

***Eleutherobia unicolor* (Kükenthal, 1906)**
(figs. 22a, b; 32c; 39)

Nidalia unicolor Kükenthal, 1906a: 34; 1906b: 26-27, figs. 15-17, pl. 1 fig. 4.

Bellonella unicolor: Utinomi, 1957: 153-156, figs. 3, 4, pl. 9 figs. 3, 4; 1962: 106 (listed only). — Song, 1976: 54-55, pl. 1 figs. 18-25. — Imahara, 1977: 33.

Material. — Hakodate, Japan, leg. Hilgendorf, 1906; MZW 51, one colony, lectotype.

Description of the lectotype. — The straight, rigid colony is 28 mm in height, of which 10 to 13 mm is occupied by stalk (figs. 22a, 32c). The latter is over 4 mm wide; it is grooved longitudinally. On one side the base is expanded.

The polyparium is 15 mm high and on an average 7 mm wide including calyces. The anthocodiae are completely retracted into the calyces, which project obliquely upwards. Their tops are eight lobed and slightly over 1.50 mm wide; the interval between the apertures of the calyces is 3 to 4 mm. Proximally the calyces widen; they project about 1 mm above the surface of the polyparium.

The anthocodial armature is a crown with points consisting of thorny spindles on an average 0.35 mm long and 0.05 mm wide (fig. 22b). The crown is about 6-8 rows deep. Each point consists of 8-10 pairs of straight spicules arranged *en chevron*. The introvert contains many spiny spindles 0.08 to 0.14 mm long. In both crown and points the spicules lie close together. Utinomi's (1957) fig. 3a gives the impression that the spindles in crown and points are small and loosely arranged, but this is not the case in the colony investigated now.

The calyx wall consists of two thin layers. The outermost one contains capstans and ovals. The capstans, often 8-radiates, are 0.06 to 0.08 mm long (fig. 39a-d). Larger ones develop into oval bodies, 0.07 to 0.11 mm long. Still larger sclerites have fewer, more distant prominences. In the layer directly under the outermost one and in the interior of the polyparium (in the thin canal walls) there are spiny spindles up to 0.35 mm long (fig. 39e, f). The sclerites in the surface layer of the stalk do not differ much from those in the capitulum (fig. 39g-i). In the interior of the stalk there are spindles up to 0.32 mm long, and numerous more or less flattened, wide sclerites with relatively few but long prominences (fig. 39j-s). The length of these sclerites varies from 0.13 to 0.25 mm.

Colour. — In alcohol the colony is brownish.

Geographical distribution. — Japan.

Genus *Inflatocalyx* gen. nov.

Diagnosis. — Alcyoniidae with cylindrical, unbranched polyparium. Polyps monomorphic; anthocodiae retractile within large, inflated calyces. Spindles nearly smooth, very sparsely distributed throughout most parts of the colony.

Type species. — *Inflatocalyx infirmata* spec. nov., here designated.

Inflatocalyx infirmata spec. nov.

(figs. 40, 41)

Material. — South Orkney Islands: 60°22'S, 46°50'W, 293-403 m, U.S. Antarctic Research Program, USNS Eltanin Sta.1084, 15 April 1964; USNM 76998, 1 colony (holotype), USNM 77000, 3 colonies (paratypes), RMNH Coel. 17423, 1 colony (paratype); South of South Orkney Islands: 62°06'S, 45°08'W, 485-489 m, U.S. Antarctic Research Program, USNS Eltanin Sta.499, 20 February 1963; USNM 76999, a smaller colony.

Description of the holotype. — The colony is curved, finger-shaped, 70 mm high and 20 mm wide at the widest part, including calyces (fig. 40b). The outside is thin and membranous but stiff. The interior of the colony is filled with wide canals separated by thin walls.

The calyces are relatively large, appearing inflated. They are directed upward, nearly parallel to the long axis of the colony; they are 1.50 mm high measured on the adcauline side, but on the abcauline side they form ridges of different lengths; they are about 2.50 mm wide near the middle. In a longitudinal direction they are fairly widely spaced: the distance between the opening of one calyx and that of a calyx lying obliquely under it varies from 7 to 15 mm.

Usually the anthocodiae are completely retracted within the calyces, but in some cases the tentacles project and in others the complete anthocodia is extended so that even the introvert projects above the edge of the calyx; the latter condition is shown in fig. 41. The anthocodiae proper (excluding tentacles and introvert) are 2.00-2.20 mm long and 2.00 mm wide. The armature consists of an indistinct crown and 8 points. The crown contains groups or bundles of spindles, irregularly arranged so that the number of rows cannot be determined. Each point consists of numerous spindles, sometimes arranged *en chevron* in the proximal part, longitudinally in the distal part. All these sclerites are straight or slightly curved spindles 0.25-0.50 mm long, nearly smooth or covered with small tubercles.

When extended the tentacles reach a length of about 2.50 mm. They have on the average 14 slender pinnules on each side. Sclerites are absent from the tentacles.

- 5(2) Polyps dimorphic; capitulum dome-like, simple or divided into a few rounded lobes *Nidaliopsis* Kükenthal, 1906
- 6(1) Colonies reaching moderate to large size, always tree-like.
- 7(8) Polyps clustered at the ends of terminal branchlets, absent from surface of trunk and main branches
..... *Siphonogorgia* Kölliker, 1874
- 8(7) Polyps scattered on trunk and main branches as well as at ends of terminal branchlets *Chironophthya* Studer, 1887

Genus *Nidalia* Gray, 1835

Nidalia Gray, 1835: 59. — Kükenthal, 1906a: 30(part). — Deichmann, 1936: 55. — Utinomi, 1958: 101-118 passim. [Type species, *Nidalia occidentalis* Gray, 1835, by monotypy.]
Cactogorgia Simpson, 1907: 829. — Utinomi, 1958: 101-118, passim.

Diagnosis. — Nidaliidae with unbranched, occasionally weakly subdivided colonies, consisting of a bare stalk and a hemispherical, dome-shaped, digitiform, or compressed lobate polyparium. Polyps monomorphic; anthocodiae thin-walled and fully retractile within firm, projecting calyces (i.e., the anthosteles). Coenenchymal sclerites stout, reaching lengths of more than 1 mm.

Remarks. — Kükenthal's (1906a: 27) diagnosis of the genus *Nidalia* states: "Kolonie unverzweigt, selten gespalten", which means that it may be "cleft" or "split", evidently in reference to Gray's original specimen, which has two capitula (Gray, 1857: 129, pl. 7). This is not the same as "branched", which implies a tree-like form with numerous branches.

The validity of the genus *Cactogorgia* Simpson, 1907. — Simpson (1907) established the genus *Cactogorgia*. In conformity with the classification of Wright & Studer (1889) he assigned it to the family Nephthyidae, subfamily Siphonogorgiinae. In his "Revision of the genera *Nidalia* and *Bellonella*", Utinomi (1958) rightly referred it to the family Nidaliidae Gray, 1869, and to the subfamily Nidaliinae.

According to Simpson (1907: 829) the genus *Cactogorgia* differs from the allied genera *Chironophthya* and *Siphonogorgia* in the following respects: (1) The colony is much more densely spiculate, firm and rigid; (2) There is a marked distinction between trunk and polyp-bearing portion; (3) There is no definite branching, but the polyps are borne mainly on the margin of flattened lobes. The third character has been entirely ignored or disregarded by later authors, first by Thomson & Mackinnon (1910: 196). They described *Cactogorgia lampas*, a new species with a dome-shaped capitulum covered with calyces but mentioned nothing about the absence of flattened lobes in their

- 9(10) Length of coenenchymal sclerites up to 2 mm; ratio of length to width about 6: 1 *N. occidentalis* Gray
- 10(9) Length of coenenchymal sclerites up to 5 mm; ratio of length to width about 4: 1 *N. deichmannae* Utinomi
- 11(8) Colony torch-like, with a dome-shaped polyparium not distinctly projecting beyond the stalk; introvert with numerous small dumb-bells *N. simpsoni* (Thomson & Dean)
- 12(7) Crown more than 20 rows deep.
- 13(14) Colony torch-like, with dome-shaped polyparium; introvert densely filled with sclerites up to 0.5 mm long; coenenchymal sclerites up to 1 mm in length *N. dissidens* spec. nov.
- 14(13) Colony with wide, spherical or hemispherical capitulum; coenenchymal sclerites more than 2 mm long.
- 15(16) Calyces 5 mm high; no sclerites in introvert; spicules of anthocodial points widen distally; coenenchymal sclerites ornamented with large, branched warts *N. agariciformis* (Simpson)
- 16(15) Calyces 1.20 mm high; numerous red sclerites in basal part of introvert; spicules of anthocodial points are slender spindles; coenenchymal spindles covered with low, blunt thorns and small tubercles ...
..... *N. rubripunctata* spec. nov.
- 17(1) Polyparium laterally flattened; polyps situated mainly on the margins of the flat lobes.
- 18(19) Anthocodial points composed of one or two pairs of spindles, occasionally with one or two intermediates ... *N. celosioides* (Simpson)
- 19(18) Anthocodial points composed of 6-8 pairs of sclerites, or 10-15 spindles, roughly *en chevron* or irregularly arranged.
- 20(21) Crown 8 rows deep; each point composed of 6-8 pairs of spindles that increase in size from the base upward; anthocodiae measure 1.50×1.00 mm *N. expansa* (Simpson)
- 21(20) Crown 10-14 rows deep; each point composed of 10-15 spindles disposed irregularly or indistinctly *en chevron*; anthocodiae measure $3.00-4.50 \times 2.00$ mm *N. alciformis* (Simpson)

Nidalia agariciformis (Simpson, 1910)
(figs. 42a, 43)

Cactogorgia agariciformis Simpson, 1910: 324-326, one plate, figs. 1-7.

Material. — Simpson's holotype; no data. Royal Scottish Museum, no number.

Description. — Fig. 42a shows the colony at natural size. The calyces are truncated cones, 5 mm high and 3.00 to 3.50 mm wide at the base.

All anthocodiae are retracted within the calyces. In order to avoid excessive damage to the specimen, we opened only two calyces. The two oval anthocodiae differed distinctly in size. The larger one was 2.80 mm in length and 2.40 mm in width; the smaller one was 1.40 mm in length and in width.

The crown sclerites are slightly curved, practically smooth spindles up to 1.30 mm long and 0.14 mm wide. The point spicules vary in length from 0.70 to 1.30 mm. Their proximal part is thinner and smooth; distally they are wider, up to 0.14 mm, and covered with minute thorns. The infolded tentacles are 2.40 mm long (in the small anthocodiae 1.70 mm); the thin distal part is always turned back hook-shaped. The rachis is consolidated by numerous, densely packed, small sclerites, arranged *en chevron*. Most are smooth rods, basally up to 0.35 mm long; more distally they are shorter, 0.10 to 0.15 mm, in the distal point 0.04 to 0.10 mm. In the middle part of the tentacle there are also short sclerites, 0.08 mm long, with a median constriction. The introvert lacks sclerites.

In the calyces and in the surface layer of the stalk the majority of the spicules is formed by pointed, more or less curved spindles up to 2.80 mm long and 0.47 mm wide (fig. 43a, b). Especially the large sclerites bear crowded, relatively high, branched warts (fig. 43j). In addition to the large spindles mentioned, the surface layer of the stalk contains many small, narrow spindles, 0.30 to 0.55 mm long, and covered with low thorns (fig. 43c-i).

In the interior of the stalk some spindles may be longer, up to 3.40 mm. Irregular forms such as depicted by Simpson (1910: fig. 4) are scarce.

Colour. — Light greyish brown in alcohol.

Geographical distribution. — Unknown.

***Nidalia alciformis* (Simpson, 1907)**
(fig. 47c)

Cactogorgia alciformis Simpson, 1907: 834-835, figs. 4, 5, 6a-c. — Thomson & Simpson, 1909: 148-149, pl. 7 figs. 4-6.

Material. — China Sea, leg. Schneehagen, ZMH C2515, one specimen. Indian Ocean, littoral, R.I.M.S.S. Investigator. BMNH 1933.3.13.85, small piece of polyparium, paratype, Sir J. A. Thomson coll. Another label reads "schizoparatype, L.M.I. Macfadyen, 1952".

The specimen from the China Sea (ZMH C2515) to our knowledge constitutes the first record of this species since Simpson's original publication (1907). The shape of the colony (fig. 47c), with its flat capitulum and arrangement of the polyps mainly on the margin, is typical. Simpson's description of the type specimen is so distinct that a full description of the present specimen would be superfluous. The hard colony is 48 mm tall, with the stalk occupying 25 mm. The stalk is narrowest just above the base, where it is 4 mm wide, distally widening to 8 mm. The capitulum is flattened laterally, 5 mm thick in the middle, but 7-9 mm along the margins where the polyps are concentrated; its greatest diameter is 25 mm.

To Simpson's description of the polyps and sclerites we add that in the introvert there are many sclerites that resemble those in the tentacles: scales up to 0.12 mm long, with a median constriction. For the rest we refer to Simpson's description.

Geographical distribution. — Bay of Bengal: Andaman Islands, Arakan coast; China Sea.

***Nidalia borongaensis* spec. nov.**
(figs. 42b, c, 44, 46a)

Material. — R/V Anton Braun, Sta. I-47B, 19°50'N., 92°55'E., (somewhere off Boronga Is., Bay of Bengal), depth 22-30 m, 5 April 1963; two colonies, the widest one the holotype, USNM 77002; the other the paratype, RMNH Coel.17424.

Description of the holotype. — The height of the colony is 20 mm; seen from above the capitulum is 10 × 15 mm wide (fig. 42b). The calyces are about 1.75 mm high, but in many cases they merge together, so that the height cannot be ascertained.

The polyps are completely retracted within the calyces. The anthocodial crown consists of five to seven rows of horizontally disposed, curved spindles, up to 1.25 mm long and 0.08 to 0.16 mm wide (figs. 44e, f, 46a). The point

spicules are wide spindles, straight or curved, usually two or three in a row; the length is up to 1.30 mm, the width is 0.15 to 0.20 mm (fig. 44a-d). Both crown and point sclerites are covered with good-sized thorns.

In the rachis of the tentacles there are chevroned, spiny rods, 0.15 to 0.20 mm long (fig. 44g-k). The pinnules contain rods, 0.09 mm long, and scales with a median constriction and less than 0.05 mm long (fig. 44l-o).

The introvert is densely filled with scales and rods. Distally, just under the crown, they are small ovals, 0.025 to 0.040 mm long; proximally they are rod-shaped, measuring 0.10 mm and more in length (fig. 44p-s).

The sclerites in the calyces and in the surface layer of the stalk are straight or more or less crooked, usually unbranched spindles and rods, up to 2.20 mm long and 0.37 mm wide (fig. 44t, u). They bear closely set, crenellated warts. The sclerites in the interior of the stalk are pointed spindles with the same length as those in the surface layer, but they are narrower, up to 0.30 mm.

Colour. — In alcohol the colony is light yellowish brown.

Variation. — The paratype has the same height as the holotype, but it is narrower (fig. 42c).

Remarks. — The new species is characterized by the numerous small sclerites in the introvert, the shortness of the crown (five to seven rows), the length and width of the anthocodial sclerites and the ornamentation of the latter (densely placed high thorns).

Geographical distribution. — Bay of Bengal.

***Nidalia celosioides* (Simpson, 1907)**

Cactogorgia celosioides Simpson, 1907: 830-832, one plate — figs. 1-3c.

Remarks. — The type-specimen has not been located, but may be in the Indian Museum, Calcutta. In the British Museum (Natural History) there is a bottle containing two small pieces bearing labels that read: "*Cactogorgia celosioides* Simpson, 1933.3.13.89, Investigator, Andamans, paratype, Sir J. A. Thomson coll.", and "Investigator, Andamans, schizocotype". The two fragments are too small to provide any useful information, so we must depend upon Simpson's (1907) original description for the time being.

***Nidalia deichmannae* Utinomi, 1954**
(figs. 45, 47a)

Nidalia rigida Deichmann, 1936: 57-58, pl. 4 fig. 4. — Bayer, 1961: 53 (in Key).

Not *Nidalia rigida* (Pütter); Kükenthal, 1906a: 33.

Nidalia deichmannae Utinomi; 1954: 43, footnote 3.

Material. — Cuba, off Havana: 23°10'54"N, 82°18'00"W, depth 230 fms (= 421m), 17 January 1885, R/V Albatross Sta.2321; USNM 10835, one specimen. Off Texas: 27°02'N, 96°40'W, 4 February 1939, R/V Pelican; USNM 49682, one specimen. Off Barbados, Windward Islands: 13°02'N, 59°34'W, depth 110-135 fms (= 201-247 m), 20 September 1964, R/V Oregon Sta.5015; USNM 53931, one specimen. Discovery Bay, Jamaica: Nekton Gamma, Sta.N-244d, August-September 1972; USNM 54843, one specimen.

Remarks. — The colonies closely resemble those of *N. occidentalis* (see fig. 47a, b). The main difference is the shape and especially the size of the sclerites. Both Deichmann (1936) and Bayer (1961) correctly stated that the ratio length: diameter of the sclerites in *N. occidentalis* is 6 : 1, in *N. deichmannae* 4 : 1. The difference in spiculation between the two species is shown in fig. 45. The big sclerites are flattened laterally. Examination of such sclerites by scanning electron microscope shows that they are commonly the result of fusion of adjacent sclerites, producing exceptionally large and irregular shapes.

The presence of numerous small, oval and rod-shaped sclerites (0.03-0.05 mm long), sometimes with a median constriction, in the distal part of the introvert in some (many?) specimens of *N. deichmannae* is a less distinct difference from *N. occidentalis*, as a few of these small sclerites may be present in some specimens of that species as well.

When *Bellonella rigida* Pütter, 1900, was transferred to the genus *Nidalia* by Kükenthal (1906a: 33), *Nidalia rigida* Deichmann, 1936, became a junior secondary homonym and was renamed *Nidalia deichmannae* by Utinomi (1954: 43, footnote 3). Article 59(b) of the International Code of Zoological Nomenclature now in force (Third Edition, 1985) provides that secondary homonyms rejected and renamed before 1961 are permanently rejected unless use of the replacement name is a cause of confusion. As far as we can determine, there has been only one use of *N. rigida* Deichman since its original publication (Bayer, 1961: 53, in key only). Therefore, use of the replacement name can hardly be a cause of confusion, so we here adopt the new name proposed by Utinomi.

Later, Utinomi (1958: 105) was of the opinion that *N. occidentalis* and *N. deichmannae* are conspecific: "the two are so alike each other that it is not possible to separate them from each other specifically". It is doubtful whether

Utinomi would have retained this standpoint if he had an opportunity to see and study any samples of *N. deichmannae*. It must be admitted that the points of resemblance are so numerous that it is far from easy to make a decision. Nevertheless the present authors hold the view that both species are valid.

Geographical distribution. — West Indian Region.

***Nidalia dissidens* spcc. nov.**

(figs. 47d, 48, 49)

Material. — Bahamas, Santaren Channel: 23°37'N, 79°24'W, 529-543 m. Gerda Sta. 1016, 15 June 1968; USNM 54855, one colony, the holotype; second specimen, USNM 77278, paratype; 23°34'N, 79°17'W, 525-516m. R/V Gerda Sta. G-1015, 15 June 1968. USNM 54854, one colony, paratype. Straits of Florida: 25°07'N, 79°15'W, 549m. M/V Combat Sta. 447, 23 July 1957. USNM 54855, one colony, paratype. Lesser Antilles, north of Anguilla: 18°26.4'N, 60°12.6'W, 393-451 m. R/V Pillsbury Sta. P-984, 22 July 1969. USNM 55202, 4 colonies, paratypes.

Description. — The holotype colony has a total height of 30 mm. It consists of a stalk and a capitulum. The unbranched stalk is 20 mm high. At a height of 7 mm it is narrowest, 6 to 7 mm. Distally and proximally it widens funnel-wise, proximally it has a basal expansion (fig. 47d).

Seen from above the capitulum is oval in shape; the diameters are 17 and 10 mm. It is slightly convex and bears closely set polyps (fig. 48a). Each polyp has a low calyx with an eight-lobed edge. The anthocodia projects above the calyx for a distance of 4 to 7 mm; the width is on an average 2.50 mm. The introvert is retracted within the fold between anthocodia and calyx. It is densely filled with straight or curved spindles and rods, up to 0.50 mm long (fig. 48b, c). It is noteworthy that these spicules often form small, randomly scattered groups of parallel spindles (fig. 48d).

The anthocodiae are armed with crown and points. The crown is exceptionally long (fig. 48b). It is composed of about twenty to thirty rows of weakly curved spindles, up to 1.20 mm long. Each point consists of a number of straight or curved slender spindles, up to 1.30 mm long (fig. 48b, c). Proximally they are arranged *en chevron*, ten to twelve in a row; distally they lie parallel to each other. Between these points there are eight intermediate points, each consisting of a few spicules, which are shorter and narrower than those in the principal points. Broch (1939: 7) found the same condition in *Clavularia* (?) *diademata* Broch, 1939. He called them primary and secondary points. The sclerites in the latter can be considered intermediates (see Bayer et al., 1983: 8).

The tentacles, about 2 mm long, are for the greater part retracted within the

anthocodiae. They are densely filled with sclerites. Those in the basal part of the tentacle rachis are relatively wide, curved, thorny rods, 0.60 mm long. More distally and laterally the sclerites are shorter and thinner; the pinnules contain numerous tiny rods (fig. 49 l, n).

The calyces and surface layer of the stalk contain spindles and rods, up to 1.20 mm long. They are covered with irregular spines and thorns (fig. 49a-d). The canal-walls in the interior of the stalk are thin membranes; they contain few, slender spindles with low, often truncated thorns; they measure up to 1 mm in length (fig. 49e-g).

Colour. — In alcohol the colony is creamy white.

Remarks. — The species differs from all known *Nidalia* species in having an introvert densely filled with interlacing rods and spindles, whereas in some (all?) other *Nidalia* species the introvert contains (some) scales and/or minute dumb-bells. We think this difference is insufficient ground for establishing a new genus.

Etymology. — The specific name *dissidens* refers to the different spiculation of the introvert.

Geographical distribution. — Straits of Florida; Bahamas; Lesser Antilles.

***Nidalia expansa* (Simpson, 1907)**

Cactogorgia expansa Simpson, 1907: 830, 833, one plate, figs. 7-9c.

Remarks. — The depository of the type specimen is unknown, but is probably the Indian Museum. No material has been available for study, so the original description must suffice for the present.

***Nidalia lampas* (Thomson & Mackinnon, 1910) (figs. 42d, 46c, d, 50)**

Cactogorgia lampas Thomson & Mackinnon, 1910: 196, pl. 11, fig. 6, pl. 13, fig. 16. — Thomson & Dean, 1931: 183, pl. 3 figs. 3, 5.

Not *Cactogorgia lampas*; Thomson & Dean, 1931: 183, pl. 6 fig. 10.

Not *Nidalia lampas*?; Bayer, 1974: 258-261, fig. 1A-F, pl. 2E.

Material. — Seychelles: depth 37 fms (=68 m); BMNH 1912.2.24.57; one colony the holotype. Kei Islands: 5°36.5'S., 132°55.2'E., depth 90 m, sand, coral and shells; Siboga Expedition, Sta.260, 16/18 December 1899; ZMA Coel.2275, two specimens.

Description of the holotype. — The specimen is excellently represented by Thomson & Mackinnon, pl. 11 fig. 6. Unfortunately, the short branch is now broken off (fig. 42d). Distally the stalk widens funnel-shaped, forming the

torch-like capitulum. Many polyps are not retracted. The dimensions of the anthocodiae are 2.35-2.50 × 1.75-2.00 mm. The crown consists of six to seven rows of horizontal spindles (fig. 46c). Each point is formed of two or three pairs of chevroned, curved, weakly thorned spindles, up to 1 mm long. There are no sclerites in the introvert.

The sclerites in the calyces and in the surface layer of the stalk may be straight, but often they are irregularly curved and elaborately branched (fig. 50). The length is up to 2.25 mm, the width may be up to 0.35 mm. The prominences are high, rough warts.

Variation. — One of the specimens collected by the Siboga Expedition, Sta.260, is too small to justify investigation. In the other colony the number of transverse rows in the crown is six to eight or seven to ten (fig. 46d). As in the holotype, the introvert is destitute of sclerites, but unlike the holotype the coenenchymal sclerites are unbranched. Now the question arises whether this difference justifies the creation of a new species. In our opinion it does not. In other octocorals we sometimes see the same phenomenon, e.g. in *Sarcophyton glaucum* and in *Simularia polydactyla*.

Remarks. — The specimen collected by the Siboga Expedition, Sta.164, which was included within *Cactogorgia lampas* by Thomson & Dean, 1931: 183, must be referred to *N. simpsoni* (see p. 61), as is also the case with Bayer's *N. lampas*? (Bayer, 1974: 258).

Geographical distribution. — Seychelles; Indonesian waters.

***Nidalia macrospina* (Kükenthal, 1906)**
(fig. 42j, k, 46b, 51)

Nidalia macrospina Kükenthal, 1906a: 34-35; 1906b: 30-31, figs. 23, 24; pl. 2 figs. 11, 12. — Thomson & Dean, 1931: 35, pl. 8 fig. 7.

Bellonella macrospina, Utinomi, 1957: 162-164, fig. 7, pl. 10 fig. 10; 1958b: 100 (listed); 1960a: 5; 1962: 106 (listed). — Utinomi & Harada, 1958: 388 (listed).

Bellonella sibogae Utinomi, 1957: 164-165, fig. 8, pl. 10 fig. 11.

Material. — Banda Sea, vicinity of Kai Islands: 5°28.4'S, 132°0.2'E, depth 203 m, hard coral sand; Siboga Exped., Sta.251, 8 December 1899. ZMA Coel.2974, one specimen. Arabian Sea, off Gujarat State: 20°23'-43.8'N, 70°00'-17.2'E, depth 43 m, R/V Anton Bruun, Sta.206A; 15 November 1963; USNM 60236; several colonies, of which a few are kept in RMNH, Coel.17425; USNM 60241, one branched colony. ?China Sea. ZMH C1719, one specimen.

Description of specimen SMH C1719 (fig. 42k). — The label with the coral reads: "*Nidalia (Bellonella) macrospina*; Itzerodt d; Pfeffer; Kuckenthal 1917; ? China Sea." Although Kükenthal's name is misspelled, it seems possi-

ble that Kükenthal himself identified the specimen in 1917; the name *macrospina* was also misspelled.

The small, slender colony measures 30 mm in height; the stalk is short, 4 to 8 mm high. It is attached to a shell. The calyces are rather far apart, in the shape of truncated cones projecting obliquely upwards. The abcauline side is on an average 3 mm high, the adcauline side 1.25 to 1.40 mm. All anthocodiae are completely retracted.

The crown is five to six rows deep; the sclerites are nearly smooth, up to 0.45 mm long. The eight points consist of six to eight pairs of chevroned, smooth sclerites, up to 0.45 mm long and 0.03 to 0.04 mm wide. The tentacles could not be investigated. There are no sclerites in the introvert.

The sclerites in the surface layer of the colony are up to 3.50 mm long; Kükenthal (1906b) and Utinomi (1957) report lengths of 6 and 5 mm respectively. Some spindles are bifurcated at one end. The prominences, which are rather widely spaced, are very small, low, truncated thorns and tiny warts 0.015 to 0.025 mm in diameter. Kükenthal's (1906b) fig. 23 on the right probably creates the impression that the prominences are densely placed and stretched in a transverse direction, but in our specimen they are small in all directions; sometimes they are arranged in transverse rows. In Kükenthal's (1906b) pl. 2 fig. 11 a number of pointed spindles project far beyond the surface of the stalk as they do in the colony described above.

Colour. — In alcohol the colony is brick-red; the retracted anthocodiae are white.

Variation. — The specimen ZMA Coel.2974 is illustrated by Thomson & Dean, 1931, pl. 8 fig. 7. The imbricate calyces are tubular or conical; they project obliquely upwards. On the abcauline side the height is 4 to 7 mm, on the adcauline side 2 to 4 mm. The sclerites in the calyces are spindles up to 3.20 mm long and 0.50 mm wide; they are covered with small, low, often crenellate warts.

The anthocodial crown is five to six rows deep; the length of the sclerites is up to 0.95 mm (fig. 46b). The points consist of smooth, curved spindles, 0.80 to 1.20 mm long and 0.07 to 0.08 mm wide, hence larger than those in the specimen described above. The tentacles have smooth rods 0.20 mm long.

The surface layer of the polyparium of specimen ZMH C1719 contains spindles up to 4.40 mm long; in the base they are up to 3.40 mm long and 0.65 mm wide; a few are bifurcated at one end (fig. 51). The small, crenellate warts are often elongated in a transverse direction. In the interior of the colony the membranous canal walls have very few sclerites.

Colour. — The colony is not light brown as stated by Thomson & Dean (1931), but light grey.

The specimens from the Arabian Sea (USNM 60236) are small, the largest 30 mm in height (fig. 42j). All are brick-red in colour.

The other specimen from the Arabian Sea (USNM 60241) is 45 mm high; it has two side branches, 10 to 15 mm long. The colour is grey to light brown.

Remarks. — The question arises whether Utinomi (1957: 165) was correct in referring Thomson & Dean's *Siboga* specimen described above to his new species *Bellonella sibogae*. We think he was, for the differences, are rather small. But it is quite a different question whether his new species was justified. It is not clear that *B. sibogae* is sufficiently different from *N. macrospina* (Kükenthal 1906a, 1906b; Utinomi, 1957) and from the specimen in the Hamburg Museum (ZMH C1719) described here to permit separation.

Although the specimens show some differences in anthocodial armature, they also have important points of similarity, including the number of rows of sclerites in the crown, absence of sclerites from the introvert, length of sclerites of the calyces and surface layer of polyparium and stalk, and the paucity of sclerites in the interior of the colonies, as well as the length of stalk and relative height of the calyces. These similarities are sufficiently strong evidence that the specimens belong to one species, *N. macrospina*, of which *Bellonella sibogae* Utinomi is a junior synonym.

Geographical distribution. — Japan, Indonesia, Arabian Sea.

***Nidalia occidentalis* Gray, 1835**
(figs. 42e-g, 45, 47b, 52, 53)

Nidalia occidentalis Gray, 1835: 59, 60; 1857: 129, pl. 7. — Deichmann, 1936: 56, 57, pl. 1 fig. 5, pl. 4 figs. 1-3. — Utinomi, 1958: 102-106, figs. 1-3. — Bayer, 1961: 53, figs. 9h, 10a-c; 1974: 258, 261, fig. 1G-I, pl. 2 fig. D. — Verseveldt, 1978: 45-47.

Material. — Several colonies from the West Indian region are kept in the National Museum of Natural History, Washington. Barbados, leg. Ehrhardt (further information is lacking); ZMH C2514; one colony.

Remarks. — After Deichmann's (1936) and Utinomi's (1958) detailed descriptions and Bayer's (1961, 1974) short remarks only a few additions need to be given.

The shape of the colony. — Usually the more or less curved or crooked stalk, which widens apically, bears a dome-shaped or mushroom-shaped capitulum, which distinctly projects beyond the stalk (see Gray, 1857, pl. 7; Bayer, 1974, pl. 2 fig. D; our figs. 42e-g, 47b). But sometimes the capitulum does not project; see Utinomi, 1958, fig. 1A. Utinomi's specimen was small; according

to the text it measured 22 mm in height, so the scale below his fig. 1A must be 5 mm.

Usually, the stalk is unbranched, but bifurcated colonies have been found; see Gray's figure, 1857, pl. 7.

The calyces and anthocodiae. — Usually the anthocodiae are completely retracted within the calyces. In this case the calyx is cone-shaped. But in case the anthocodia is protruding, the calyx is cylindrical, its mouth is open and the width of the calyx is 2.50 mm; the height is always 1.75 to 2.50 mm.

The anthocodiae are oviform (fig. 52). The dimensions vary rather considerably; the length from 1.70 to 3.00 mm, the width from 1.30 to 2.50 mm. The armature consists of crown and points. The crown is very wide; it consists of fifteen or more rows of bent spicules. In each point the proximal spicules are arranged *en chevron*, three to six or eight in each row; the distal ones lie parallel to each other. Between the points there are usually two intermediate sclerites.

The distal part of the introvert is devoid of sclerites, but proximally it is densely filled with scales, up to about 0.10 mm long.

The coenenchymal sclerites. — The spindles in the calyces, in the surface layer of the stalk and in the interior of the stalk closely resemble each other. Their ornamentation is typical. Some spicules are armed with distant small thorns, others have small truncated prominences, and still others are densely covered with complicated, often branched warts (fig. 53a-g).

Geographical distribution. — West Indian Region.

Nidalia rubripunctata spec. nov.

(figs. 54, 55)

Material. — Colombia, off Carrizal: 12°17'N, 72°15'W, depth 60-64 m; Pillsbury Sta.-P773, 29 July 1968; USNM 55205 (the holotype), 10 paratypes USNM 77001, and 4 paratypes RMNH Coel.17427; 12°05'N, 72°38.5'W, depth 79-82 m; Pillsbury Sta.P-775, 29 July 1968; USNM 55206, 4 paratypes.

Description of the holotype. — The colony (fig. 54a) has a stiff, crooked, barren stalk, 80 mm long. The width varies from 3 to 6 mm; immediately beneath the capitulum it is 8 mm wide. The capitulum is globular, 15 mm in height and width.

The calyces are truncated cones, each with a red margin (see below). They are about 1.20 mm high, the centers 3 to 4 mm apart.

Most anthocodiae project beyond the edge of the calyces (fig. 54). Often they droop, not having any support beyond from the soft introvert. At the level

of the crown the anthocodia is widest, 2 mm; the height of an anthocodia is also 2 mm. Rather striking is the number of 25 to 30 rows of spicules in the crown. These spicules are slender, pointed, nearly smooth spindles up to about 0.70 mm long and 0.03 mm wide. An anthocodial point consists on each side of two to five sclerites, which are smooth, some of them hockeystick-shaped, up to 1 mm long and 0.07 mm wide. Between each two points there are on an average three smaller intermediates.

The rachis of the tentacles is densely filled with transversely placed rods about 0.08 mm long.

The introvert is thin-walled and devoid of sclerites distally, but in the most proximal part sclerites are very crowded and conspicuous by their red colour. In retracted anthocodiae they are accumulated on the margins of the calyces. This can be easily understood by reference to "contraction" (fig. 1), which shows the base of the introvert where it joins the rim of the calyx. The sclerites are flat scales and minute rods; the former are 0.07 mm long and they often have a median waist; the latter are 0.07 to 0.16 mm long, sometimes longer, and are covered with tiny thorns (fig. 55).

The sclerites in calyces and stalk are long, narrow, pointed spindles up to 3 mm long and 0.26 mm wide. They are densely covered with low, blunt thorns, truncated cones and small, compound, irregularly shaped warts.

Colour. — The bright red specks on the margins of the calyces contrast beautifully with the white of the rest of the colony.

Variation. — The colonies observed differ among themselves only in size.

Geographical distribution. — Caribbean coast of Colombia.

***Nidalia simpsoni* (Thomson & Dean, 1931)**
(figs. 47e-g, 56, 57)

Cactogorgia simpsoni Thomson & Dean, 1931: 184, pl. 15 figs. 6, 8; pl. 27 fig. 3.

Cactogorgia lampas; Thomson & Dean, 1931: 183, pl. 3 figs. 3, 5; pl. 6 fig. 10.

Nidalia lampas; Bayer, 1974: 258, fig. 1 A-F; pl. 2 E. — Faulkner 1974: 157, pl. 19. — Faulkner & Chescher, 1979: 271, pl. 44.

Not *Cactogorgia lampas* Thomson & Mackinnon, 1910: 196, pl. 11, fig. 6; pl. 13, fig. 16. (see page 57).

Material. — Timor, south coast: 9°0.3'S, 126°24.5'E, depth 112 m, mud, sand and shells; Siboga Expedition Sta. 289, 20 January 1900; ZMA Coel.2276, one specimen, the holotype. Between Misool and Irian, Papua: 1°42.5'S, 130°47.5'E, depth 32 m, sand, small stones and shells, Siboga Expedition Sta. 164, 20 August 1899; ZMA Coel.2272, three specimens identified with *Cactogorgia lampas* by Thomson & Dean, 1931: 183. Hansa Bay, N. coast of Papua-New Guinea: depth 36 m, in mud; collected by Mrs. A. Tursch in 1979, no. Var. 50; RMNH Coel.17428, two specimens. Palau Islands: Great Reef, Baileschesengel Island, Ngemelis Islands; depth 12 m. Coll. Douglas Faulkner, 9 August 1973; USNM 58586, two specimens.

Description of the holotype. — A beautiful drawing of the colony is given by Thomson & Dean (1931, pl. 15 fig. 8). Our fig. 47e shows it at natural size. Damage visible along the margin of the capitulum is the result of necessary examination of the polyps.

Thomson & Dean's description needs some additions. The (retracted) anthocodiae are 2.80 to 3.00 mm long and 2.40 mm wide. The crown consists of 15 to 20 rows of transversely placed slender spindles, up to about 1.15 mm long (fig. 56). In general the anthocodial points are composed of three to five pairs of chevroned spindles, up to 1.50 mm long and 0.12 mm wide. Usually they are irregularly disposed; sometimes a few are longer than the others. Between the points one or two intermediates are present. In order not to damage the holotype the drawings of the anthocodial armature (fig. 56b) have been made of a polyp taken from another specimen, Siboga Expedition Sta.164.

The introvert contains numerous small sclerites: dumb-bells, smooth or with tiny prominences and 0.08 to 0.14 mm long; see Thomson & Dean, 1931: pl. 27, fig. 3, to the left. In the same part of this figure Thomson & Dean give drawings of three sclerites from the tentacles; these are curved and wide, usually still wider at one end.

The calyces, the surface layer and the interior of the stalk contain unbranched, straight or curved spindles; those in the surface layer are longest, up to 2.60 mm. The prominences are conspicuously high, often branched warts (fig. 57).

Variation. — One of the specimens (RMHN Coel.17428) from Hansa Bay, Papua-New Guinea is very small and has few polyps. The other one is a little larger; in the anthocodiae the crown consists of up to eighteen rows; the introvert has numerous small scales.

On the basis of the high number of transverse rows in the crown, together with the overall colonial form, the material from the Palau Islands reported questionably (Bayer, 1974) as *Nidalia lampas* is more realistically assigned to *Nidalia simpsoni*. It appears quite possible that the scale-like sclerites of the tentacles of *Nidalia lampas* occur also in the introvert, as they do in the Palauan material.

Colour. — Colour photographs of fully expanded colonies taken *in situ* in the Palau Islands have been published by Faulkner (1974) and Faulkner & Chesher (1979).

Geographical distribution. — Indonesian Archipelago; Palau Islands.

Genus *Nidaliopsis* Kükenthal, 1906

?*Itephirus* Koch, 1886: 3.

Nidaliopsis Kükenthal, 1906: 38. — Lüttschwager, 1915: 35. 40. [Type species, *Nidaliopsis pygmaea* Kükenthal, 1906. by monotypy].

Diagnosis. — Rather small Nidaliidae with club-shaped or cylindrical colonies; polyparium spherical, dome-shaped, or lobed, stalk unbranched. Polyps dimorphic: autozooids retractile within calyces; siphonozooids scattered or in one series between the autozooids. Coenenchymal sclerites wide spindles and ovals, densely covered with warts; thorn-clubs may be present in the surface layer.

Nidaliopsis alta (Tixier-Durivault, 1955)
(figs. 58, 59)

Alcyonium altum Tixier-Durivault, 1955: 199-204, figs. 1-3; 1961: 230, fig. 1.
?*Itephirus speciosus* Koch, 1886: 3-4, pl. 1 figs. 1-2.

Material. — West Africa: off the lighthouse of Cabinda, 7°05'N, 12°00'W, 8-10 miles from Sierra Leona; R/V Mercator, cruise 14, 15 January 1938; IRSN, seven dried colonies. Seven miles W. of Luanda, Angola: 5°10'S, 12°E, depth 30 m; Cruise "Atlantique Sud", Sta.159, 24 March 1949; SMF, many specimens. Off Ivory Coast west of Abidjan: 5°05'N, 4°59.5'W, depth 22 m; R/V Pillsbury, Sta.48, 31 May 1964; USNM 76990, many specimens. Côte d'Ivoire, region of Abidjan, off Port Bouet and Grandbassam, depth 32-37 m; 28 May 1969; "Reine Pokou" ORSTOM, SMF 4943, many specimens; RMNH Coel.17430, 6 specimens.

Description. — According to a label added to the dried colonies collected by the R/V Mercator 15 January 1938, these colonies are "type"; they differ from "type a" and "paratype b" mentioned by Tixier-Durivault, 1955: 203, 204.

The colonies consist of a stalk and a polyparium. The stalk may be long and pointed, measuring up to about 40 mm in length (fig. 58a, d, g-i), or short, cylindrical or slightly tapering basally (fig. 58b, c, e, f, j, k). The lowermost part of the stalk is often dirty black, having apparently been buried in mud. Distally the stalk merges with the polyparium without a sharp boundary.

The polyparium is usually branched and consists of some lobes, but in the colony represented in fig. 58i the polyparium is unbranched, fingerlike. In young colonies the capitulum is also unbranched (fig. 58c, f, j, k). The polyparium is covered with calyces, which are cylindrical or conical with blunt apices. Their height is up to 1.60 mm; on the abaxial side of the marginal calyces the height is up to 2.50 mm. Owing to these high calyces the capitulum has a spiny appearance. At the base the calyces are 1.60 mm wide.

Superficially the polyps seem to be of one kind, but on closer examination

they appear to be dimorphic. The autozooids are completely retracted into the calyces. Only in their distalmost part the anthocodiae contain some curved, often chevroned spindles and clubs, 0.16 to 0.40 mm long. The siphonozooids are invisible to the naked eye, but in sections they are conspicuous on account of the siphonoglyphs with their thick epithelium and long cilia; they resemble the siphonoglyphs represented by Kükenthal, 1906a, pl. 6 fig. 29.

The calyces consist of weakly curved, slender spindles placed parallel to each other, up to 1.00 mm, rarely 1.30 mm in length (fig. 59a-c). They are ornamented with truncated or rounded, slightly wart-like prominences. In the interior of the polyparium the same kind of sclerites occur, but they are shorter and wider.

In the surface layer and in the interior of the stalk the sclerites are short, wide ovals or spindles, sometimes lozenge or irregularly shaped, and 0.30 to 0.60 mm long. They are densely covered with rounded, wart-like prominences (fig. 59l-t).

Colour. — From creamy white to reddish violet (in alcohol).

Discussion. — Tixier-Durivault (1955, fig. 1) figured two colonies of her *Alcyonium alta*; fig. 1a represents the holotype, fig. 1b one of the paratypes. In both drawings the calyces look like low hillocks, which is incorrect and deceptive. In 1961, fig. 1, Tixier-Durivault gave a much better drawing of a specimen from Cameroon.

The collection from Pillsbury station 48 contains also many shorter, more or less cylindrical specimens. The smaller ones of this type, 9 to 20 mm high, strikingly resemble Koch's colonies of *Itephitrus speciosus* (see his pl. 1 figs. 1. 2a-c). It is noteworthy that Koch's specimens also have long spindles, 1.5 to 2 mm. In the polyparium of *N. alta*, however, they are shorter, rarely up to 1.30 mm. In our opinion this difference is not of crucial importance in separating *I. speciosus* from *N. alta*, but the hollow stalk into which the polyps open, as W. Koch apparently observed, cannot be explained.

In conclusion, the synonymy of *I. speciosus* and *N. alta* seems not unlikely but cannot be confirmed, as Koch's type series kept in ZMH was destroyed during World War II (information from Dr. M. Grasshoff, SMF, in litt.).

The sample from Pillsbury station 48 is interesting for yet another reason. In this sample there are small, young specimens as well as larger, apparently mature colonies. The young ones have a cylindrical stalk and an unbranched capitulum (fig. 58c, f, j, k). If at an early stage in their development they find a tiny stone or something else to attach themselves to, they form a holdfast and remain more or less cylindrical (fig. 58b). Otherwise the stalk develops in the mud and terminates in a point (fig. 58a, g). But sometimes the growing stalk encounters some object in the mud at a later stage, in which case it does form a

holdfast after all (fig. 58d, h, i). Consequently, the form of the colony, with either a long or short, pointed or bluntly ending stalk, and with a branched (in older colonies) or an unbranched polyparium is of no taxonomic significance.

Geographical distribution. — Tropical west coast of Africa.

***Nidaliopsis violacea* Tixier-Durivault, 1955)**

(figs. 60, 61)

Alcyonium violaceum Tixier-Durivault, 1955: 242-246, figs. 34-36.

Metcalcyonium violaceum; Tixier-Durivault, 1961: 238-239.

Material. — West coast of Africa: Off Ghana: 4°40'N, 2°00'W — 4°39'N, 2°02'W, depth 49-53 m, R/V Pillsbury, Sta.28, 28 May 1964; USNM 76991, two small colonies. Off Ivory Coast west of Abidjan: 5°05'N, 4°59.5'W, depth 22 m; R/V Pillsbury, Sta.48, 31 May 1964; USNM 76992, one specimen. Off Ivory Coast: 4°45'N, 6°13.5'W — 4°44'N, 5°16'W, depth 64 m, R/V Pillsbury, Sta.62, 2 June 1964; USNM 76993, many specimens; RMNH Coel. 17431, several specimens; 4°35'N, 6°40'W — 4°35'N, 6°41'W, depth 64 m, R/V Pillsbury, Sta.63, 2 June 1964; USNM 76994, many specimens; RMNH Coel. 17432, several specimens. Ghana, Eviano, depth 40 m; ORSTOM; MNHN, three specimens. Gulf of Guinea, dredged by the "Reine Pokou", depth 80 m, 8 December 1967; ORSTOM, Centre de Recherches océanographiques d'Abidjan; some young colonies. Off Sénégal: 14°32.5'N, 17°10.3'W, depth 13-14 m, Campagne L'Amaro, Sta.04, 5 May 1983; collection B, Seret, some colonies. West Africa: 6°16'S, 12°7'E, 15 miles SW Hoita Seca, depth 50 m. Expédition Atlantique Sud, no.8; 3 August 1948; IRSN, three specimens.

Description. — The clavate colonies consist of a spherical or oval capitulum and a stalk, differently shaped usually narrowing basally (fig. 60a-f, h). Not infrequently the capitula detach from the stalk (fig. 60g).

Tixier-Durivault (1955: 242, 244) correctly observed that in *Alcyonium violaceum* two kinds of polyps are present, large and small ones; each large one being surrounded by one series of small ones. So far we agree with Tixier-Durivault, but we disagree with her in regarding the small polyps as young polyps. In our opinion the small ones are siphonozooids for the following reasons:

1. Between the small polyps and the large ones there are no transitional forms; the retracted anthocodiae of the latter measure about 2 mm in length and 0.80 mm in breadth, those of the former measure 0.70 by 0.40 mm.
2. The distribution of the small polyps over the whole surface of the capitulum is too uniform for young polyps.
3. Only in the small polyps are there gonads.
4. The small polyps have two long and six reduced mesenterial filaments.
5. In the small polyps there are no anthocodial sclerites.

The autozooids have higher and wider, cone-shaped calyces. In the dis-

talmost, pointed part of the anthocodiae there is an accumulation of slender, fusiform spicules, up to 0.35 mm long and yellow or red in colour. The introvert contains no sclerites.

In the capitulum the sclerites are slender, pointed, warty spindles, up to 1.20 mm long (fig. 61a, b). In the surface layer they may be club-shaped, the heads having pointed or flat, high prominences; the length is up to 0.35 mm (fig. 61c, d).

The coenenchyme of the stalk contains shorter and wider, more or less oval-shaped sclerites, measuring up to 1.00 mm in length and densely covered with rounded warts (fig. 61h-j). In the surface layer there are also some thorn clubs and ovals with high, irregular processes (fig. 61e-g).

Colour. — In alcohol the capitula are purple, light purple, sometimes white; distally the stalk has the same colour, but basally it turns to light purple or dirty white.

Discussion. — Kükenthal's (1906a, pl. 2 fig. 10) figure of *Nidaliopsis pygmaea* resembles some of our colonies of *violacea*. The thick-set specimen with its slightly convex polyparium, covered with autozooids and siphonozooids (the latter invisible to the naked eye) and the very short colonial stalk strongly contrasts with the long-stalked, club-shaped colonies represented in our fig. 57. In addition, Kükenthal's specimens were very small, only 5 to 9 mm high; the enlargement of his figure is $\times 11$.

It was a fortunate circumstance, indeed, that in his collection Kükenthal (1906a: 40) found one specimen having a slender, curved stalk, 18 mm long with a pear-shaped capitulum 2 mm high and wide. That colony must have resembled very much our specimens of *N. violacea*. Kükenthal did not find any difference with his other colonies and he referred the stalked specimen to *N. pygmaea* as "Form B". This demonstrates that there is a close relationship between *N. pygmaea* and *N. violacea*.

Geographical distribution. — West coast of tropical Africa.

Genus *Pieterfaurea* gen. nov.

Diagnosis. — Nidaliidae with unbranched, digitiform colonies consisting of polyparium and stalk. Polyps monomorphic, retractile, devoid of sclerites, each surrounded by a wreath of vertical or slanting, often club-shaped sclerites forming a kind of palisade. Interior of stalk with spindles of moderate size.

Type-species. — *Sinularia (Sclerophytum) unilobata* J. S. Thomson, 1921.

Pieterfaurea unilobata (J. S. Thomson, 1921)
(figs. 62, 63, 64)

Sinularia (Sclerophyuum) unilobata J. S. Thomson, 1921: 172, fig. 5.

Material. — West of Umtwalumi, N. by W. 2 miles, depth 25 fms (= 46 m), 14 August 1901; R/V "Pieter Faure", no. 12482, BMNH 1962.7.20.52; one small, complete colony and a few fragments.

Description. — Although Thomson gave a good description of the above material (represented in our fig. 58), it is desirable to present a new description of this peculiar species, with the remarkable surface of its polyparium, and to give a drawing of the latter (fig. 63).

The polyps are completely or nearly completely retracted within the polyparium. Each polyp is ringed by a wreath of white spicules standing in an erect or slanting position and projecting above the surface of the polyparium; they form a sort of palisade around each polyp. These spicules strongly contrast with the dark brown polyps and coenenchyme. Thomson (loc. cit.) called these palisades the "cuplike part" of the polyps. They are composed of ordinary coenenchymal sclerites arranged in this unusual way. They are warty, mainly club-shaped, the heads often with prominences taller on one side; the length is up to 1.20 mm (fig. 64a-f). It is a pity that Thomson's drawings (1921: fig. 5) are so bad, that the position of the illustrated sclerites in the colony is not mentioned, and that the scale of magnification is not given.

The stiff polyps are devoid of sclerites.

The surface layer of the polyparium contains clubs, rods and spindles, 0.60 mm long on the average (fig. 64g-l). In the interior of the polyparium there are few sclerites; they are nearly smooth, up to 0.70 mm in length.

The surface layer of the stalk contains spindles up to 1.20 mm long, often bent and usually covered with round prominences. In the interior of the stalk there are many spindles, up to 2 mm long and 0.40 mm wide. They bear low, rounded or truncate conical projections, often arranged in transverse rows.

Remarks. — In all parts of the colony the polyps and the coenenchyme are hard and tough; it is not easy to isolate the sclerites in hypochlorite. What this species has in common with *Sinularia* species is the solidity of the colony and the large size of the sclerites, but this solidity is not solely due to sclerites. Thomson's reference of this species to *Sinularia* is incorrect, and assignment to *Bellonella* as Verseveldt (1980: 11) suggested is equally incorrect, for the cup-shaped palisades around the polyps are not calyces by any means. Calyces are cylindrical or wart-like projecting anthosfeles (see Bayer *et al.*, 1983: 6) that can completely enclose the anthocodiae, unlike the stiff palisades. According-

ly, it is necessary to establish a new genus, which we call *Pieterfaurea* in honour of the research vessel that collected the specimens.

Geographical distribution. — East coast of South Africa.

ACKNOWLEDGEMENTS

This study could not have been accomplished without the deeply appreciated collaboration of a good many people, who kindly made available the octocorals kept in their museums. We mention Dr. R. W. M. van Soest, Instituut voor Taxonomische Zoölogie, Zoölogisch Museum Amsterdam (ZMA), Dr. M. Grasshoff, Senckenberg Museum Frankfurt (SMF), Dr. M. Dzwillo, Zoölogisches Museum Hamburg (ZMH), Dr. E. Kritscher, Naturhistorisches Museum Wien (NHMW), Dr. Wilfrida Decraemer and Dr. J. van Goethem, Institut Royal des Sciences Naturelles de Belgique, Brussels (IRSN), Mme. Marie-José d'Hondt, Muséum National d'Histoire Naturelle, Paris (MNHN), Dr. C. Carpine, Musée Océanographique, Monaco (MOM), Dr. P. F. S. Cornelius and Mr. G. L. J. Paterson, British Museum (Natural History), London (BMNH), Dr. Susan Chambers, The Royal Scottish Museum, Edinburgh (RSM), Dr. L. Wallin, Uppsala Universitets Zoologiska Museum, Uppsala (UUZM), Dr. J. Wiktor, University Museum of Natural History, Wrocław (MZW), Dr. Philip N. Alderslade, Northern Territory Museum of Arts and Sciences, Darwin (NTMD) and Dr. G. C. Williams, South African Museum, Cape Town (SAM). To all of these we express our best thanks. In many cases the loan involved important and valuable type specimens.

We also were able to investigate a large number of colonies present in the U.S. National Museum of Natural History (Smithsonian Institution), Washington (USNM). In the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH), there are few specimens of soft corals that belong to the genera discussed in this paper, but Mr. J. C. den Hartog, curator of the Department of Coelenterates, willingly acted as intermediary in many of the loans just mentioned. It also has fallen his unenviable lot to carry out the final technical editing of the manuscript for press, which he has done with great care and understanding.

We are grateful to Mr. W. ter Spill (Zwolle, The Netherlands), who kindly reviewed the manuscript, and to Mr. G. J. Vrijmoeth (also of Zwolle), who made the photographs of the colonies printed in this paper. The scanning electron micrographs were made by Mr. Walter R. Brown, chief of the Scanning Electron Microscope Laboratory, National Museum of Natural History, Smithsonian Institution.

REFERENCES

- Bayer, F. M., 1961. The shallow-water Octocorallia of the West Indian Region. — Stud. Fauna Curaçao and other Caribb. Islands 12:1-373, figs. 1-101, pls. 1-27.
- Bayer, F. M., 1974. A new species of Trichogorgia and records of two other octocorals new to the Palau Islands. — Micronesica 10(2):257-268, figs. 1-3, pls. 1-3.
- Bayer, F. M., M. Grasshoff & J. Verseveldt (eds.), 1983. Illustrated trilingual glossary of morphological and anatomical terms applied to Octocorallia: 1-75, 218 figs. Leiden.
- Brundin, J. A. Z., 1896. Alcyonarien aus der Sammlung des Zoologischen Museum in Upsala. — Bihang K. Svenska Vet. - Akad. Handl. 22 IV(3):1-22, pls. 1, 2.
- Deichmann, E., 1936. The Alcyonaria of the western part of the Atlantic Ocean. — Mem. Mus. Comp. Zool. Harvard 53:1-317, pls. 1-37.
- Faulkner, D., 1974. This Living Reef: 1-184, including 107 colour photographs. New York.

- Faulkner, D. & R. Chesher, 1979. Living Corals: 1-310, 195 colour photographs. New York.
- Gray, J. E., 1835. Characters of a new genus of corals (*Nidalia*). — *Proc. Zool. Soc. London* 1835:59-60.
- Gray, J. E., 1857. Description of a new genus of Gorgoniadae. — *Proc. Zool. Soc. London* 1857:128-129, pl. 7.
- Gray, J. E., 1862a. Description of some new species of *Spogodes* and of a new allied genus (*Morchellana*) in the collection of the British Museum. — *Proc. Zool. Soc. London* 1862:27-31, 7 figs.
- Gray, J. E., 1862b. Description of two new genera of zoophytes (*Solenocaulon* and *Bellonella*) discovered on the north coast of Australia by Mr. Rayner. — *Proc. Zool. Soc. London* 1862:34-37, 2 figs.
- Gray, J. E., 1869. Notes on the fleshy alcyonoid corals (*Alcyonium*, Linn., or *Zoophytaria Carnosa*). — *Ann. Mag. nat. Hist.* (4)3:117-131.
- Imahara, Y., 1977. Alcyoniid octocorals from Suruga Bay, the Pacific coast of central Japan. — *Annot. Zool. Japon.* 50(1):31-35, figs. 1, 2.
- Koch, W., 1886. Ueber die von Herrn Prof. Dr. Greeff im Golf von Guinea gesammelten Anthozoen. Inaugural-Dissertation: 1-36, pls. 1-5. Bonn.
- Kükenthal, W., 1906a. Alcyonacea. — *Wiss. Ergebn. deutschen Tiefsee-Exped. "Valdivia"* 13(1):1-111, figs. 1-5, pls. 1-12.
- Kükenthal, W., 1906b. Japanisches Alcyonaceen. — *Abhandl. math.-phys. Klasse Kön. Bayerischen Akad. d. Wissensch. Beiträge Naturgesch. Ostasiens. Suppl. Band 1*:9-86, figs. 1-69, pls. 1-5.
- Kükenthal, W., 1906c. Die Stammesgeschichte und die geographische Verbreitung der Alcyonaceen. — *Verhandl. d. Deutsch. Zool. Gesellschaft* 1906:138-149.
- Lamouroux, J. V. F., 1812. Sur la classification des polypiers coralligènes non entièrement pierreux. — *Nouv. Bull. Sci. Soc. philom.* 3:181-188.
- Lüttschwager, J., 1915. Beiträge zu einer Revision der Familie Alcyoniidae. — *Arch. Naturgesch.* (A)80(10):1-42, figs. 1-9.
- May, W., 1899. Beiträge zur Systematik und Chorologie der Alcyonaceen. — *Jena. Zeitschr. Naturw.* 33:1-180, pls. 1-5.
- Molander, A. R., 1915. Northern and Arctic invertebrates in the collection of the Swedish State Museum, VII. Alcyonacea. — *K. Svenska Vet.-Akad. Handl.* 51(11): 1-94, figs. 1-14, pls. 1-3.
- Molander, A. R., 1929. Die Octactiniarien. — *Further zool. Results Swedish Antarctic Exped. 1901-1903* 2(2): 1-86, figs. 1-27, pls. 1-5.
- Nutting, C. C., 1912. Descriptions of the Alcyonaria collected by the U.S. Fisheries steamer "Albatross", mainly in Japanese waters, during 1906. — *Proc. U.S. Nat. Mus.* 43(1923): 1-104, pls. 1-21.
- Pfeffer, G., 1889. Zur Fauna von Süd-Georgien. — *Jahrb. Hamb. Wissensch. Anst. Jahrg.* 6(2) 1888:37-55.
- Pütter, A., 1900. Alcyonaceen des Breslauer Museums. — *Zool. Jahrb. (Syst.)* 13:443-462, pls. 29, 30.
- Saville Kent, W., 1870. On two new genera of alcyonoid corals, taken in the recent expedition of the yacht *Norma* off the coast of Spain and Portugal. — *Quart. J. micr. Sci. (N.S.)* 10:397-399, pl. 21.
- Simpson, J. J., 1907. On a new siphonogorgid genus *Cactogorgia*; with descriptions of three new species. — *Trans. Roy. Soc. Edinb.* 45(3):829-836, 1 pl. (Also appears in Thomson & Simpson, 1909. *Vide infra.*)
- Simpson, J. J., 1910. On a new species of *Cactogorgia*. — *Proc. Roy. Soc. Edinb.* 30(4): 324-326, 1 pl.
- Slepkova, N. V. & L. N. Seravin, 1983. Spontaneous and induced retraction of polyps in *Gersemia fruticosa* (Alcyonacea, Nephthyidae). — *Zoologicheskii Zhurnal* 62(5):675-680. [In Russian with English summary.]
- Song, J.-I., 1976. A study on the classification of the Korean Anthozoa, 2. Alcyonacea. — *Korean*

- J. Zool. 19(2):51-62, fig. 1, pls. 1, 2.
- Strand, E., 1926. *Miscellanea nomenclatoria zoologica et palaeontologica*. — *Archiv Naturgesch.* 92A(8):30-63.
- Studer, Th., 1878. Uebersicht der Anthozoa Alcyonaria, welche während der Reise S.M.S Gazelle um die Erde gesammelt wurden. — *Monatsberichte Kön. Preuss. Akad. Wiss. Berlin* 1878:632-688, pls. 1-5.
- Studer, Th., 1887. Versuch eines Systemes der Alcyonaria. — *Arch. Naturgesch.* 53(1): 1-74, pl. 1.
- Studer, Th., 1891. Note préliminaire sur les Alcyonaires provenant des campagnes du yacht l'Hirondelle (1886-1888), seconde partie-Alcyonacea et Pennatulacea (1). — *Mém. Soc. Zool. de France* 4:86-95.
- Studer, Th., 1901. Alcyonaires provenant des campagnes de l'Hirondelle (1886-1888). — *Résultats des campagnes scientifiques accomplies sur son yacht par Albert I^{er} de Monaco* 20:1-64, pls. 1-11.
- Thomson, J. A., 1927. Alcyonaires provenant des campagnes scientifiques du Prince Albert I^{er} de Monaco. — *Résultats des campagnes scientifiques accomplies sur son yacht par Albert I^{er} de Monaco* 73:1-77, pls. 1-6.
- Thomson, J. A., & L. M. I. Dean, 1931. The Alcyonacea of the Siboga Expedition with an addendum to the Gorgonacea. — *Siboga Exped. Monogr.* 13d:1-227, pls. 1-28.
- Thomson, J. A. & D. L. Mackinnon, 1910. Alcyonarians collected on the Percy Sladen Trust Expedition by Mr. J. Stanley Gardiner. II. The Stoloniifera, Alcyonacea, Pseudaxonia, and Stelechotokea. — *Trans. Linn. Soc. London (II, Zool.)* 13(8):165-211, pls. 6-14.
- Thomson, J. A. & J. J. Simpson, 1909. An account of the alcyonarians collected by the Royal Indian Marine Survey ship Investigator in the Indian Ocean. II. The alcyonarians of the littoral area: i-xviii. 1-319, pls. 1-9 Calcutta.
- Thomson, J. S., 1910. The Alcyonaria of the Cape of Good Hope and Natal. Alcyonacea. — *Trans. Roy. Soc. Edinburgh* 47(3):549-589, pls. 1-4.
- Thomson, J. S., 1921. South African Alcyonacea. — *Trans. Roy. Soc. South Africa* 9(2):149-175, pls. 5, 6.
- Thomson, J. S., 1924. Charts and comparisons of the distribution of South African Alcyonaria. With a statement of some of the problems of their dispersal. — *Trans. Roy. Soc. South Africa* 11(1):45-84, charts 1-3.
- Tixier-Durivault, A., 1954. Les octocoralliaires d'Afrique du Sud. I. Alcyonacea. — *Bull. Mus. nat. Hist. nat. Paris* (2)26:124-129, 261-268, 385-390, 526-533, 624-631.
- Tixier-Durivault, A., 1955. Alcyonaires atlantiques intertropicaux. — *Inst. roy. Sci. nat. Belgique. Expéd. océan. Belge eaux côst. Afric. Atlant. Sud.* 3(4):197-246, figs. 1-36.
- Tixier-Durivault, A., 1961. Les octocoralliaires du Golfe de Guinée et des Iles du Cap-Vert. Camp. de la Calypso: Golfe de Guinée. — *Ann. Inst. Océan. Monaco* 39:237-262, figs. 1-21.
- Tixier-Durivault, A., & M. J. d'Hondt, 1974. Nouvelles récoltes d'octocoralliaires à Madagascar. — *Tethys* 5(2-3) 1973 [1974]:251-265, figs. 1-9.
- Tixier-Durivault, A., & M. J. d'Hondt, 1975. Les octocoralliaires de la campagne Biaçores. — *Bull. Mus. nat. Hist. nat. Paris* (3)252 [1974], *Zool.* 174:1361-1433, carte 1, figs. 1-32.
- Utinomi, H., 1954. Some alcyoniid octocorals from Kii coast, middle Japan. — *Publ. Seto marine biol. Lab.* 4(1):43-55, figs. 1-8, pl. 1.
- Utinomi, H., 1957. The alcyonarian genus *Bellonella* from Japan, with descriptions of two new species. — *Publ. Seto mar. biol. Lab.* 6(2):147-168, figs. 1-8, pls. 9, 10.
- Utinomi, H., 1958a. A revision of the genera *Nidalia* and *Bellonella*, with an emendation of nomenclature and taxonomic definitions of the family Nidaliidae (Octocorallia, Alcyonacea). — *Bull. British Mus. (Nat. Hist.) Zool.* 5(5):101-121, figs. 1-6.
- Utinomi, H., 1958b. On some octocorals from deep waters of Prov. Tosa, Sikoku. — *Publ. Seto mar. biol. Lab.* 7(1):89-110, figs. 1-8, pls. 5, 6.
- Utinomi, H., 1960. Noteworthy octocorals collected off the southwest coast of Kii Peninsula, middle Japan. I. Stoloniifera and Alcyonacea. — *Publ. Seto mar. biol. Lab.* 8(1):1-26, figs. 1-9.

pls. 1, 2.

- Utinomi, H., 1962. Preliminary list of octocorals of Sagami Bay deposited in the Biological Laboratory of the Imperial Household. — Publ. Seto mar. biol. Lab. 10(1): 105-108.
- Utinomi, H., 1964. Some octocorals from the Antarctic waters off Prince Harald Coast. — Jap. Antarctic Res. Exped. Sci. Rep. (E)23:1-14, figs. 1-6, pls. 1, 2.
- Utinomi, H. & E. Harada, 1958. A list of bottom animals collected by a trawler "Kaun-maru" off the southwest coast of Kii Peninsula. — Publ. Seto mar. biol. Lab. 6 (3):385-395, fig. 1.
- Verseveldt, J., 1978. On some Telestacea and Alcyonacea (Coelenterata: Octocorallia) from the West Indian region. — Zool. Med. Leiden, 53(4):41-47, figs. 1-3, pl. 1.
- Verseveldt, J., 1980. A revision of the genus *Sinularia* May (Octocorallia, Alcyonacea). — Zool. Verh. Leiden 179:1-128, figs. 1-68, pls. 1-38.
- Wright, E. P. and Th. Studer, 1889. Report on the Alcyonaria collected by H. M. S. Challenger during the years 1873-76. — Rep. Sci. Res. Voyage Challenger Zool. 31:i-lxvii, 1-314, pls. 1-43.

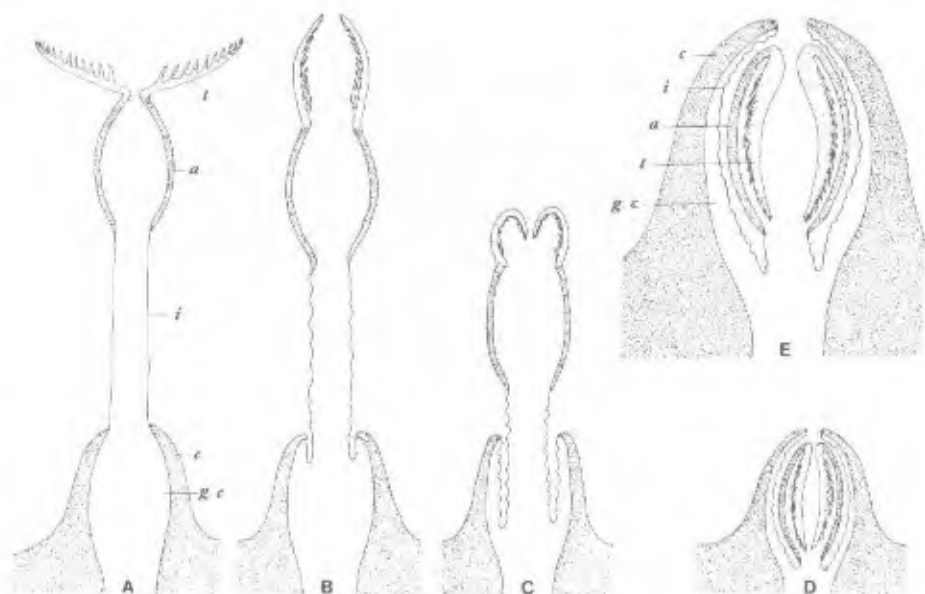


Fig. 1. Contraction and retraction of polyp-with-a-calyx. A, polyp extended; B, tentacles move toward each other, the introvert slackens; C, the tentacles bend inward, the introvert disappears into the calyx; D, E, anthocodia and introvert are completely retracted into the calyx; *t.*, tentacles; *a.*, anthocodia; *i.*, introvert; *c.*, calyx; *g. c.*, gastral cavity.

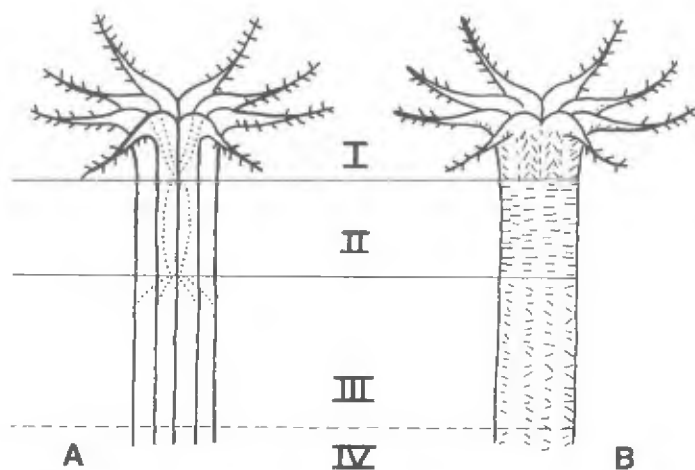


Fig. 2. Contraction and retraction of a polyp-without-a-calyx, in *Gersemia fruticosa* (M. Sars), after Slepikova & Seravin, 1983. A, extended polyp, polyp wall transparent, pharynx and mesenteries visible; B, the same polyp with its sclerites. Part I: tentacles with some sclerites in the rachis of each tentacle; in the distal part of the polyp wall chevroned sclerites forming the anthocodial points. Part II: the crown with its transversely placed sclerites. Parts I and II together form the anthocodia. Part III is the introvert. Part IV is the coenenchyme into which the polyp can retract.

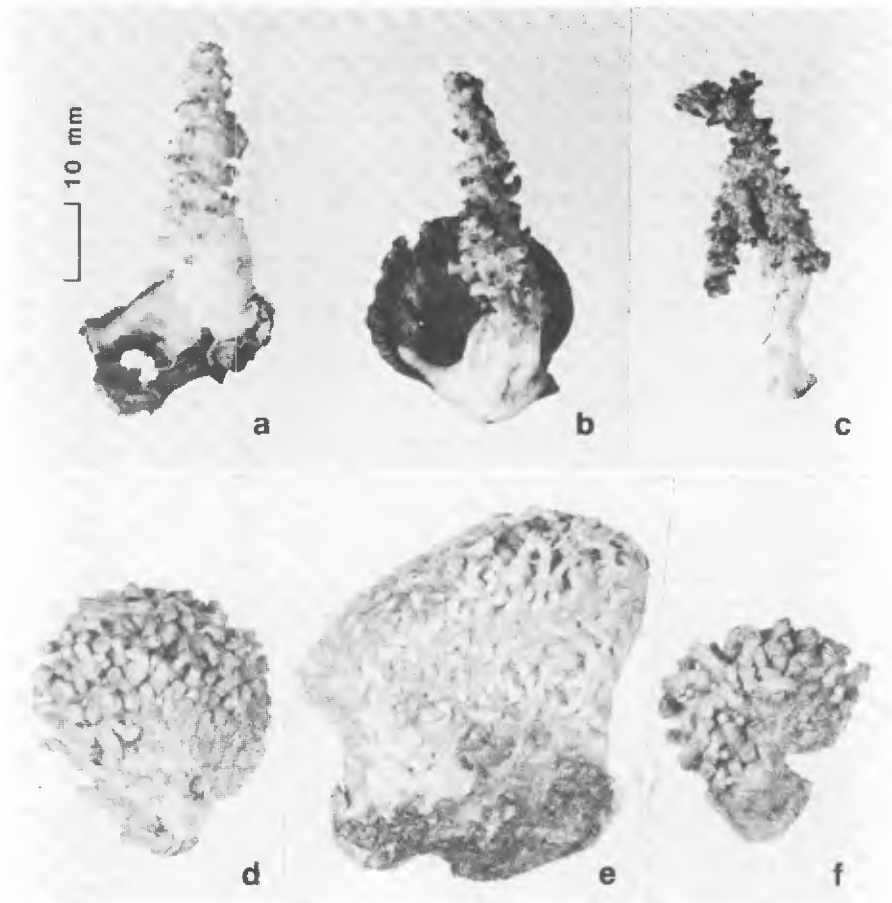


Fig. 3. a-c, Colonies of *Bellonella bocagei* (Saville Kent); a, b, South Atlantic Cruise, Sta.10, MNHN; c, South Atlantic Cruise, Sta.193, MNHN. d-f, *Bellonella capitata* (Pfeffer), ZMH C2453. Enlargement indicated by 10 mm bar.

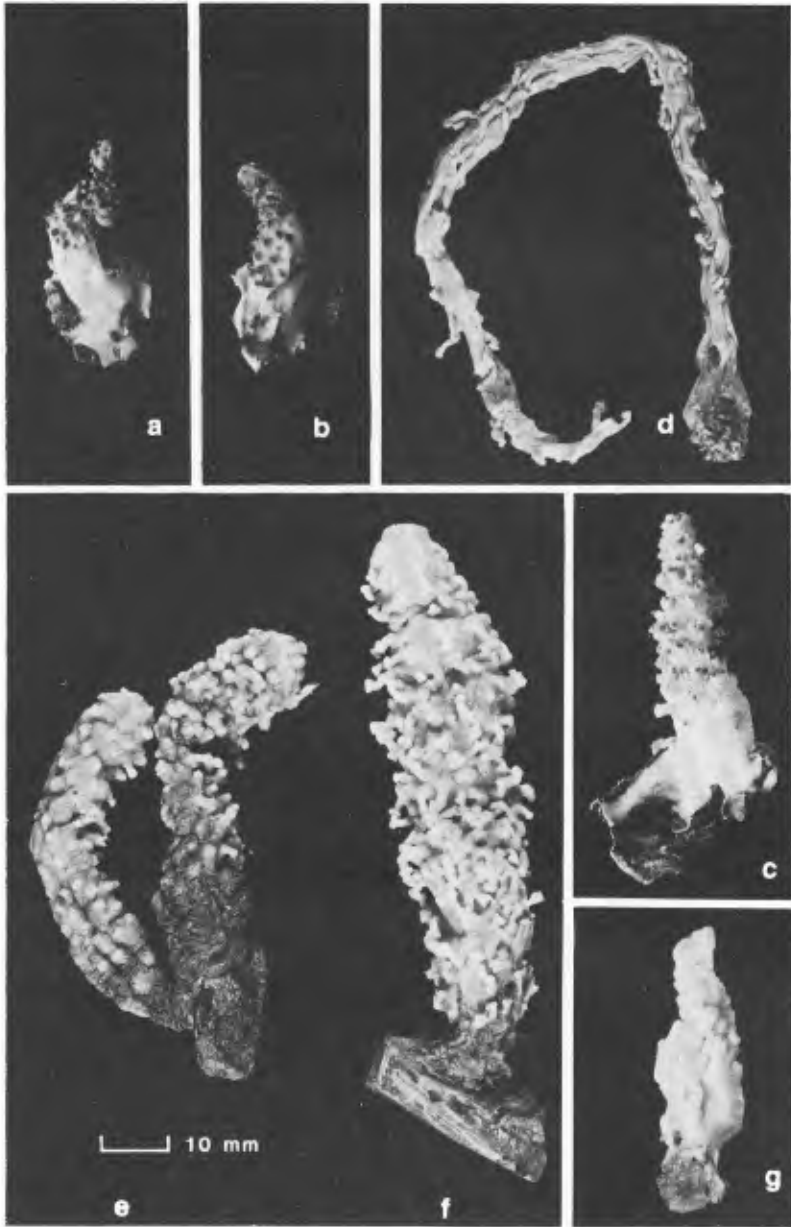


Fig. 4. Colonies of *Bellonella* species. a, *B. bocagei* (Saville Kent; SMF 4944; b, the same species, Gold Coast, MNHN, syntype of *B. madseni* Tixier-Durivault; c, the same species, South Atlantic Cruise, Sta. 10; d, *B. epedana* spec. nov., holotype, USNM 60446; e, *B. clavata* (Pleffer), ZMII C2452, paralectotype; f, the same species and collection number, lectotype; g, *B. cinerea* Tixier-Durivault & d'Hondt. Enlargement indicated by 10 mm bar.

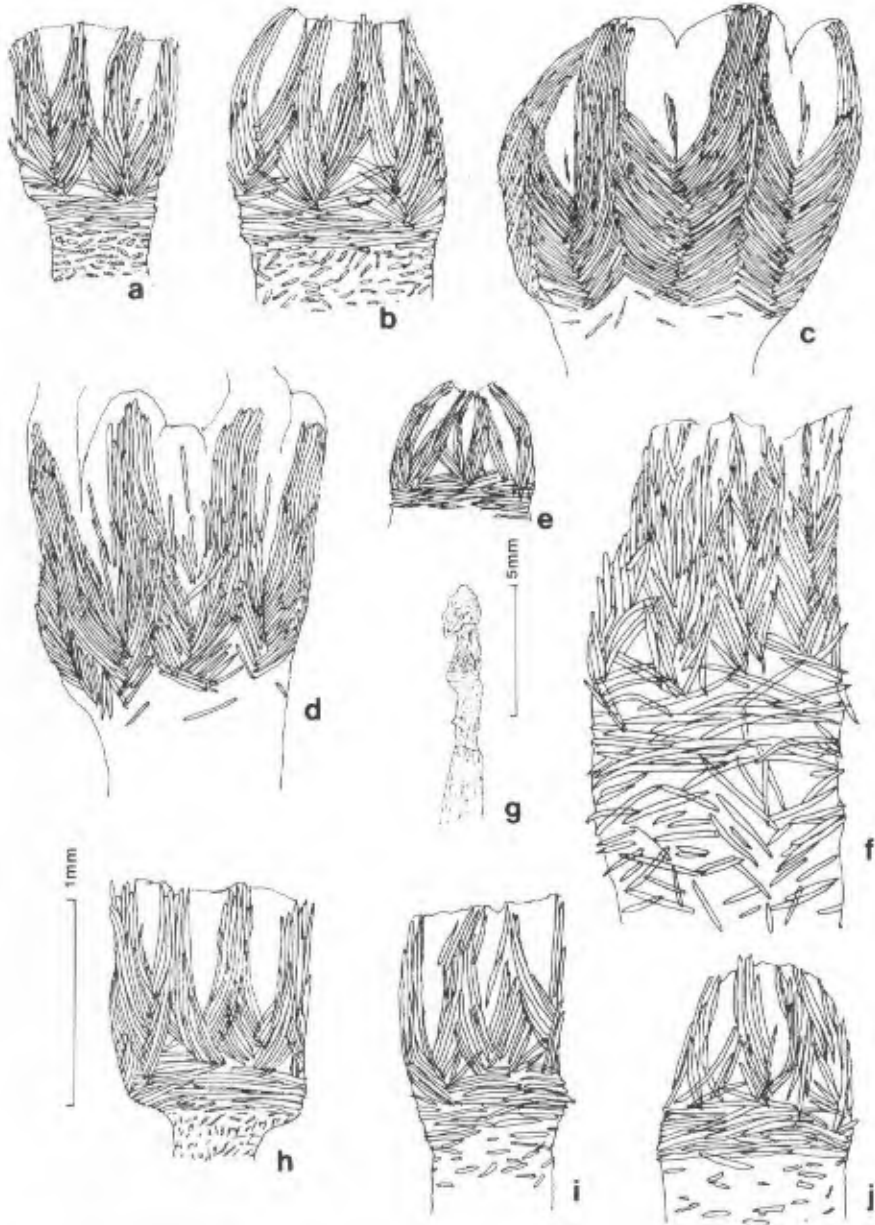


Fig. 5. a-f, Anthocodial armatures of *Bellonella* species. a, b, *B. bocagei* (Saville Kent), SMF 4944; c, *B. capitata* (Pfeffer), ZMH C2453; d, *B. clavata* (Pfeffer), ZMH C2452; e, *B. conspicua* Tixier-Durivault, MNHN; f, *B. epedana* spec. nov., USNM 60446; g, polyp of *B. epedana*; h-j, anthocodial armatures of *Bellonella* species: h, *B. molokaiensis* spec. nov., holotype, USNM 57078; i, j, *B. petila* spec. nov., holotype, USNM 57581. Enlargement of a-f and h-j indicated by 1 mm bar at h; that of g by 5 mm bar at g.

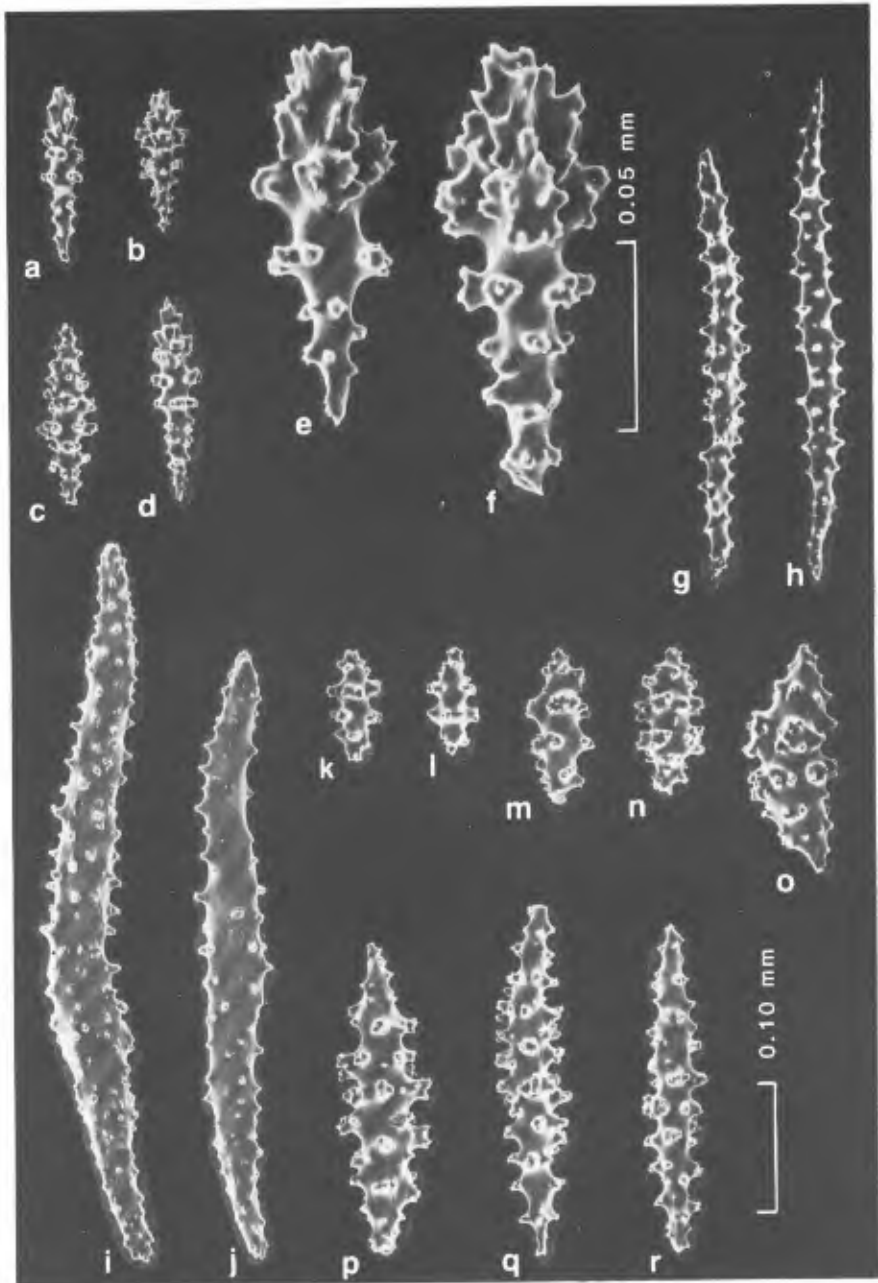


Fig. 6. *Bellonella bocagei* (Saville Kent), SMF 4944. Sclerites: a-f, from surface layer calyx; g, h, from inner layer calyx; i, j, from anthocodiae; k-n, from surface stalk; o-r, from interior stalk. Enlargement of e and f indicated by 0.05 mm bar, that of all other sclerites by 0.10 mm bar.

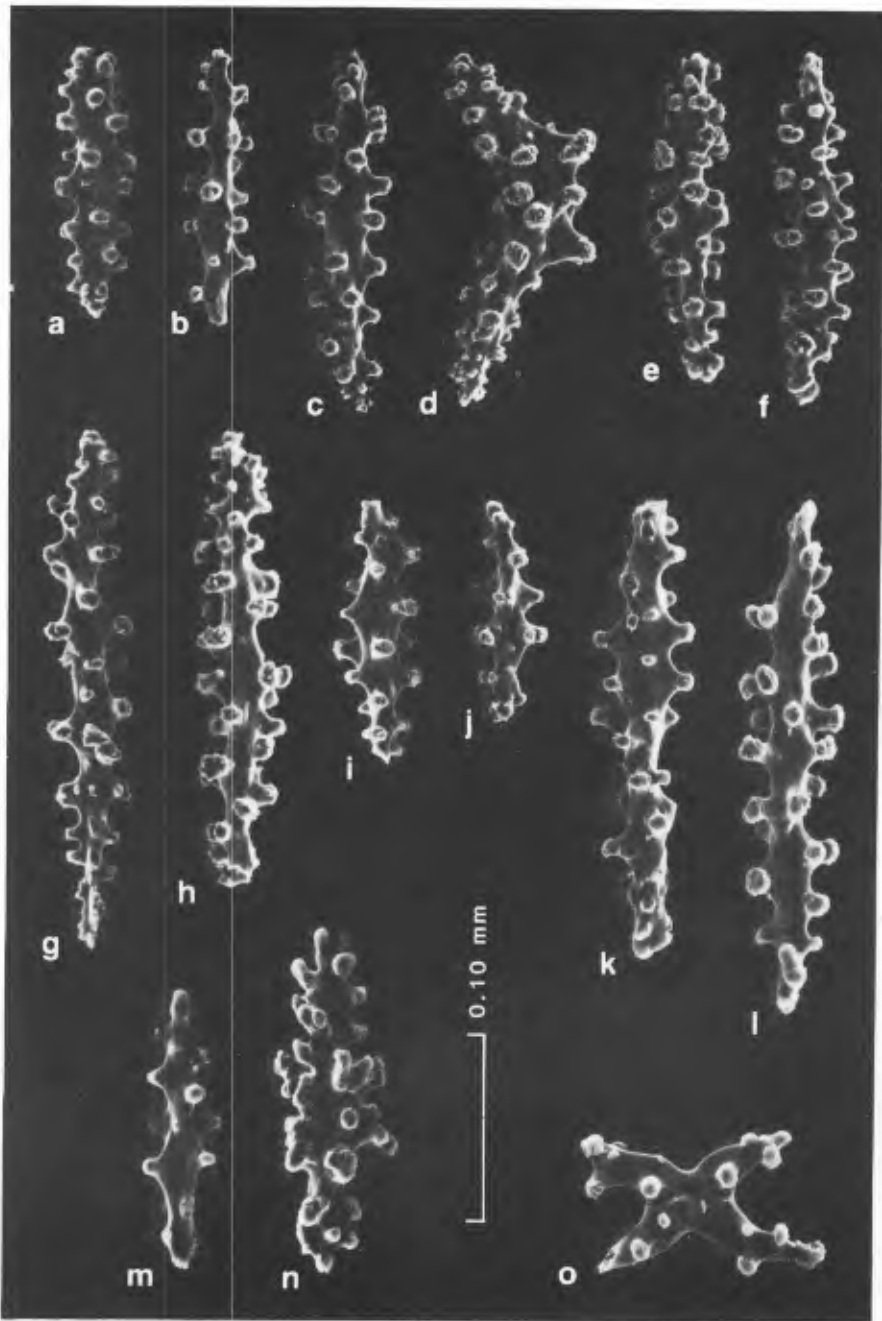


Fig. 7. *Bellonella capitata* (Pfeffer), ZMH C2453. Sclerites: a-f, from calyx wall; g-j, from surface stalk; k-o, from interior stalk. Enlargement indicated by 0.10 mm bar.

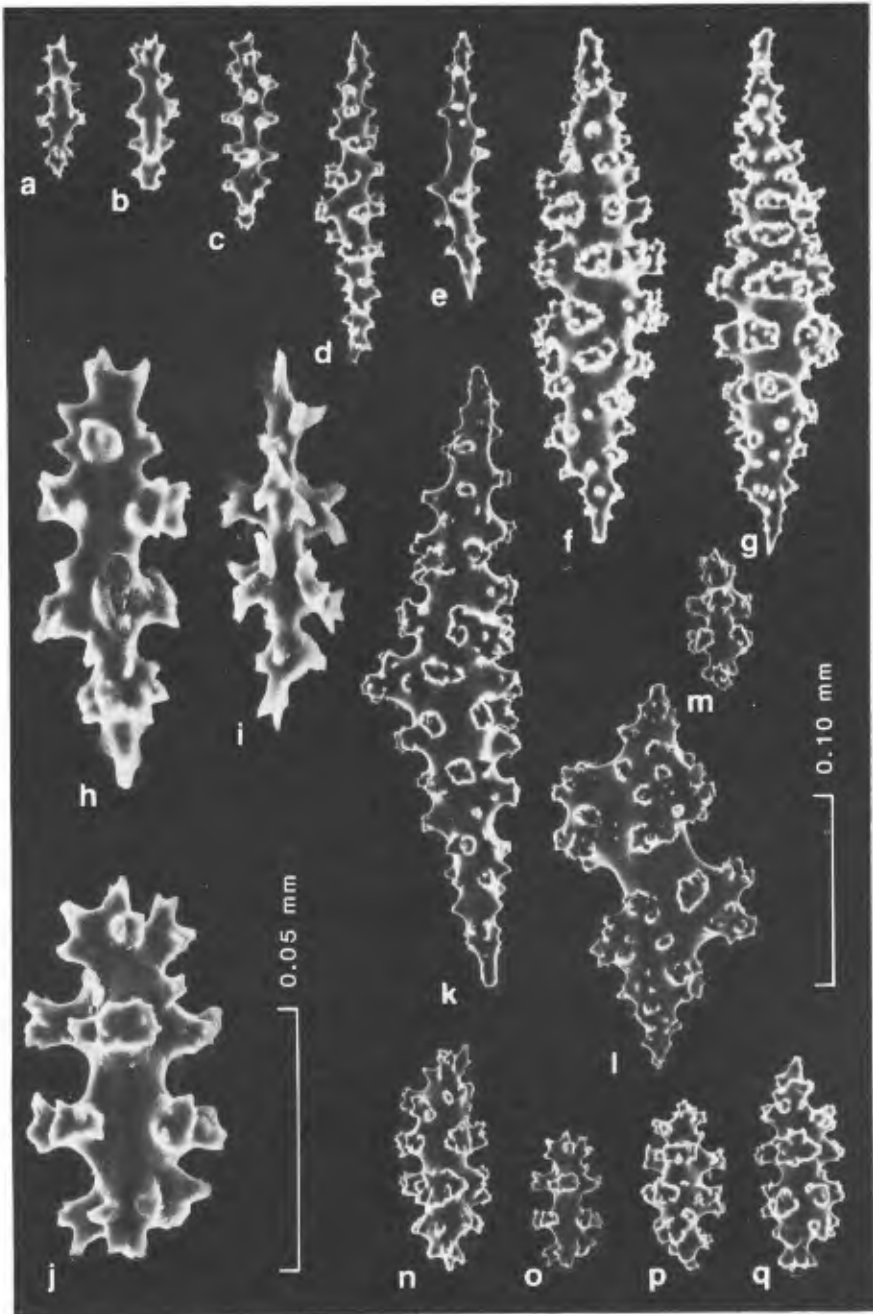


Fig. 8. *Bellonella cinerea* (Tixier-Durivault & d'Hondt), MNHN. Sclerites: a-i, from calyx wall; j-q, from surface stalk. Enlargement of a-g and k-q indicated by 0.10 mm bar; that of h-j by 0.05 mm bar.

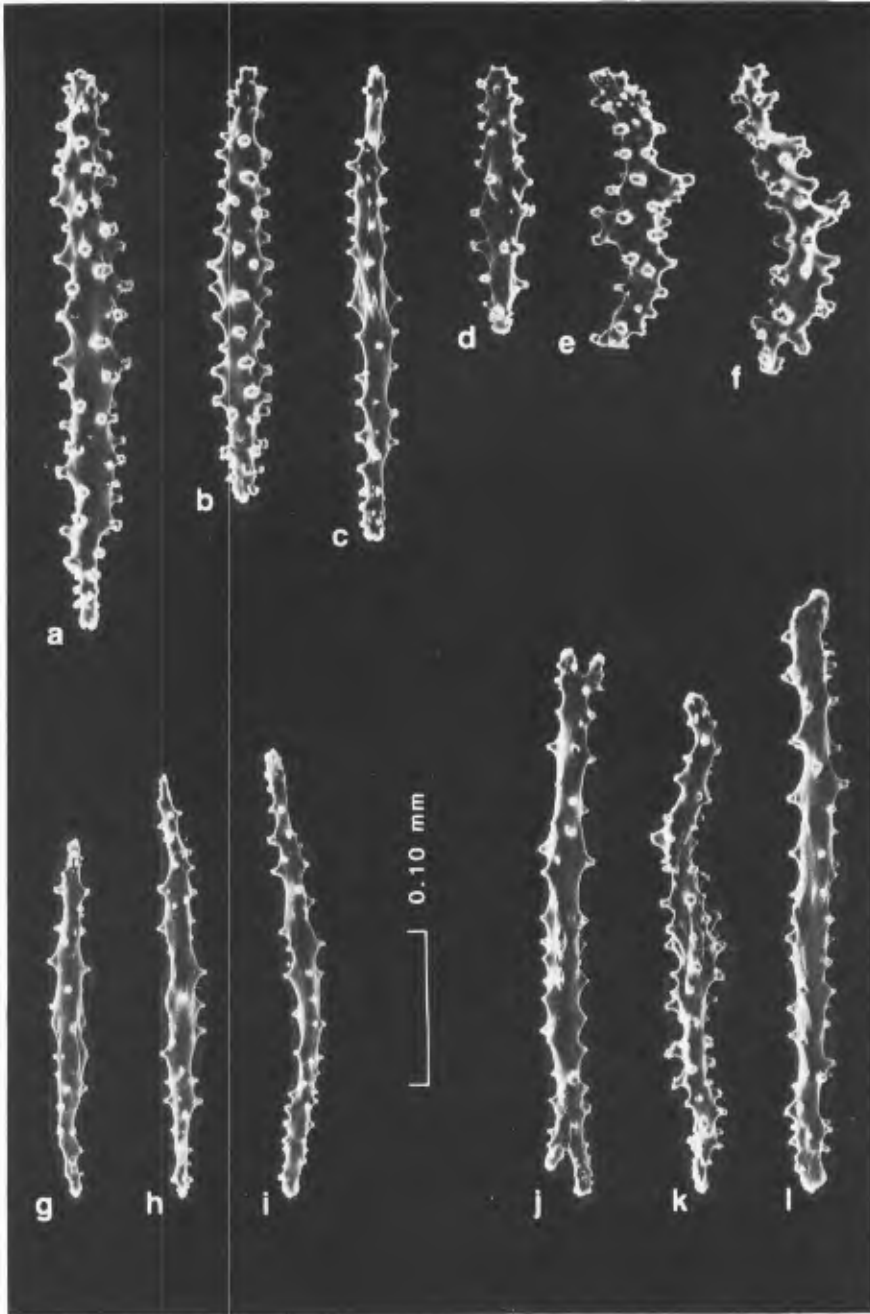


Fig. 9. *Bellonella clavata* (Pfeffer), ZMH C2452. Sclerites: a-f, from surface calyces and polyparium; g-l, from interior of polyparium. Enlargement indicated by 0.10 mm bar.

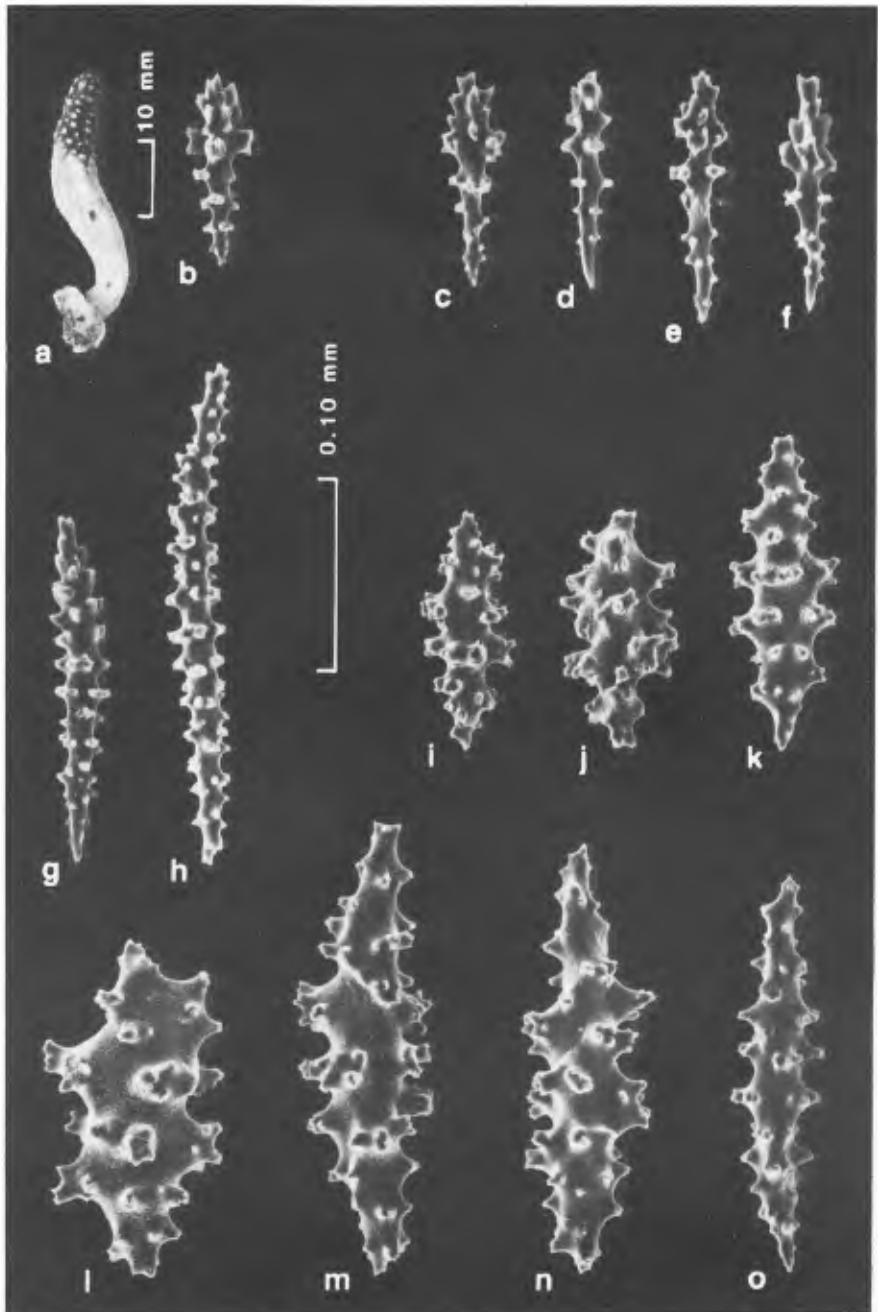


Fig. 10. *Bellonella conspicua* Tixier-Durivault, MNHN. a, colony; b-h, sclerites from surface parapodium; i-k, from surface stalk; l-o, from interior stalk. Scale of a indicated by 10 mm bar; that of b-o by 0.10 mm bar.

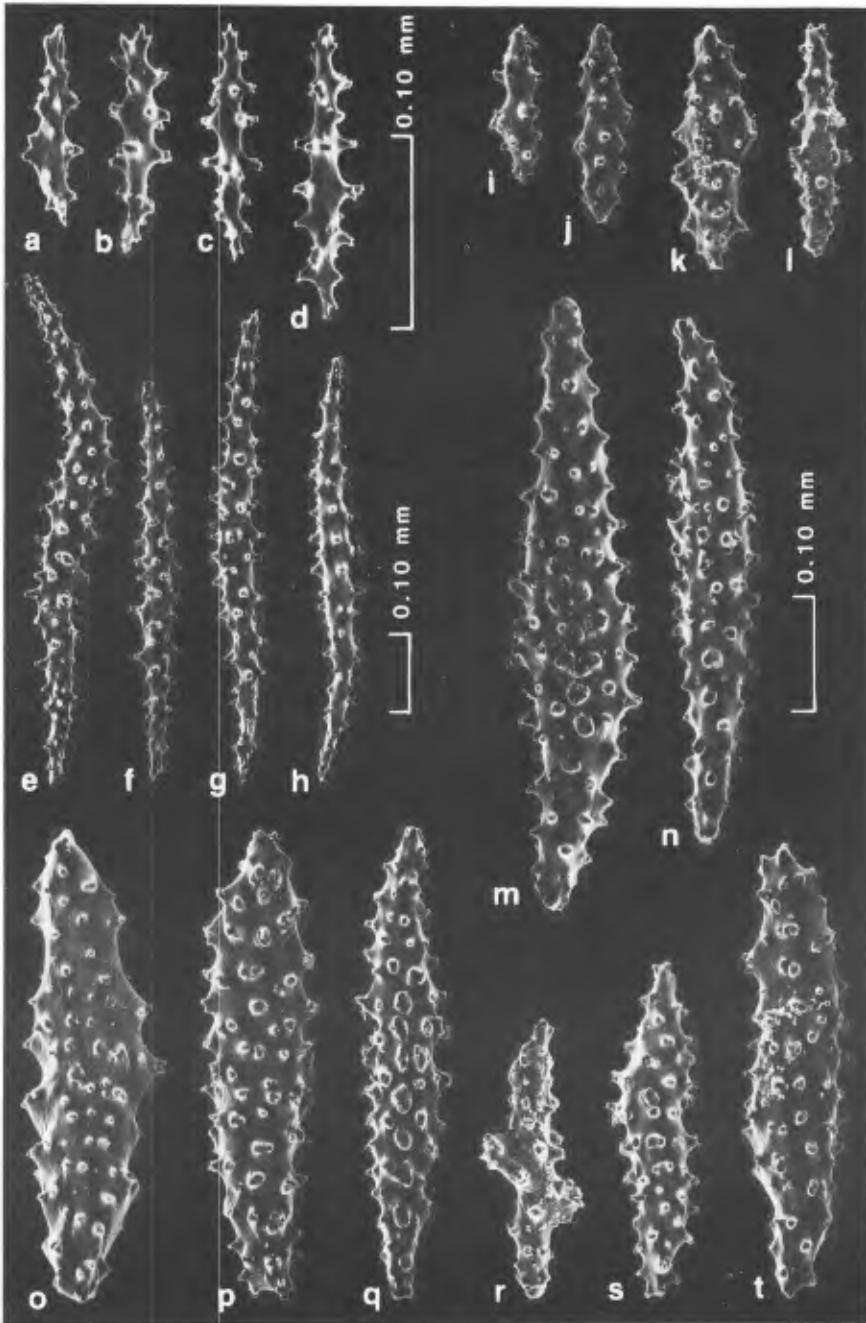


Fig. 11. *Bellonella epedana* spec. nov., USNM 60446. Sclerites: a-h, from surface polyparium; i-t, from surface base of stalk. Enlargement of a-d indicated by 0.10 mm bar at d; that of e-h by 0.10 mm bar at h; that of i-t by 0.10 mm bar at n.

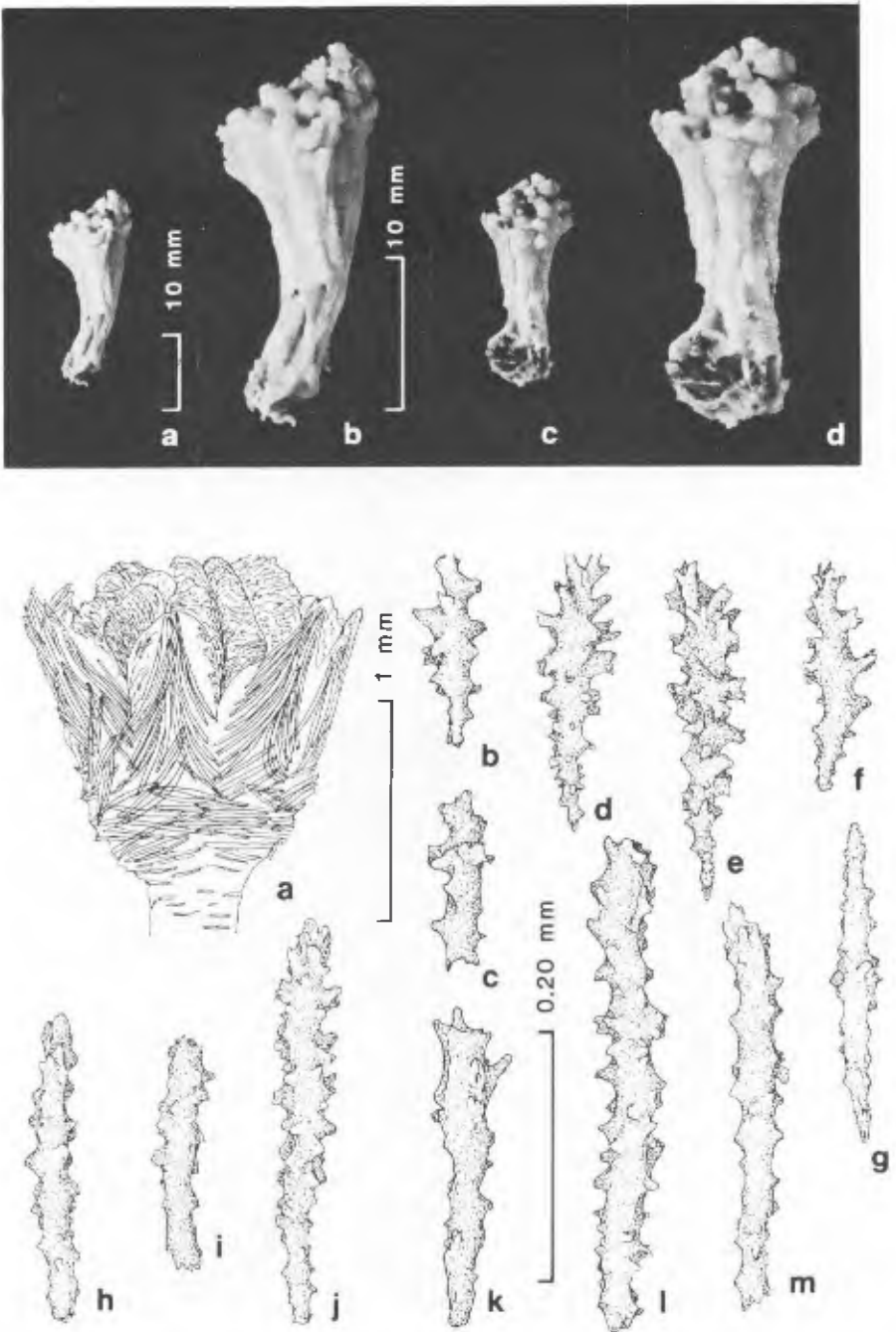


Fig. 13. *Bellonella granulata* Gray, BMNH 1935.8.16.1, holotype. a, anthocodial armature; b-g, sclerites from surface layer of stalk; h-m, sclerites from interior of stalk. Enlargement of a indicated by 1 mm bar at a; that of b-m by 0.20 mm bar at k.

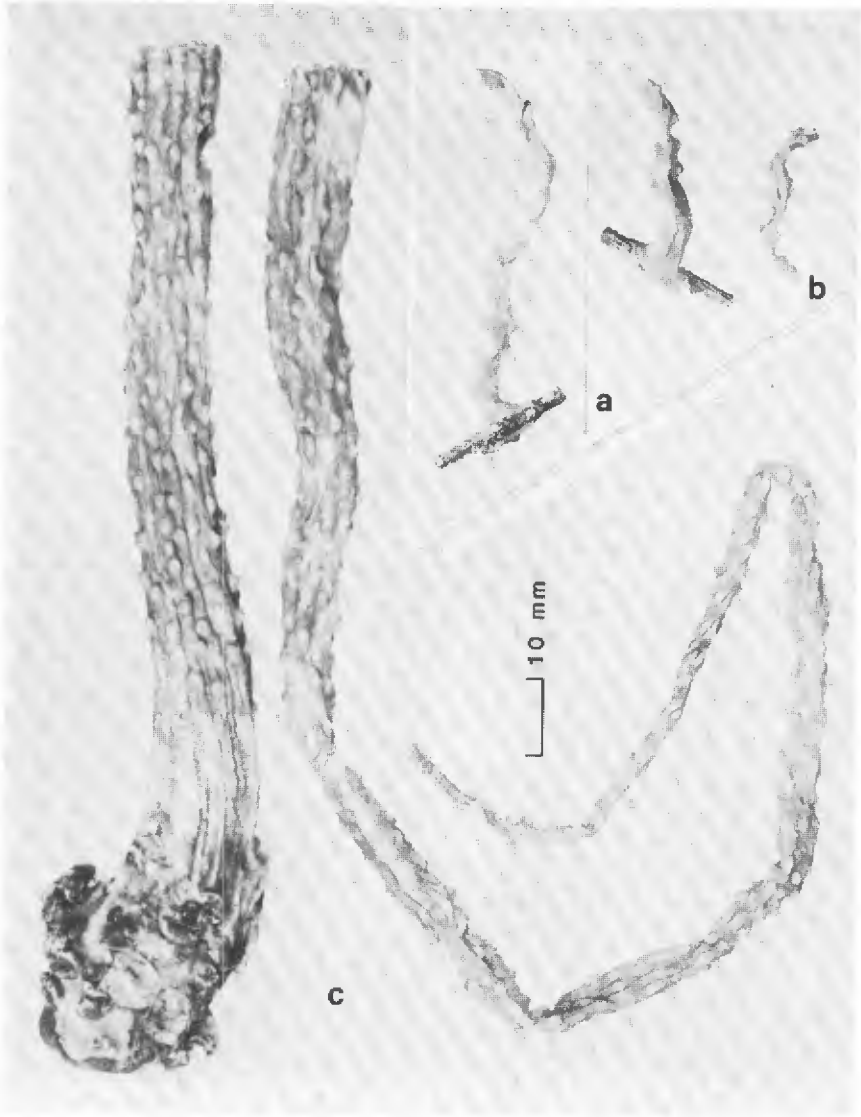


Fig. 14. a, b, *Bellonella molakaiensis* spec. nov., USNM 57078; c, *Bellonella petila* spec. nov., USNM 57581. Enlargement indicated by 10 mm bar.

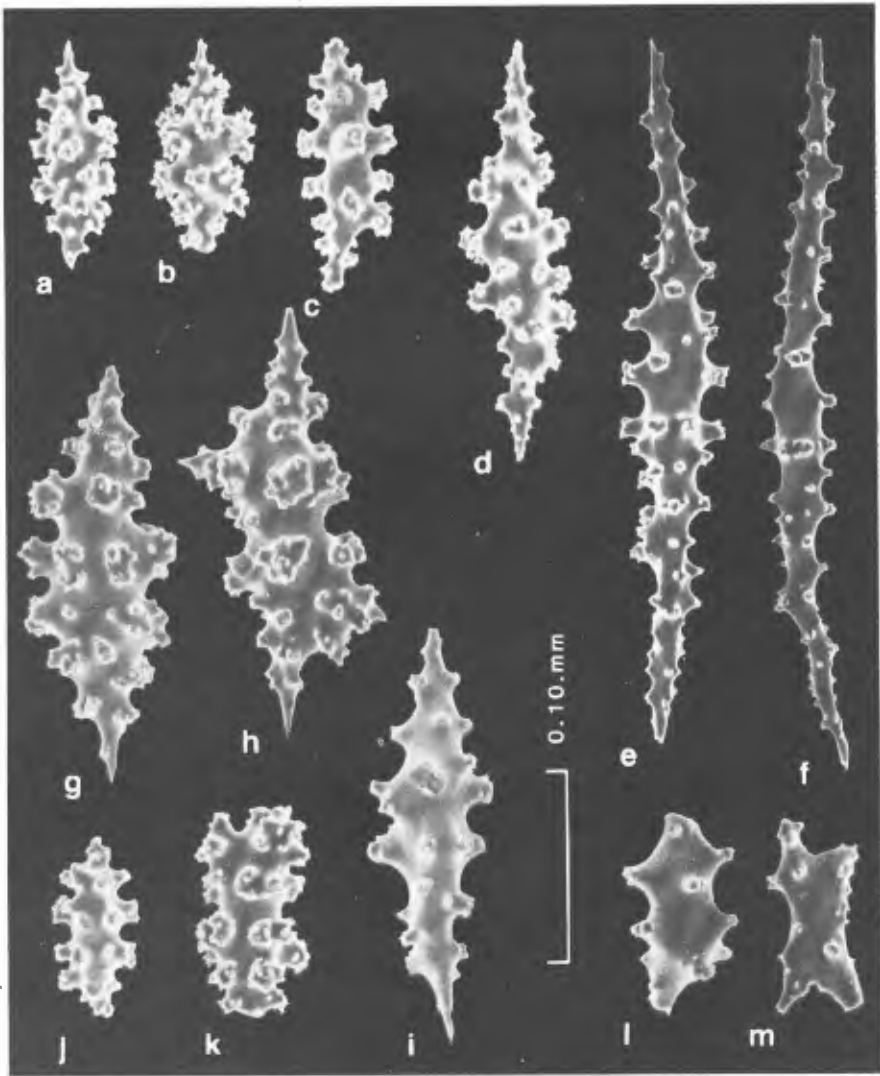


Fig. 15. *Bellonella molokaiensis* spec. nov., USNM 57078. Sclerites: a-c, from outer layer of calyx; h-l, from inner layer of calyx; g-m, from surface layer of stalk. Enlargement indicated by 0.10 mm bar.

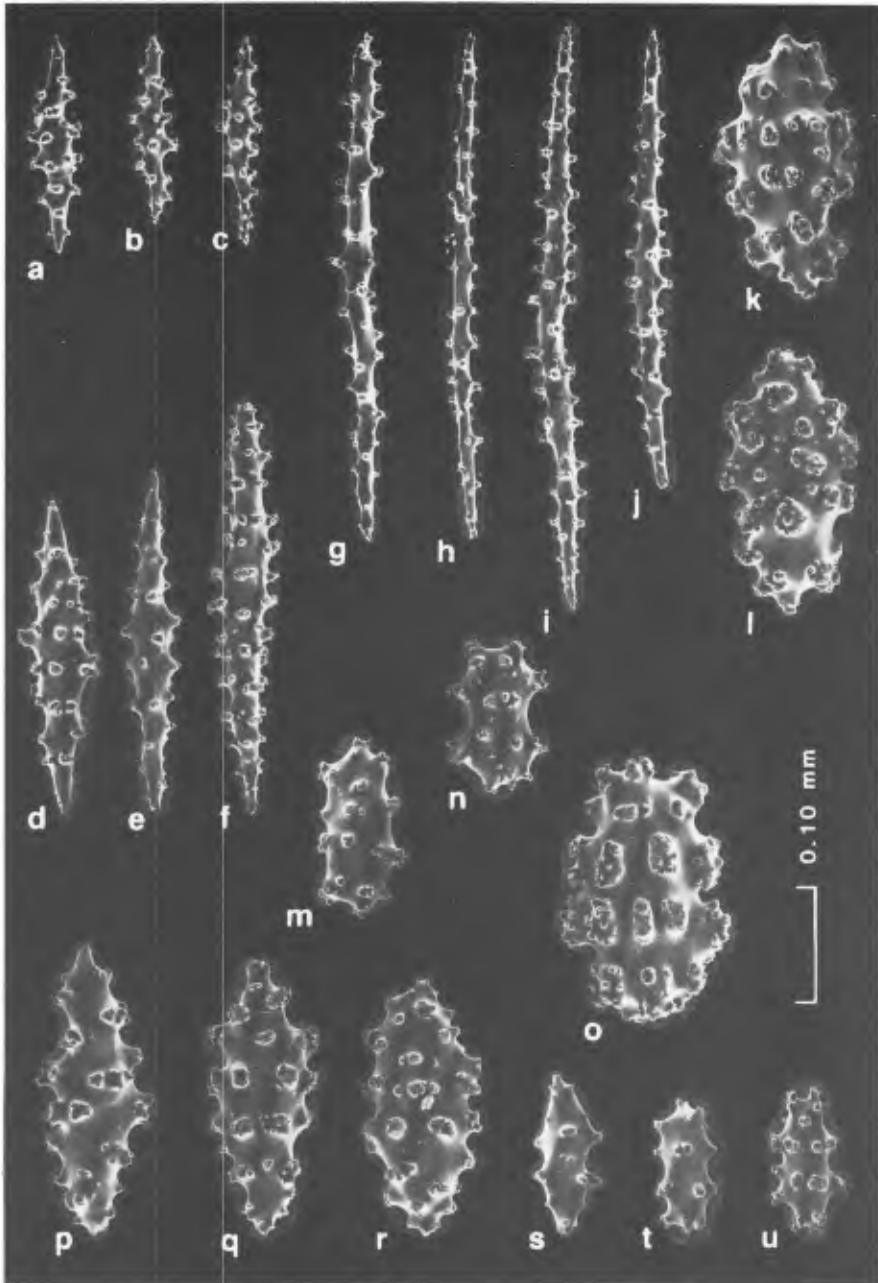


Fig. 16. *Bellonella petilus* spec. nov., USNM 57581. Sclerites: a-f, from surface layer of polyparium; g-j, from interior of polyparium; k-u, from surface layer of stalk. Enlargement indicated by 0.10 mm bar.

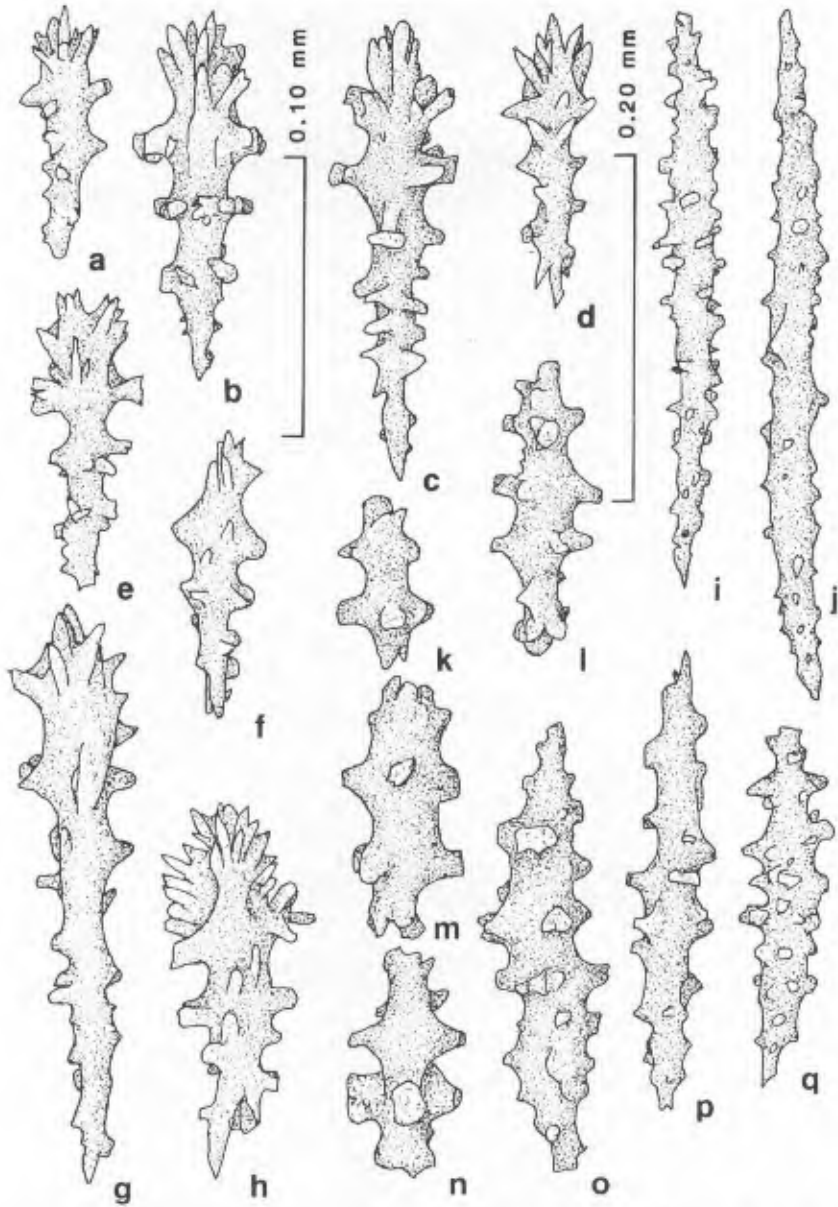


Fig. 17. *Bellonella variabilis* (Studer), MOM. Sclerites: a-h, thorn clubs from calyx wall; i-j, spindles from calyx wall; k-o, from surface of stalk; p-q, from interior of stalk. Enlargement of a-h, k-o indicated by 0.10 mm bar at b; that of i, j, p, q by 0.20 mm bar at d.

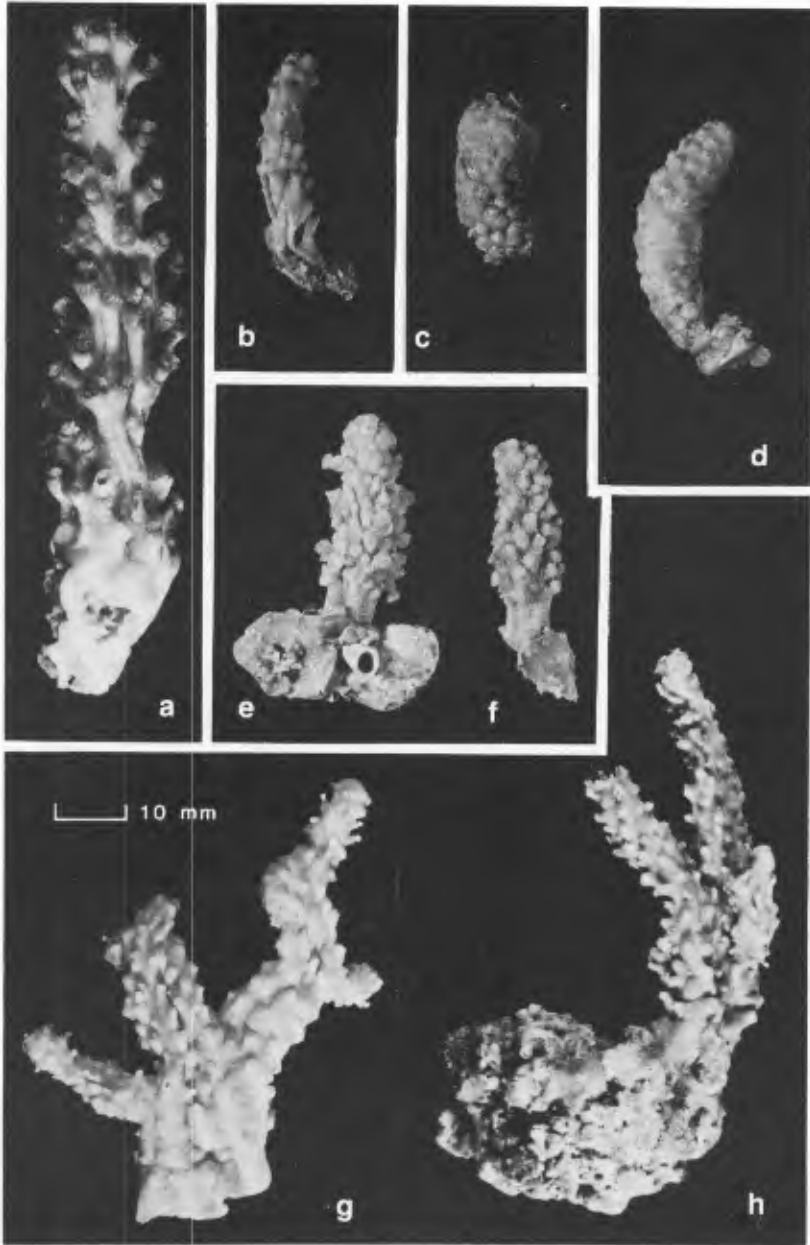


Fig. 18. Colonies of *Eleutherobia* species. a, *E. splendens* (Thomson & Dean), ZMA Coel. 2980, holotype; b, *E. duriuscula* (Thomson & Dean), ZMA Coel. 2974, holotype; c, *E. rotifera* (J. S. Thomson), MNHN, holotype; d, *E. flava* (Nutting), USNM 30089, holotype; e, f, *E. rubra* (Brundin), USNM 30177; g, *E. somaliensis* spec. nov., RMNH Coel. 17420, paratype; h, *E. somaliensis* spec. nov., USNM 77003, holotype. Enlargement indicated by 10 mm bar.

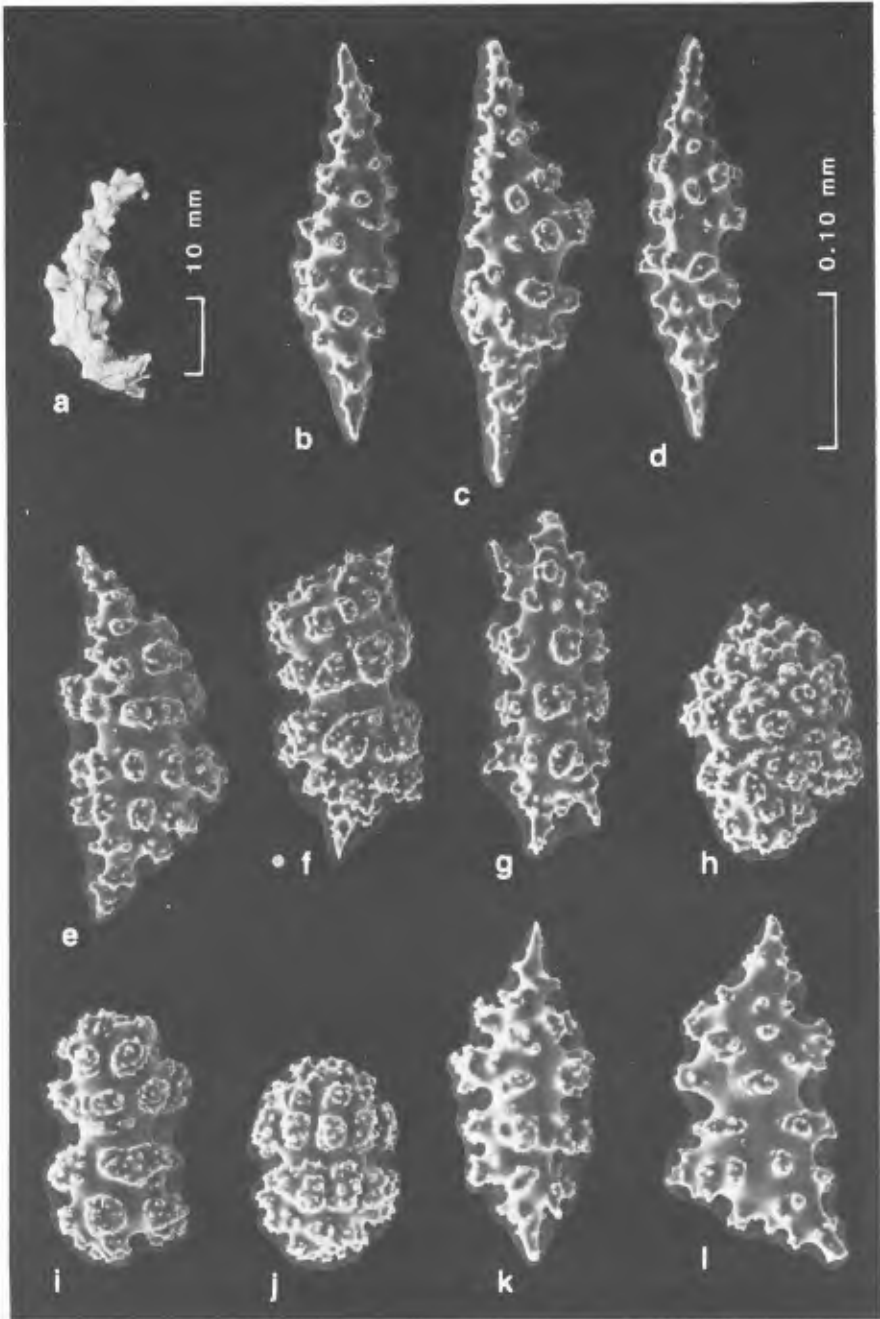


Fig. 19. *Eleutherobia dofeini* (Kükenthal). MZW 61; a, colony; b-j, selerites from calyx wall; k, l, from interior of stalk. Enlargement of a indicated by 10 mm bar; that of b-l by 0.10 mm bar.