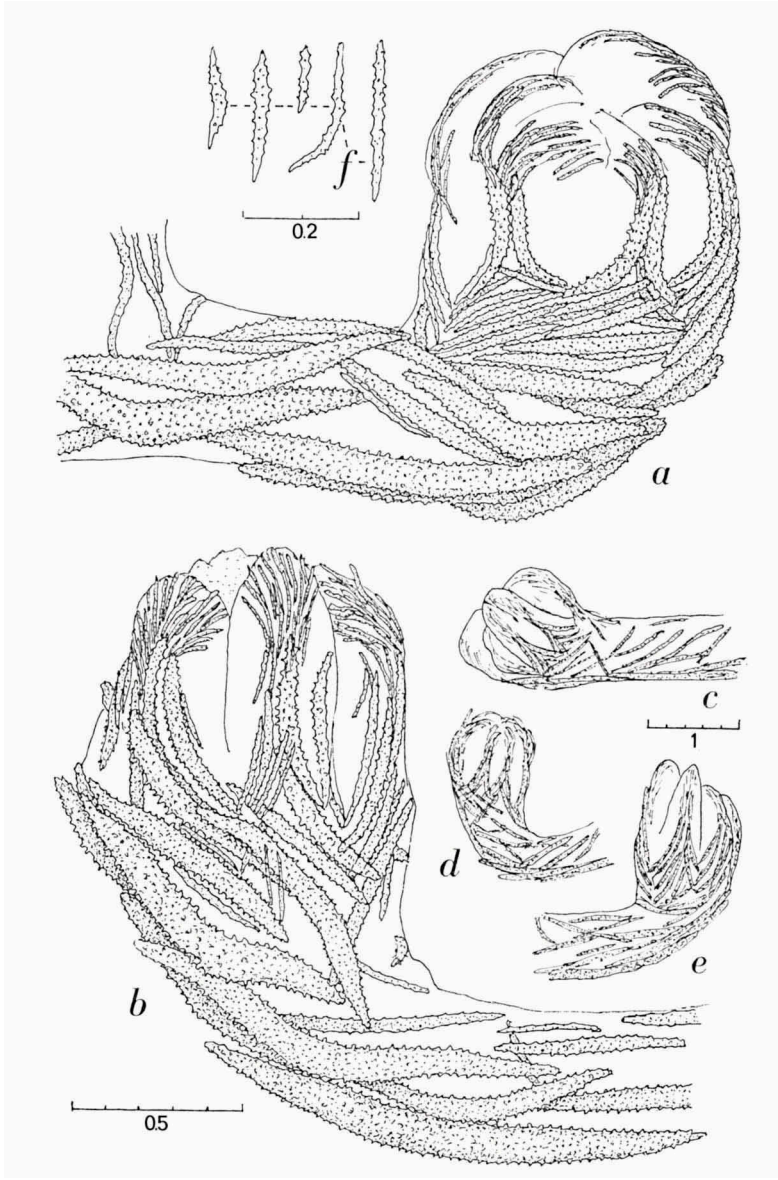

Fig. 8. *Stereonephthya imbricans* Thomson & Dean, Gordon Reef, Strait of Tiran, NS 13293. *a-e*, polyps; *f*, sclerites from tentacles. Enlargement of *a* and *b* indicated by 0.5 mm scale at *b*; that of *c-e* by 1 mm scale at *c*; that of *f* by 0.2 mm scale at *f*.

are not retracted within the anthocodiae (fig. 8*a-e*); they clearly show the armature consisting of longitudinally arranged, often flat, sometimes slightly clavate spindles, 0.15 to 0.30 mm long (fig. 8*f*). The anthocodiae are nar-

rower than those of the type specimen (compare fig. 8 with figs. 6 and 7); in the former they are 1.40 to 1.60 mm wide, in the latter 1.40 to 1.75 mm, but here the tentacles are completely retracted, so that the anthocodiae gather volume. The colour is creamy.

Finally the colonies identified with *S. macrospiculata* by Thomson & Dean (1931: 146). Utinomi (1966: 216) suggested that these colonies "may be a kind of *Paraspongodes*, close to *P. crassa* Kük.". However, the polyps of these colonies have a distinct supporting bundle. Therefore they do not belong to the genus *Paraspongodes*. After a renewed investigation we have concluded that quite probably they do indeed belong to *S. macrospiculata* Thomson & Mackinnon (= *Coronephthya macrospiculata*, Utinomi's new combination). It is a pity that the paucity of the fragmentary material renders a closer investigation impossible. The "specimen" from Sta. 12 consists merely of a few very small fragments. The specimen from Sta. 154 is represented in Thomson & Dean's pl. 7 fig. 7. It consists only of a number of big sclerites firmly joined together; polyps are absent. The specimens from Sta. 257 and from Sta. 289 are distal parts of small colonies, they consist of some polyps. These are bigger than those in *S. imbricans*. The anthocodial sclerites are much larger and wider, and more irregularly placed; the armature is very much like that pictured in Utinomi's fig. 1d (1966). The supporting bundle is very strong, and consists of some spicules, which may have a length of 4 mm or more. The colony from Sta. 260 is the only specimen that is practically complete. Its total height is 20 mm. The sterile stalk is unbranched, but the polyparium seems to consist of a few short branches, which bear the polyps. One cannot say that the polyparium is "unbranched, crown-like" (Utinomi, 1966: 215); the smallness and the damage of the colony may play a part. Perhaps the short branches just mentioned are outgrowths of the "bosses" found by Utinomi (1966: 208) in Nutting's type specimen.

Another suspicious fact is the presence of spindles in the thin canal-walls. In this respect a renewed investigation of new material is needed. For the present we refer the fragments and colonies to *Coronephthya macrospiculata*, just as Thomson & Dean did.

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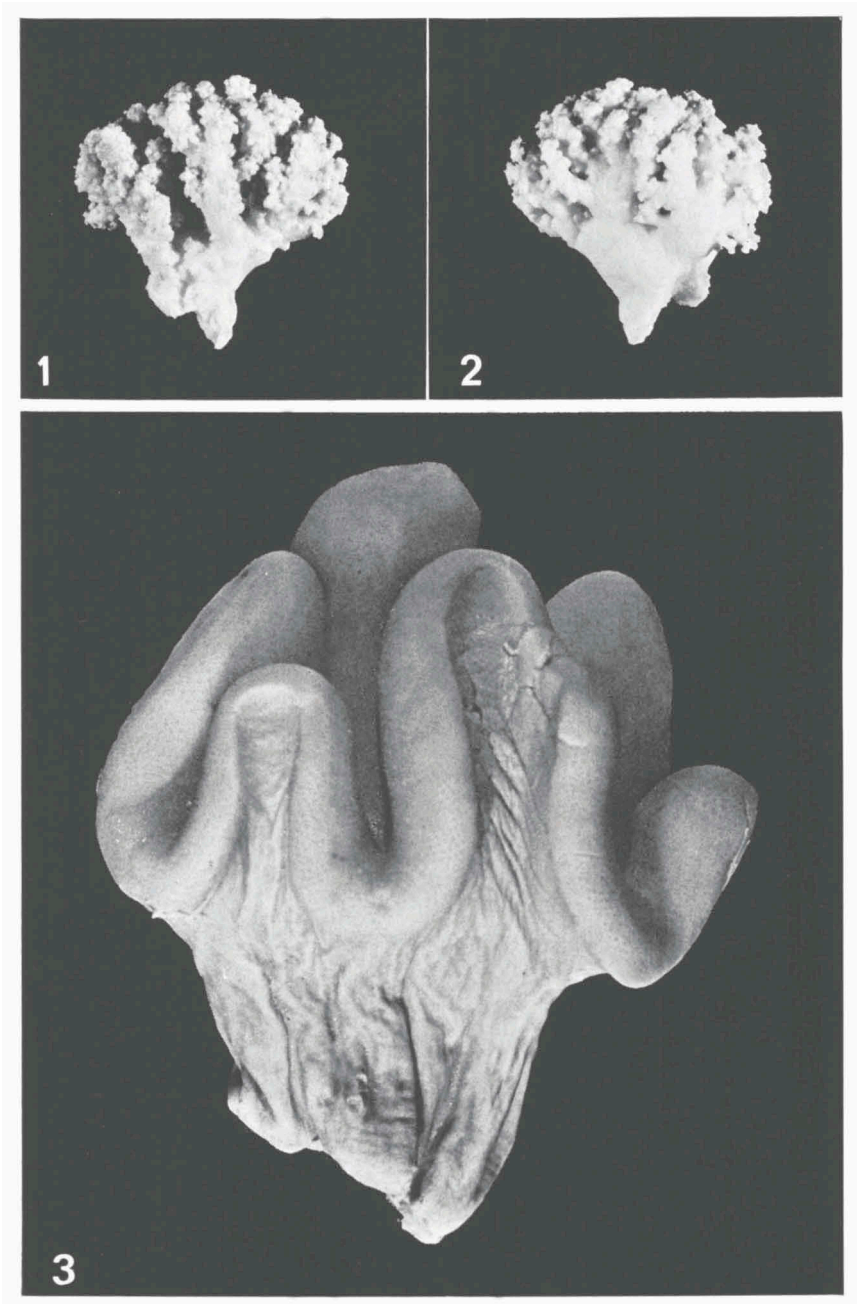
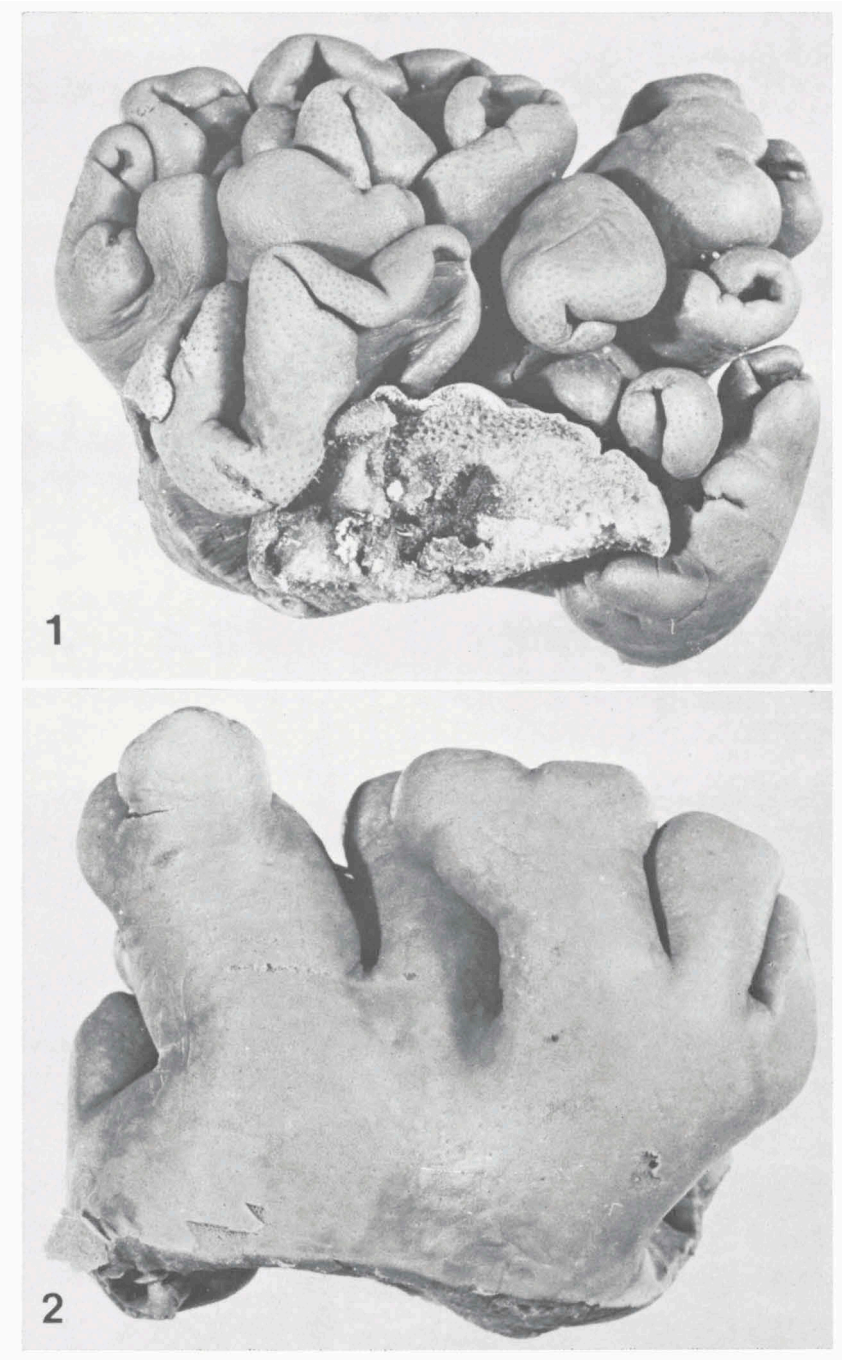


Figs. 1, 2. *Cladiella arbusculoides* sp. nov., holotype, Sharm esh Sheikh, NS 13272; × 1.
Fig. 3. *Sarcophyton auritum* sp. nov., holotype, Muqebla', NS 13280; × 0.8.



Figs. 1, 2. *Sarcophyton gemmatum* sp. nov., holotype, Muqebla', NS 13281; × 1. 1, side-view. 2, seen from above.

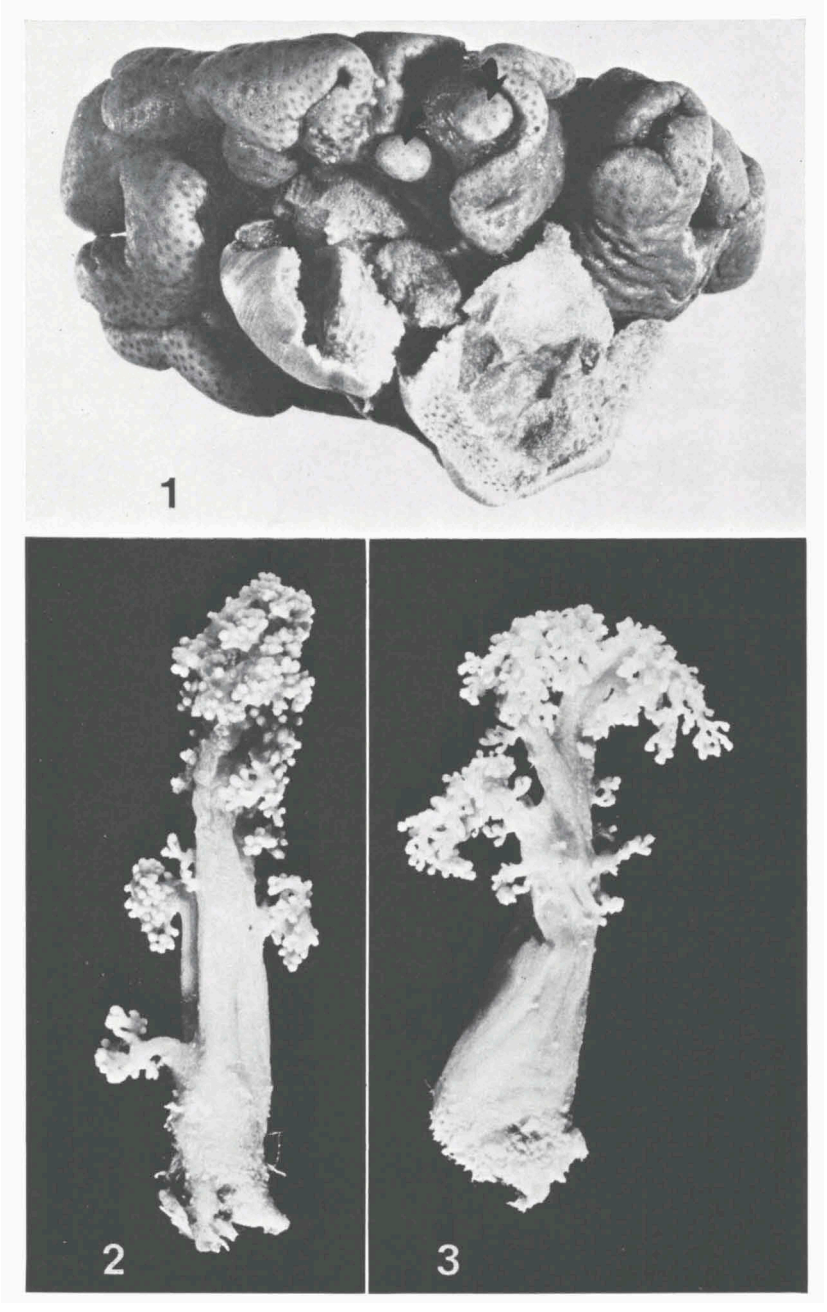
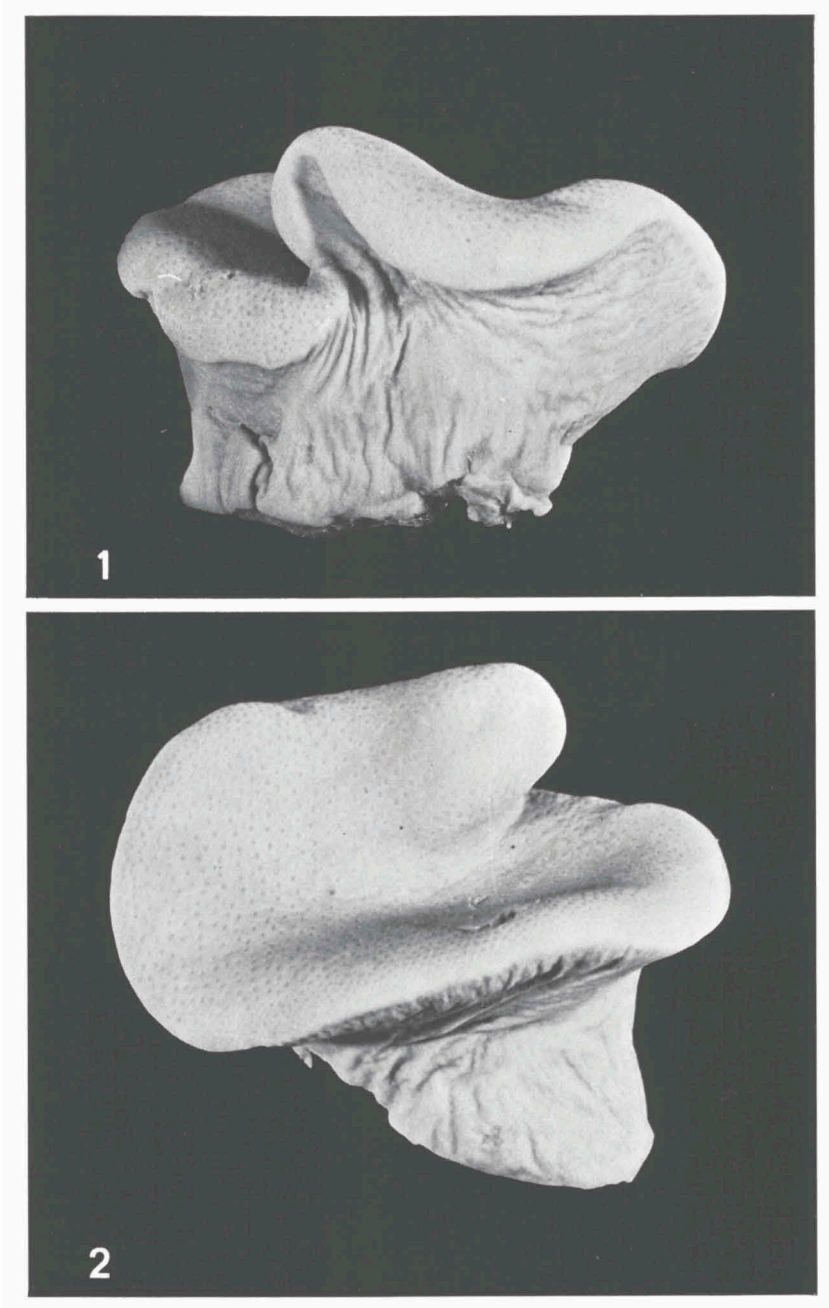
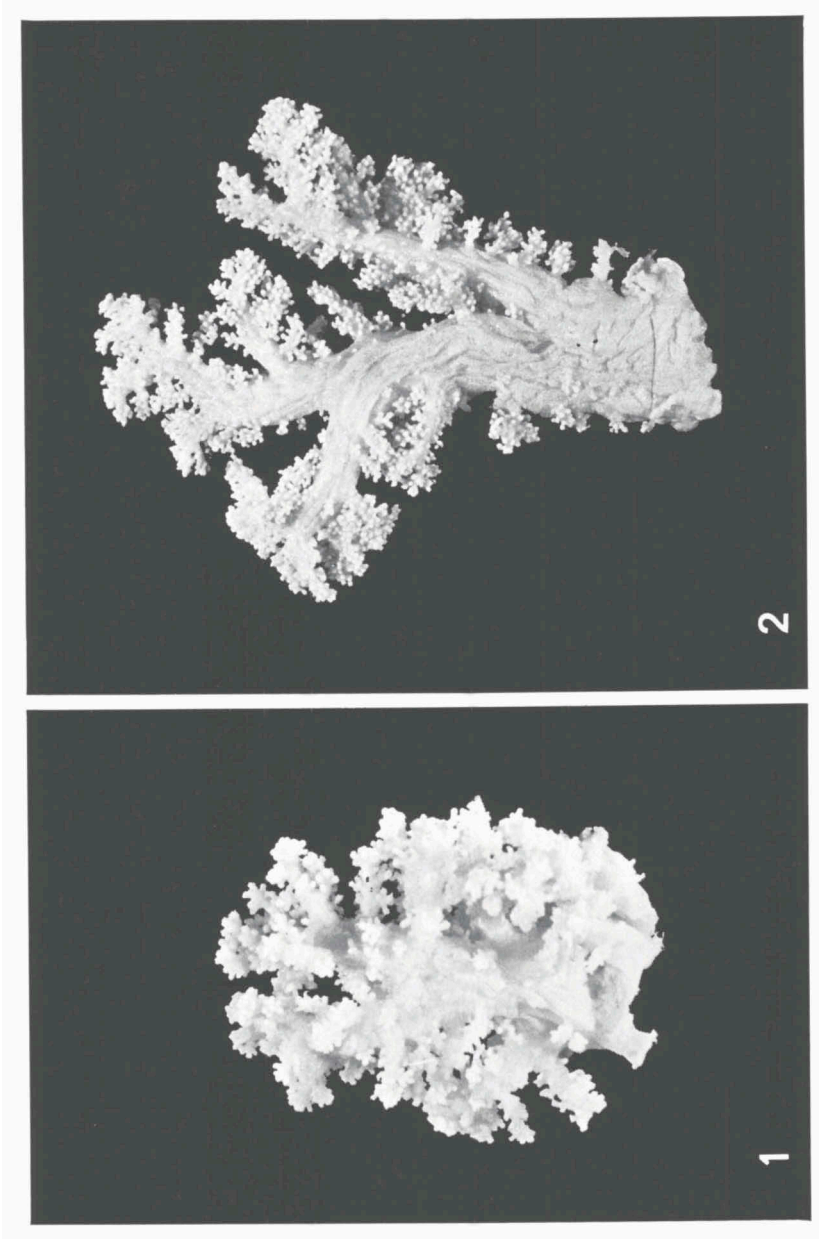


Fig. 1. *Sarcophyton gemmatum* sp. nov., paratype, Sharm esh Sheikh, RMNH Coel. no. 12295, side-view; in the middle, close to the upper side of the colony, two buds are visible; × 1.5.

Figs. 2, 3. *Stereonephthya imbricans* Thomson & Dean, Gordon Reef, Strait of Tiran. 2, NS 13293. 3, RMNH Coel. no. 12298. Both × 1.



Figs. 1, 2. *Sarcophyton pauciplicatum* sp. nov., holotype, Sharm esh Sheikh, seen from different sides, NS 13287; × 1.



Figs. 1, 2. *Scleronephthya lewinsohni* sp. nov., Gordon Reef, Strait of Tiran. 1, holotype, NS 13278a. 2, paratype, RMNH Coel. no. 12297. Both × 1.