STUDIES ON THE FAUNA OF CURAÇAO AND OTHER CARIBBEAN ISLANDS: No. 215

BARBABOS DEEP-WATER SPONGES

by

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ABSTRACT

Deep-water sponges dredged up in two locations off the west coast of Barbados are systematically described. A total of 69 species is recorded, among which 16 are new to science, viz. *Pachymatisma geodiformis, Asteropus syringiferus, Cinachyra arenosa, Theonella atlantica, Corallistes paratypus, Corallistes tubulatus, Scleritoderma cyanea, Spongosorites siliquariae, ?Halichondria ruetzleri, Leucophloeus lewisi, Acanthella vaceleti, Bubaris flagelliformis, Biemna oxeata, Phlyctaenopora halichondrioides, Echinochalina melana, Strongylophora stoneae.* Of each species illustrations of the habit and/or the skeletal architecture and spiculation are provided. A review of West Indian deep water sponges is given in the form of tables of records of deep water sponges arranged according to the major higher taxa. A special report is given of the distribution of the quantitatively important sponges in a transect perpendicular to the coast off Paynes Bay from 110 to 325 m. Along this depth gradient it was possible to distinguish three distinct zones: an upper (110–137 m) zone poor in specimens, with *Spongosorites siliquaria* n.sp. and *Topsentia porrecta* as characteristic species, a zone from 137–172 m rich in species and numbers, and a third zone below 208 m in which *Vetulina stalactites* is the dominant sponge. These three zones may be related to the morphology of the sea bottom and the grain size of the sediment.

INTRODUCTION

Deep-water sponges (i.e. sponges occuring below the coral reefs and on the lower shelf and the upper slope down to 400–500 m) from the West Indies are poorly known. Only three publications are devoted exclusively to the description of deep-water sponges (SCHMIDT, 1879 and 1880; DE LAUBENFELS, 1934), although several others contain taxonomic descriptions of deep forms in connection with shallow-water forms (notably SCHMIDT, 1870; DE LAUBENFELS, 1936a, 1953; VAN SOEST, 1977, 1978, 1980, 1984). Data on quantitative distribution and ecology are even more scarce: they are only provided in LEWIS (1965), who studied the benthic communities, topography and bottom sediments in depths between 50 and 400 m along a transect at right angles to the west coast of Barbados. From the qualitative data derived mainly from dredge hauls three broad and general communities were recognized: a sponge and coral community between 50 and 150 m; a coelenterate, mollusk and echinoderm community between 100 and 300 m; and a mollusk community between 300 and 400 m.

As to the depth distribution of the sponge species (Appendix on p. 1061 of LEWIS, preliminary identifications made by W.D. HARTMAN) a total of 31 species were found between 50 and 350 m, of which 23 occurred in the 50–100 m interval (with possibly some true coral reef dwellers), 19 in the 100–150 m interval (*Agelas schmidti* was reported common), 5 in the 150–200 m interval (with two *Corallistes* species reported as common), 1 (*Vetulina stalactites*) in the 200–250 m interval, and 2 (*Azorica cribriphora* and again *V. stalactites*) in the 250–300 m interval.

During 1978–1980 one of us (N.S.) studied the surface sediments of the 110–325 m depth interval at the foot of a fossil barrier reef off Paynes Bay on the west coast of Barbados (13° 10'N 59° 40' W) by means of component analysis (especially the grain fractions coarser than sand grade) and found sponges to be one of the more significant constituents. The research yielded a large amount of sponge samples belonging to 58 species, several of which appear to be new to science.

In 1964 several huge dredge samples from depths of 100–200 m off Holetown on the west coast of Barbados were secured by Dr. P. WAGENAAR HUMMELINCK; they contained also ample sponge material, belonging to 32 species, several of which again belonged to previously undescribed forms. Some of these have been described since then in papers by one of us

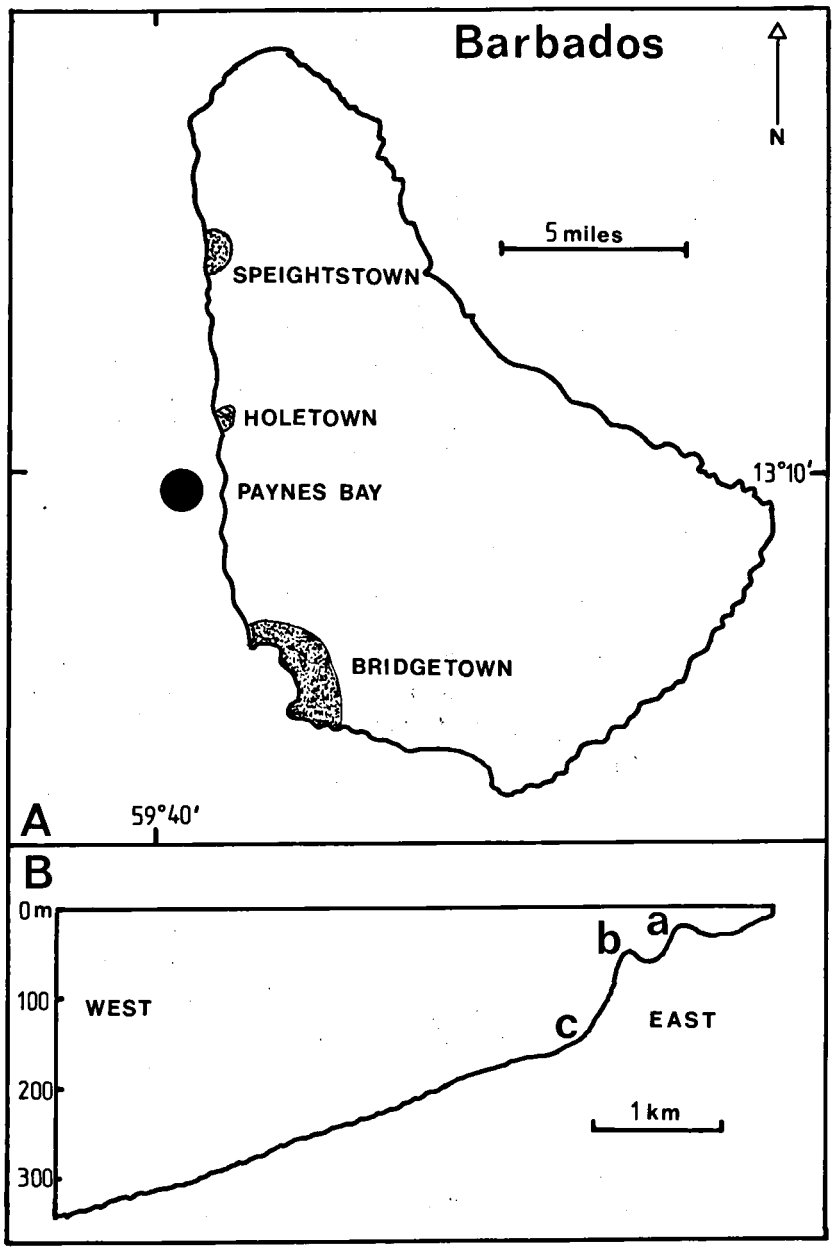

FIGURE 1.A. Map of Barbados, showing approximate location of study area (black dot). B. Profile of the sublittoral and upper shelf in a transect off Paynes Bay on the west coast of Barbados; a = top of the first ridge or barrier reef, b = the top of the second, fossil barrier reef, c = the break in the slope of the sea floor at 137 m.

(RWMVS). The two collections combined, with the preliminary identifications of LEWIS' (1965) material by Prof. W.D. HARTMAN, enabled us to get a clear picture of the deep-water sponge fauna, its composition, distribution and ecology.

GEOLOGICAL AND HYDROGRAPHICAL CONDITIONS

Barbados (cf. Fig. 1a), the easternmost island of the Lesser Antilles, forms a rising top on the N-S running Barbados Ridge situated in the so-called 'Lesser Antilles deformed belt' (CASE & HOLCOMBE, 1980). Therefore, the shelf or the sublittoral zone is very narrow, mostly less than five kilometres, around the whole island. Between 80 and 85% of the 430 km^2 surface of the island consists of Pleistocene coral rocks (the Coral Rock Formation). In the NE part of the island, older, Tertiary deposits crop out, especially in the 'Scotland District' (SAUNDERS, 1965). The seaward transportation of sediments from the island is insignificant, particularly westwards as two submerged barrier reefs hinder transport (MACINTYRE, 1967). The crest of the oldest of these reefs, the fossil barrier reef, which was probably formed between 15,000 and 12,500 Y.B.P., is now situated at a depth of about 70 m (Fig. 1b). Eustatic and isostatic movements in the late Quaternary period played a significant role in controlling the nature of the surface sediments near the shelf edge. Sea level was situated 100–120 m below present level 15,000–19,000 Y.B.P. during the glacial maximum. From c. 16,000 to c. 7,000 Y.B.P. a relatively quick rise in sea level took place, whereas from 7,000 Y.B.P. until present day the rise was relatively slow (JAMES & GINSBURG, 1978). These eustatic conditions must be related to the local isostatic movements.

From the sample areas there are no hydrographical data available, but for other stations off the west coast (LEWIS, *et. al.*, 1962), it has been demonstrated that the characteristic 'intrusion' of highly saline, relatively nutrient-poor waters in depths from about 100 to 200 m found in many parts of the Caribbean region (e.g. PARR, 1936; JOHANNESSEN, 1968; JAMES & GINSBURG, 1978) is clearly present. Current conditions are poorly known. In general, the water down to 600–700 m runs W to NW in the passages between the islands of the Lesser Antilles, reaching their greatest speed at about 300 m.

MATERIAL AND METHODS

Paynes Bay samples were collected by means of a naturalist's rectangular dredge 2.5–2.75 mm mesh. All biogenic materials, regardless of the taxon, were sorted into three size categories: 2–9 mm diameter, 9–30 mm and > 30 mm. All organisms, sponges included, were dried in an oven, and counted; sponges were preidentified using growth form, consistency and surface characteristics. Of each preidentified taxon several samples were preserved dry and ultimately identified using light-microscopic slides and SEM preparations (described in BUIZER & VAN SOEST, 1977). Alleynes Bay samples were dredged up with 6.25 mm mesh rectangular dredge; samples were preserved in ethanol. Depths of the samples ranged between 90 and 324 m.

SYSTEMATIC DESCRIPTIONS

SUBPHYLUM SYMPLASMA
CLASS HEXACTINELLIDA
SUBCLASS HEXASTEROPHORA

Order **DICTYONINA**

Family **AULOCYSTIDAE** Schulze, 1886

Genus **Aulocystis** Schulze, 1886

Aulocystis grayi (Bowerbank, 1869)

Myliusia grayi BOWERBANK, 1869: 335, pl. 23 fig. 8, pl. 25 fig. 1.
Myliusia zittelii SCHMIDT, 1880: 51, pl. 3 fig. 11–12, pl. 4 fig. 5, pl. 6 fig. 4.
Aulocystis grayi, SCHULZE, 1887: 359, pl. CIV 7; Moret, 1926: pl. 23 fig. 1.
(Not: *Aulocystis grayi*, SCHULZE, 1900: 1, pl. 1–11 = *A. grayi polae* Ijima, 1927: 303).

Material: ZMA POR. 5145, 5146, Off Paynes Bay, 153 m, 3-VIII-1978/14-IX-1978.

Description Pl. 1 fig. 1–2, text-fig. 2a):
Four small fragments, of which the largest is about 3 cm high, up to 3.5

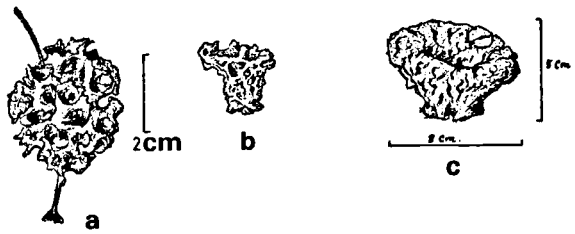

FIGURE 2. Habits of hexactinellid sponges, a. *Aulocystis grayi*, b. *Cyrtaulon sigsbeei*, c. *Dactylocalyx pumiceus*.

cm in diameter; it has the characteristic habit of a honey-combed system of round tubules 3–6 mm in diameter; consistency brittle.
Colour (dry): pale brown, whitish grey to white.
Ectosome: absent because specimens are macerated.
Choanosome: rigid dictyonine frame-work; skeletal meshes are oval or rectangular, 150–450 μm in largest dimensions; lychniscose knots average 100 μm in diameter.
Spicules: fused hexaradiates, ornamented with rows of small spines, averaging 25–40 μm in diameter, loose hexaradiates often with one ray very short, normally lightly acanthose, with rays of 120–225 by 3–5 μm, discohexasters 50–65 μm in diameter.

Ecology: Incrusting sediment lumps and Antipatharian stems; depth range 153–1461 m.

Distribution: Barbados, St. Vincent (Bowerbank, 1869), Guadeloupe (Schmidt, 1880), Haiti (Moret, 1926).

Discussion: *A. grayi polae* Ijima (1927) from the Red Sea (considered to be the same species as the present one by SCHULZE, 1900) merits separate specific status as *A. polae* in view of the considerable morphological differences and geographic separation.

Family **TRETODICTYIDAE** Schulze, 1886

Genus **Cyrtaulon Schulze, 1886**

Cyrtaulon sigsbeei (Schmidt, 1880)

Volvulina sigsbeei SCHMIDT, 1880: 58, pl. III 14–15, pl. IV 6, pl. VI 6.
Cyrtaulon sigsbeei; SCHULZE, 1886: 333, pl. XCII.

Material: ZMA POR. 5147, Off Paynes Bay, 108–170 m, VI-1978/V-1979.

Description (Pl. 1 fig. 3–4, text-fig. 2b):

Numerous specimens, the largest of which tend to become an irregular cup or a vase, of up to 4.5 cm in height, 3 cm wide, riddled with holes of 1–3 mm in diameter, which traverse the whole body; surface hispid – tubercular; consistency hard and fragile.

Ectosome: absent (macerated).

Choanosome: dictyonine skeleton forming irregular triangular, quadrangular, or polygonal meshes, 50–400 μm in size; the nodes are often somewhat swollen.

Spicules: fused spicules of the main skeleton are often slightly acanthose and average 10–40 μm in diameter; loose spicules include acanthose uncinata with characteristic centrotylote swelling: 550–950 by 2–4 μm; simple, lightly acanthose hexasters: 30–70 μm, which seem to be incipient hexaradiates of the main skeleton, as they are frequently fused; modified discohexasters, which tend to form scopulae: rays 50 μm, long stalks up to 150–200 by 1 μm (the rays do not issue from a common central point, but branch and fork); no dermal scopulae have been foud.

Ecology: Common below 144 m, only once found between 100 and 144 m.

Distribution: Barbados, St. Vincent (Schmidt, 1880).

Discussion: This species has been expertly redescribed by SCHULZE; a related species, *C. solutus* Schulze (1886), occurs in Indonesian waters.

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Family **EURETIDAE** Schulze, 1886

Genus **Dactylocalyx** Strutchbury, 1841

Dactylocalyx pumiceus Stutchbury, 1841

Material: ZMA POR. 3826, 1 mile off Holetown, 200 m.
ZMA POR. 3827, 0.5 mile off Holetown, 100 m.
ZMA POR. 5148, Off Paynes Bay, 153–211 m, VI-1978/V-1979.

Description (Pl. 1 figs 5–6, text-fig. 2c):

Several larger and smaller pieces, presumably fragments of flattened cups; largest piece 18 by 19 by 3 cm, so entire specimens may reach a considerable size; surface pitted and holed by larger and smaller holes, undulating, uneven; consistency brittle, fragile.

Colour (dry): whitish grey.

Ectosome: not available (although a few spirit fragments have been examined).

Choanosome: tight-meshed with thick, fused hexaradiates; few loose spicules could be found, owing to the macerated state of most of the material; the skeleton meshes are polygonal and of widely ranging size: 30–220 μm in diameter; surface of spicules heavily acanthose with spines often on warty elevations; diameter 30–110 μm.

Ecology: Common between 144 and 180 m.

Distribution: West Indies, several Atlantic localities (SCHULZE, 1886), Brazilian waters (MOTHES DE MORAES, 1977).

Discussion: Several other species of *Dactylocalyx* are reported from West Indian waters; these are either synonyms of the present species or representatives of other genera.

WEST INDIAN HEXACTINELLIDS

About 30 species of Hexactinellids have been reported to occur in West Indian waters (cf. table 1). Most of these are known from only a single record and thus are ill-known and in need of revision.

TABLE I

HEXACTINELLIDA FROM DEEP WATER (> 50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS

Amphidiscophora:	
Hyalonema sieboldi Gray, 1859	?
Hyalonema toxeras (W. Thomson, 1877)	valid species
Hyalonema schmidti (Schulze, 1899)	valid species
Pheronema annae (Leidy, 1869)	valid species
Hexasterophora: Lyssacina	
Euplectella jovis Schmidt, 1880	?
Euplectella nodosa Schulze, 1886	valid species
Euplectella suberea W. Thomson, 1877	valid species
Rhabdoplectella tintinnus Schmidt, 1880	valid species
Hertwigia falcifera Schmidt, 1880	valid species
Regadrella phoenix Schmidt, 1880	?
Sympagella nux Schmidt, 1870	valid species
Scleropegma herculeum Schmidt, 1880	?
Scleropegma lanterna Schmidt, 1880	?
Scleropegma seriatum Schmidt, 1880	?
Asconema setubalense Kent, 1870	valid species
Asconema kentii Schmidt, 1880	?
Dictyonina	
Iphiton panicea Bowerbank, 1869	valid species
Aphrocallistes beatrix Gray, 1858	valid species
Aphrocallistes bocagei Schmidt, 1870 (= *A. beatrix*)	junior syn.
Dactylocalyx pumiceus Stutchbury, 1841	valid species
Dactylocalyx ingalli Bowerbank, 1869	?
Dactylocalyx patella Schulze, 1887	?
Dactylocalyx potatorum Schmidt, 1880 (= *D. pumiceus*)	junior syn.
Myliusia callocyathus Gray, 1859	valid species
Myliusia conica (Schmidt, 1880) (as *Scleropegma*)	valid species
Cyrtaulon sigsbeei (Schmidt, 1880) (as *Volvulina*)	valid species
Margaritella coeloptychoides Schmidt, 1880	valid species
Auloplax compressa (Schmidt, 1880) (as *Joanella*)	valid species
Lefroyella crispa (Schmidt, 1870) (as *Myliusia*)	valid species
Lefroyella zittelii (Schmidt, 1880) (as *Syringidium*) (= *L. crispa*)	junior syn.
Claviscopula fecunda (Schmidt, 1870) (as *Farrea*)	valid species
Bathyxiphus subtilis Schulze, 1899	valid species
Rhabdodictyon delicatum Schmidt, 1880	valid species
Aulocystis grayi (Bowerbank, 1869) (as *Myliusia*)	valid species
Aulocystis zittelii (Marshall, 1875) (as *Myliusia*) (= A. *grayi*)	junior syn.
Incertae sedis:	
Diaretula cornu Schmidt, 1880	
Diaretula muretta Schmidt, 1880	
Cyathella lutea Schmidt, 1880	
Diplacodium mixtum Schmidt, 1880	
Rhabdostauridium retortula Schmidt, 1880	
Cystispongia superstes Schmidt, 1880	

SUBPHYLUM CELLULARIA
CLASS DEMOSPONGIAE
SUBCLASS TETRACTINOMORPHA

Order ASTROPHORIDA

Family GEODIIDAE Gray, 1867

Genus Geodia Lamarck, 1815

Definition: Geodiidae with cortical sterrasters and sphaerasters, and among the megascleres subcortical orthotriaenes.

Geodia gibberosa (Lamarck, 1815)

For extensive synonymy cf. HECHTEL, 1965.

Material: ZMA POR. 3820, 0.5 mile off Holetown, 100 m.

Description (text-fig. 3):

Oblong, incrusting specimen of 3 cm long, 2 cm wide and 2 cm high, buried in coral rubble; surface smooth, small pore-sieves evenly distributed, barely visible to the naked eye; a few oscules of about 1 mm in diameter are also present; consistency tough.

Colour(spirit): yellow-white.

Ectosome: the usual crust of sterrasters, with small sphaerasters on top and between them; pore areas free of sterrasters, but with abundant sphaerasters surrounding the individual pores.

Choanosome: radiate architecture, becoming pulpy-confused subcortically towards the interior.

Spicules: oxeotes up to 1500 by 25 μm; cortical small oxea characteristically 150 by 5 μm; orthotriaenes averaging 800 by 22 μm with clads of 220 μm; protriaenes are rare, only a single broken one was found; sterrasters perfectly isodiametric, 50–60 μm in diameter; sphaerasters of two distinct categories, cortical ones with reduced strongylote rays: 4–8 μm, and multirayed oxysphaerasters: 10–20 μm.

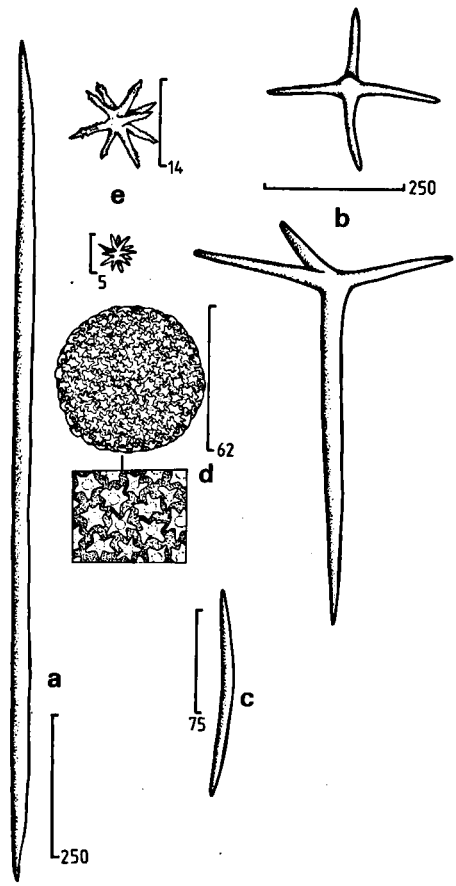

FIGURE 3. *Geodia gibberosa*, a. oxeote megasclere, b. orthotriaenes, c. cortical small oxea, d sterraster, with detail in inset, e. sphaerasters (two size categories).

Ecology: Apparently rare in deeper water; common in shallow water.

Distribution: Tropical Atlantic, possibly also on the Pacific coast of Middle America (DE LAUBENFELS, 1936b).

Discussion: For an extensive description of this species the reader is referred to HECHTEL (1965) and WIEDENMAYER (1977). *Geodia cariboea* Duch. & Mich. (1864) is here considered a synonym of *G.gibberosa* in spite

of WIEDENMAYER's opinion. The smallest category of sphaerasters seems to be missing from the type specimen of *G.cariboea*, but these might have worn off; the single dichotriaene found in the specimen so far, can hardly serve as a specific difference. *Geodia media* var. *leptorhaphes* Uliczka (1929) is similar to *G.gibberosa*, but has the oscules in sieve-like groups.

Geodia cf. **megastrella** Carter, 1876

Geodia megastrella CARTER, 1876: 400, pl. XVI 46; TOPSENT, 1911: 1, pl. 1; TOPSENT, 1928 109, pl. 1 30.

Material: ZMA POR. 5272, Off Paynes Bay, 144–153 m, 11-VIII-1978.

Description (Pl. 11 figs 1–4, text-fig.4):

Lumpy-lobate, 10 by 10 by 7 cm, with an apical depression of 1.5 cm in diameter and a depth of 3 cm; no distinction between pores and oscules is apparent, both consist of evenly distributed small groups of 'pores'; surface smooth but hispid due to projecting megascleres; consistency (dry) stony. Colour (dry): pale yellow, choanosome dark brown.

Ectosome: the usual cortex of sterrasters coated with a layer of strongylosphaerasters; total thickness 2 mm.

Choanosome: radiate architecture, becoming confused-crumbly in the interior.

Spicules: oxeotes: 2700–3400 by 25–40 μm; cortical small oxea: 150 by 3–4 μm; orthotriaenes: 1000–4800 by 35–50 μm, clads 160–300 μm; anatriaenes: 1500–1700 by 10–15 μm, clads: 25–55 μm; sterrasters, slightly oval: 70–110 μm; lightly spined oxyasters: 25–31 μm, with 6–8 rays, cortical strongylosphaerasters: averaging 10 μm; subcortical oxysphaerasters: 15–22 μm.

Ecology: Rare at 144–153 m, elsewhere from 200–2380 m.

Distribution: Barbados, off Portugal (CARTER, 1876), off Brittanny (?) (TOPSENT, 1911), Madeira (?) (TOPSENT, 1928).

Discussion: The specimen largely agrees with CARTER's description, except for the cortical small oxea, which could easily have been overlooked. Conspecificity with TOPSENT's material is less certain, because TOPSENT

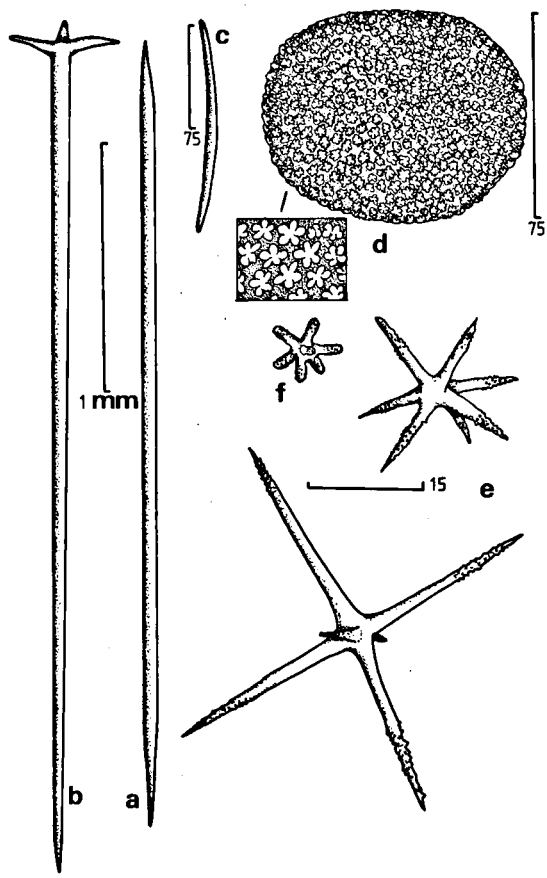

FIGURE 4. *Geodia* cf. *megastrella*, a. oxeote megasclere, b. orthotriaene, c. cortical small oxea, d. sterraster, with detail in inset, e. oxysphaerasters, f. strongylosphaeraster.

quotes larger sterraster sizes than our specimen (and CARTER's). TOPSENT may have been misled by SOLLAS (1888), who cites *G. megastrella* as having sterrasters of 183 μm, whereas CARTER gives 117 μm. TOPSENT's material might turn out to be *G.pachydermata* Schmidt (1870).

Genus **Caminus** Schmidt, 1862

Definition: Geodiidae with reduced cortical strongylasters (spheres) and calthrops-like orthotriaenes.

Caminus sphaeroconia Sollas, 1886

Caminus sphaeroconia SOLLAS, 1886: 196; SOLLAS, 1888: 214; ULICZKA, 1929: 52, figs. 46–50.

Material: ZMA POR. 3819, 0.5 mile off Holetown, 100 m.

Description (Pl. II figs 5–6, text-fig. 5):

Cushion-shaped, 3 by 1.5 by 1.5 cm, with smooth surface; pores evenly distributed; oscules few, single, with slightly raised rims, diameter about 1 mm; consistency tough.

Colour (spirit): grey.

Ectosome: the usual cortex (0.5 mm thick) of sterrasters, strengthened by minute spheres.

Choanosome: pulpy, confused, due to the small size of the megascleres.

Spicules: oxeotes, mostly with strongylote apices: 300–550 by 10–16 μm; orthotriaenes with almost isoactine clads and rhabd: 250–300 by 10 μm (clads 200–250 μm); sterrasters, isodiametric: 45–90 μm; spheres (which are covered with numerous short spines): 3–4 μm.

Ecology: Deeper water.

Distribution: Barbados, off Brazil, Virgin Islands.

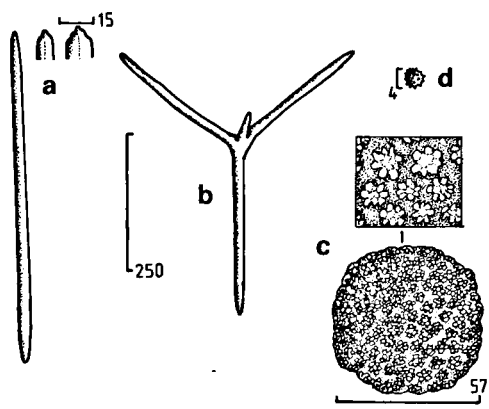

FIGURE 5. *Caminus sphaeroconia*, a. oxeote-strongylote megascleres (with enlarged varia tions of apices), b. orthotriaene, c. sterraster, with detail in inset, d. sphere.

Discussion: The generic distinctness of *Caminus* depends heavily on the question whether Mediterranean specimens described as *C.vulcani* Schmidt (1862), and tropical Atlantic specimens described as *C.sphaeroconia* are specifically distinct. If not, then the genus *Caminus* can be reduced to a subgenus or just a distinct species of *Geodia*. *Caminus apiarium* Schmidt (1870) from deep water off Florida is an ill-known Geodiid, but through its lack of spheres not closely related to the present species.

Genus **Erylus** Gray, 1867

Definition: Geodiidae with flattened or disc-shaped sterrasters and ectosomal microrhabds.

Erylus transiens (Weltner, 1882)

?Stellettinopsis euastrum; SCHMIDT, 1880: 76 (not: *Erylus euastrum* SCHMIDT, 1868)
Stelletta transiens WELTNER, 1882: 44, pl. 2 figs 22–25.
Erylus transiens; TOPSENT, 1892: 47, pl. 5 fig. 13.
Erylus alleni DE LAUBENFELS, 1934: 7.
?Erylus clavatus PULITZER-FINALI, 1986: 80, figs. 14–15.

Material: ZMA POR. 3809, 0,5 mile off Holetown, 100 m (16 specimens).

Description (Pl. III figs 1–6, text-fig.6):

Predominantly upright, finger-shaped, but may also be repent; size: up to 6 cm high, 1 cm in diameter; no apparent oscules; surface smooth, often heavily incrusted with sand and other foreign material; consistency tough but resilient.

Colour (spirit): greyish white to dark brown.

Ectosome: the usual crust of aspidasters covered with microrhabds; pores slightly elevated with a collar of microrhabds.

Choanosome: weakly developed radiate architecture, tending to be somewhat confused, due to the relative shortness of the megascleres.

Spicules: large oxea, sometimes stylote or even tylote modifications: 700–2000 by 10–35 μm; orthotriaenes with long clads and short rhabds: 150–500 by 10–30 μm, clads: 100–400 μm; rare dichotriaenes (only a single broken one was found with clads of 200/18 μm); oval thin aspidasters with almost smooth surface and crenulated edges in the young stage, but

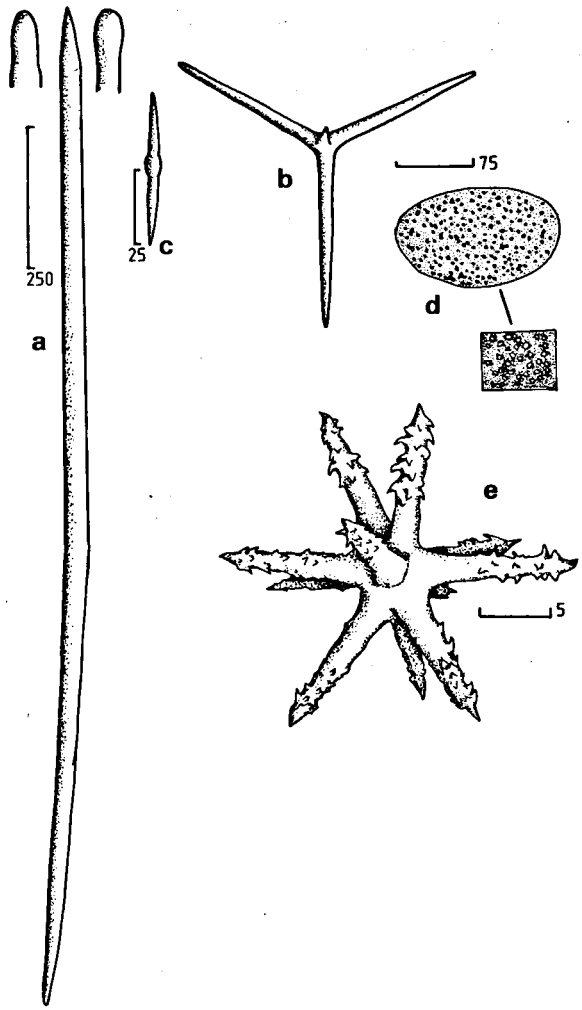

FIGURE 6. *Erylus transiens*, a. oxeote megasclere, with variations of apex, b. orthotriaene, c. centrotylote microxea, d. aspidaster, with detail in inset, e. oxyaster.

developing a granular surface of small warts in adult spicules: 100–190 by 60–100 μm; oxyasters with spined rays, probably in two size ranges, tending towards spheraster-like shape: 7–28 μm; centrotylote microxea (microrhabds): 30–58 by 1–3 μm.

Ecology: Apparently common at 100 m, elsewhere down to 1384 m.

Distribution: Barbados, Azores.

Discussion: According to previous authors *E.transiens* is a synonym of *E.euastrum* Schmidt (1868) from the Mediterranean. However, this species has smooth oxyasters, which together with the geographic separation seems enough evidence for specific distinctness. TOPSENT's (1928) figure of *Stelletinopsis euastrum* Schmidt (1880) from Grenada resembles our material. The status of SCHMIDT's material remains uncertain in view of TOPSENT's (1923) redescription.

E.alleni De Laubenfels (1934) from deep water off Puerto Rico is a junior synonym (holotype USNM 22268 examined); the only difference with our specimen is the more distinct size categories of oxyasters, but the size range is similar. *E.clavatus* Pulitzer-Finali (1986) seems to be a synonym; the only difference is perhaps the narrower width of the aspidasters. *E.goffrileri* Wiedenmayer (1977) and *E.bahamensis* Pulitzer-Finali (1986) from shallow water near the Bahamas, represent species close to *E.transiens*.

Genus **Pachymatisma** Bowerbank in JOHNSTON, 1842

Pachymatisma geodiformis n.sp.

Material: Holotype: ZMA POR. 5269, Off Paynes Bay, 144–153 m.
Paratypes: ZMA POR. 5270, Off Paynes Bay, 153 m (3 specimens).
Paratype: ZMA POR. 5271, Off Paynes Bay, 11-VIII-1978, 108–153 m.

Description (Pl. IV fig. 1, text-fig.7):

Club-shaped, tending to form a shallow cup; up to 10 cm wide, 8 cm high; oscules distributed in groups on the top or on the inside of the cup, single; pores evenly distributed over the sides; oscules 2–3 mm in diameter, pores 0.2–1 mm; both have distinct, raised rims; surface between raised rims smooth; consistency unknown (dry condition).

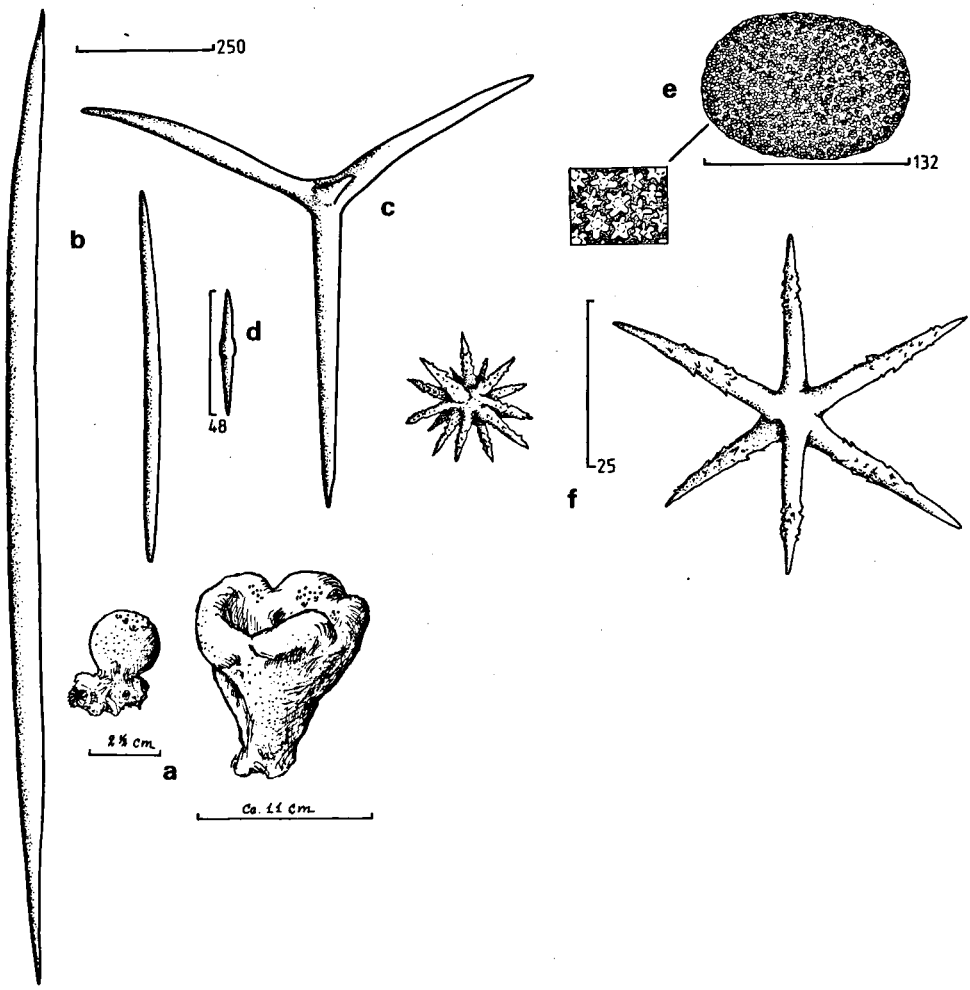

FIGURE 7. *Pachymatisma geodiformis* n. sp., a. habit, b. oxeote megascleres in two sizes, c. orthotriaene, d. centrotylote microxea, e. sterraster, with detail in inset, f. sphaeraster and oxyaster.

Colour: alive whitish grey; in the dry state ochre-yellow to brown.
Ectosome: the usual cortex of sterrasters covered and strenghthened by microrhabds; these form a palissade around oscules and pores (hence the raised rims).
Choanosome: radial architecture, becoming confused internally; colour of the choanosome darker than that of the cortex (in the dry state).
Spicules: oxeotes: 700–2600 by 20–60 μm (there seems to be a definite category of shorter (700–1000 μm) oxeotes which often show stylote or even tylote modifications); orthotriaenes, rhabds: 700/35 μm, clads: 450–600 by 30–40 μm; oval *Geodia*-like sterrasters: 110–140 by 80–110 μm; acanthose oxyasters with 6–11 rays: 42–60 μm; multi-rayed spherasters: 15–22 μm; smooth ectosomal centrotylote microxea (microrhabds): 40–57 by 2–3.5 μm.

Etymology: The name refers to the *Geodia*-like sterrasters.

Ecology: Common between 108 and 153 m.

Distribution: Barbados.

Discussion: There is a small possibility that the present material may belong to *Caminus apiarium* Schmidt (1870) described from deep water off Florida. SCHMIDT's description mentions smooth centrotylote microxea(?), but SOLLAS' (1888) redescription omits this. Other details such as the peculiar oxyasters and the lack of triaene spicules do not match at all, so conspecificity is unlikely.

The two species assigned to *Pachymatisma* (viz. *P.johnstonia* (Bowerbank, 1841) and *P.areolata* Bowerbank, 1872), differ from the present species in the possession of acanthose microrhabds and radiate oxeotes which are mostly strongyles. Both characters are probably of little generic value, but render it possible that the generic distinctness of *Erylus*, *Pachymatisma* and *Geodia* ought to be challenged.

The new species is close to *Erylus polyaster* Von Lendenfeld (1907) from South Africa; they differ in spicule sizes and habit.

12 species (cf. table II) have been recorded from deeper water, six of which are probably valid, two are certain synonyms; the four remaining ones are ill-known. ULICZKA's (1929) material is not included in table II because it is not indicated from which depths his material originated.

Family **ANCORINIDAE** Schmidt (1862)

Genus **Stelletta** Schmidt (1862)

Synonym: *Myriastra* SOLLAS (1886).

Definition: Ancorinidae with the simple spicule complement of radiate oxeotes and triaenes, and one or several categories of euasters.
Remark: The taxonomy of West Indian *Stelletta* appears to be in a state of confusion, caused by SCHMIDT's (1870, 1880) tantalizing short discriptions and some striking descrepancies between these and later redescriptions by SOLLAS (1888) and TOPSENT (1923). Identifications thus are tentative. A thorough revision of this group is needed, in which other Atlantic and Mediterranean deep-water material should be included.

Stelletta sp. aff. **pumex** (Nardo, 1847)

Tethia pumex NARDO, 1847:4.
Stelletta pumex; SCHMIDT, 1864:32, pl. III fig. 9.

Material: ZMA POR. 3815, 0.5 mile off Holetown, 100 m.

Description (text-fig.8):

Irregularly incrusting mass; 6 by 4 by 4 cm; surface heavily incrusted, lumpy, but smooth in places; no apparent oscules; consistency leathery, tough.
Colour (spirit): dark purple brown.
Ectosome: a thin crust of chiasters.
Choanosome: radiate-confused architecture.

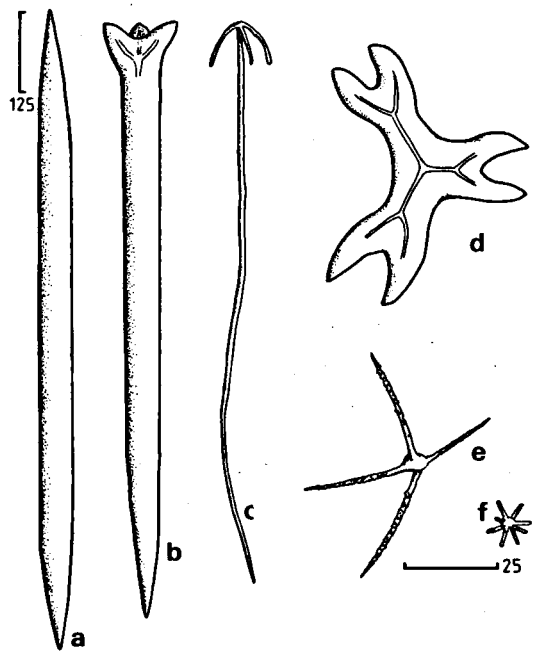

FIGURE 8. *Stelletta* cf. *pumex*, a. oxeote megasclere, b. plagiotriaene, c. anatriaene, d dichotriaene, e. oxyaster, f. chiaster.

Spicules: oxea, relatively small, fusiform: 550–1500 by 20–40 μm; numerous plagiotriaenes, characteristically with reduced, vestigial clads: 400–1000 by 15–40 μm; a single dichotriaene was found with bifurcated clads: 400/25 μm (clads 150 μm), also a single anatriaene was found: 910/12 μm, clads 35 μm; chiasters with 4–10 rays: 8–10 μm; acanthose oxyasters, with 4–8 rays: 15–40 μm.

Ecology: Rare at 100 m, elsewhere also in more shallow waters.

Distribution: Barbados, Mediterranean.

Discussion: The present (tentative) identification is made on similarities of the habit, colour, spicule sizes and categories; still, there are important descrepancies with Mediterranean specimens: the reduced vestigial clads of the plagiotriaenes are not found in them (they remind of the ones figured by

PULITZER-FINALI (1986: fig. 7) from material identified by him as *Stelletta pudica*), there are no dichotriaenes or anatriaenes reported from them, and oxyasters are apparently smaller. In the present state of confused taxonomy of *Stelletta* we prefer to stress the similarities rather than add another new species.

Stelletta cf. **gigas** (Sollas, 1886)

Pilochrota gigas SOLLAS, 1886: 190; SOLLAS, 1887: 124, pl. XX figs. 1–13.

Material: ZMA POR. 5314, Off Paynes Bay, 19-IX-1978, 153 m, fragment.

Description (Pl. IV fig. 2, text-fig. 9):

In the shape of a flaring cup; 23 cm in diameter at the upper part, 8 cm at the base, 15 cm high; oscules on the inside of the cup, 1–3 mm in diameter; surface of the inner wall smooth, outer wall hispid; consistency hard.
Colour (dry): greyish yellow to ochre-yellow.
Ectosome: a thin cortex of chiasters, on the outside pierced by long oxea.
Choanosome: radiate architecture.
Spicules: oxeotes in two size categories: long thick, fusiform oxea of up to 4 mm by 70–95 μm, and smaller, slim oxea: 600–800 by 12–20 μm; no triaene spicules could be found, except for a single small calthrops (rays 100 μm, probably not proper), and one promonaene modification; chiasters (strongylasters) with 6–10 rays: 10–12 μm.

Ecology: Apparently rare at 153 m.

Distribution: Barbados, St. Paul's Rocks.

Discussion: The type of SOLLAS differs in habit from our specimen (it is more irregular in shape); moreover it has orthotriaenes of 2 mm in length and the smaller category of oxea is longer. These differences cast doubt upon the conspecificity of both; other features, however, are similar, while habit and presence or absence of triaenes are notably variable in the whole of the Tetractinellida.

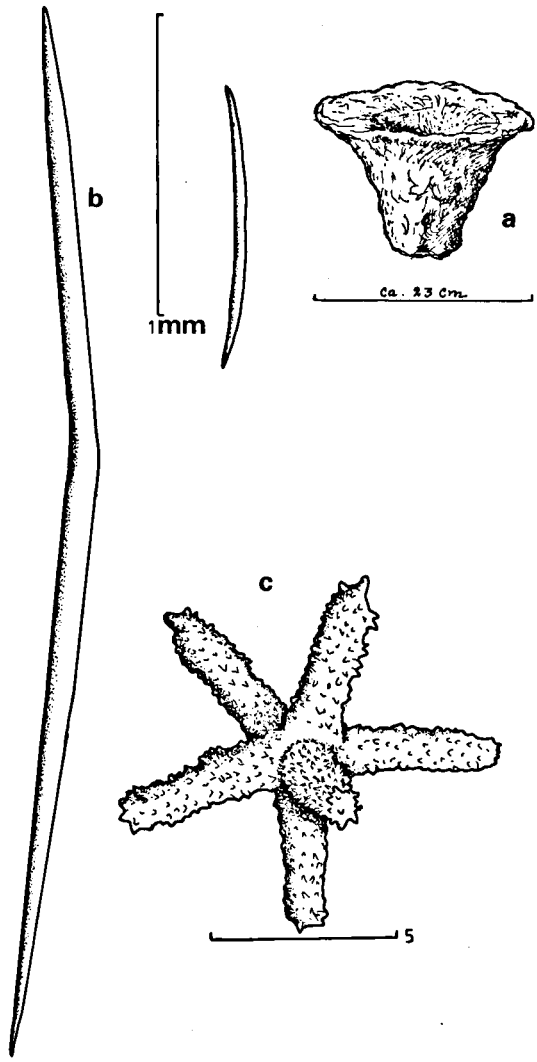

FIGURE 9. *Stelletta* cf. *gigas*, a. habit, b. oxeote megasclere, in two size categories, c. chiaster.

Stelletta cf. **anancora** (Sollas, 1886)

Pilochrota anancora SOLLAS, 1886: 189; SOLLAS, 1888: 132, Pl. XIV figs. 16–22.
Pilochrota tenuispicula SOLLAS, 1886: 190.
Stelletta anancora; BURTON, 1954: 220.

Material: ZMA POR. 5311, 0.5 mile off Holetown, 100 m.

Description (Pl. IV fig. 3, text-fig.10):

Irregular mass of 6 x 3 x 4.5 cm, with depressions containing pore-sieves of 4–8 mm in size; surface irregular, knobbly, grooved but smooth on elevations; consistency leathery.
Colour (spirit): red-brown.
Ectosome: a detachable crust of chiasters.

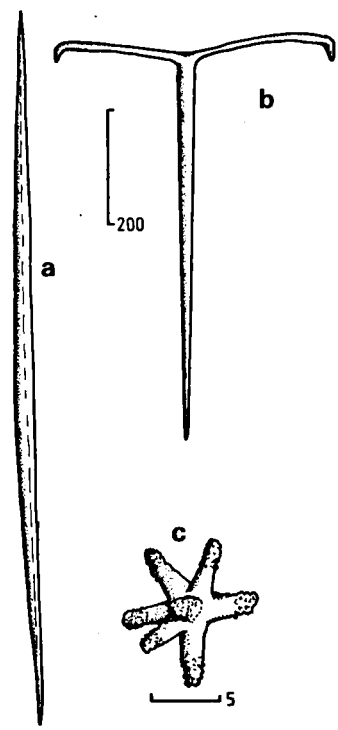

FIGURE 10. *Stelletta* cf. *anancora*, a. oxeote megasclere, b. orthotriaene, c. chiaster.

Choanosome: radiate architecture.
Spicules: oxeotes, slim, curved, relatively small: 700–1300 by 8–22 μm; rare orthotriaenes (clads at right angles to the shaft, but abruptly pointing downwards at the apices): 400–700 by 6–8 μm, clads: 120–180 μm; tylasters (chiasters) with 6–8 rays: 7–10 μm.

Ecology: Rare at 100 m.

Distribution Barbados, Brazil, Bermuda, St. Paul's Rocks.

Discussion: Several discrepancies exist between SOLLAS' description and our specimen; the most important of these is the size of the megascleres, which conform to those of *Pilochrota tenuispicula*. The present small size together with the rarity of triaenes gave rise to the suspicion that this material would better fit in the genus *Jaspis*. It is not unlike *J.pudica* Wiedenmayer (1977), although the megascleres of this species are even smaller. *Stelletta (Myriastra) kallitetilla* De Laubenfels (1936a) has the same habit as our specimen ('cauliflower'), but differs in possessing large amounts of protriaenes and anatriaenes.

The present identification is made largely on the basis of BURTON's (1954) list of synonyms.

Stelletta spec.

Material: ZMA POR. 3835, 0.5 mile off Holetown, 100 m.

Description (text-fig.11):

Small cushion, 1 cm in diameter, 0.5 cm high; surface hispid; consistency hard.
Colour (spirit): grey.
Ectosome: a layer of chiasters pierced by megascleres.
Choanosome: radiate architecture.
Spicules: oxeotes, thick, fusiform: 1400–3100 by 22–50 μm; dichotriaenes: 600–1700 by 9–30 μm, with cladome diameter of 140–250 μm; protriaenes: 1500–1700 by 4–15 μm, clads: 30–80 μm; anatriaenes: 500–1500 by 3–5 μm; tiny chiasters with a thickened centre: 3–5 μm.

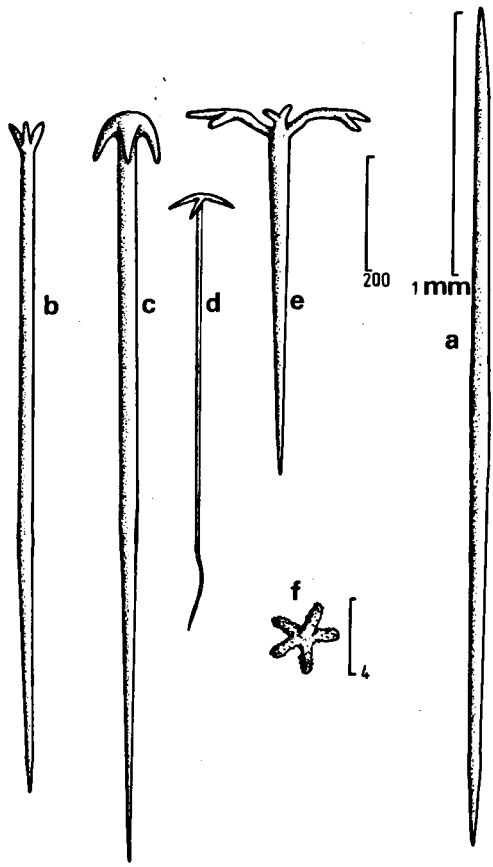

FIGURE 11. *Stelletta* spec., a. oxeote megasclere, b. protriaene, c. large thick anatriaene, d. thin anatriaene, e. dichotriaene, f. chiaster.

Ecology: Rare at 100 m.

Distribution: Barbados.

Discussion: The habit is exactly as described by SCHMIDT (1880) for his *Stelletta profunditatis*, but the description of the asters contrasts this, so we decided against using SCHMIDT's name. TOPSENT (1923) redescribed some of SCHMIDT's slides bearing labels marked with the latter name. The contents

of the slides, which conform to the Spirophorid *Thenea muricata*, are quite probably not conspecific with SCHMIDT's specimen, which appears to be lost.

The tiny chiasters are described in another of SCHMIDT's species, viz. *Stelletta pygmaeorum*, which was assigned to *Ecionema* Bowerbank (1862) by SOLLAS (1888), because SCHMIDT mentions microrhabds as second megasclere category. As SCHMIDT's specimen has never been redescribed we are unaware of its specific status.

Genus **Penares** Gray (1867)

Definition: Ancorinidae with the cortex strengthened by a tight mass of tangential microxea.

Penares mastoidea (Schmidt, 1880)

Stelletta mastoidea SCHMIDT, 1880: 70, Pl. X fig. 1.
Penares mastoidea; TOPSENT, 1923: 9, fig. 2.
?Pachastrissa hartmeyeri ULICZKA, 1929: 50, fig. 41–45.

Material: ZMA POR. 5313, Off Paynes Bay, 14-IX-1978, 153 m, 5 specimens or fragments.

Description (Pl. IV figs 3–5, text-fig.12).

Strongly varying, irregular mass; usually with blunt flabellate or knotty processes. Up to 20 cm in cross section, usually about 10 cm; oscules concentrated on upper parts, 2 mm in diameter, with raised rims, provided with iris-type diaphragm; surface smooth on upper parts, mostly hispid on the sides; pores numerous, evenly distributed over the sides; consistency unknown (dry specimens).

Colour: whitish grey alive, with distinct dark spots surrounding the oscules on the upper parts; in dry condition specimens tend to become a golden ochre-yellow.

Ectosome: a distinct cortex, consisting of a tight mass of microxea.

Choanosome: radiate architecture made up largely by the long oxeotes.

Spicules: middle-sized, thick oxeotes: 1200–2250 by 30–75 μm; occasionally, orthotriaenes or promonaene modifications occur: 1500–2000 by 25–60 μm; rare calthrops-like smaller triaenes (sometimes ortho-, some-

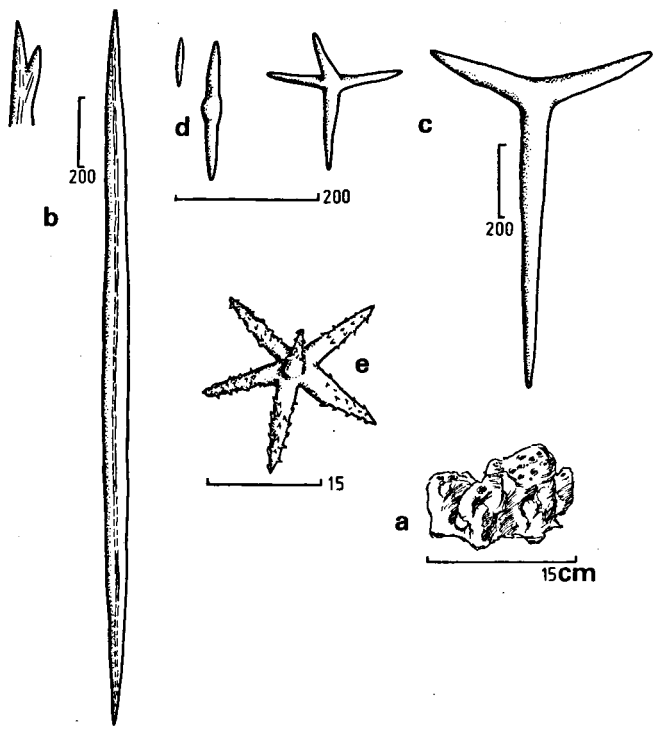

FIGURE 12. *Penares mastoidea*, a. habit, b. oxeote megasclere (with promonaene modification), c. ortho/plagiotriaenes, d. ectosomal small oxea in two size categories, e. oxyaster.

times plagiotriaenes), with rays of 100–200 by 10–15 μm; small ectosomal oxea in two size categories: 30–60 by 1–4 μm, and 140–210 by 9–15 μm (quite a few are distinctly centrotylote, a few seem somewhat rugose); acanthose oxyasters with 4–8 rays: 15–34 μm.

Ecology: Found at 153 m, elsewhere known from 470 m.

Distribution: Barbados, Grenada.

Discussion: The present specimens conform quite closely to TOPSENT's redescription of *Stelletta mastoidea* (1923: 9), but differ somewhat from SCHMIDT's (1880) description and habit figure. ULICZKA's description of *Pachastrissa hartmeyeri* reminds of the present material, too, although spicule sizes differ considerably.

Genus **Asteropus** Sollas, 1888

Definition: Ancorinidae (?) with sanidasters.

Asteropus simplex (Carter, 1879)

Material: ZMA POR. 5302, Off Paynes Bay, 1978/80, 153 m.

Description (Pl. IV fig. 6, text-fig.13):

Cup-shaped, with one side not quite closed; 10 cm high, 7 cm in diameter at the top, with steep walls; two oscules, each across the other on opposing sides of the break in the cup wall; rim and inner surface smooth, outer side hispid; consistency tough, crumbly.

Colour (dry): rim and inner side light brown, outer side dark purple (probably not the proper life colour).

Ectosome: the sketeton of the rim and the inner surface is made up of tangential megascleres carrying abundant sanidasters.

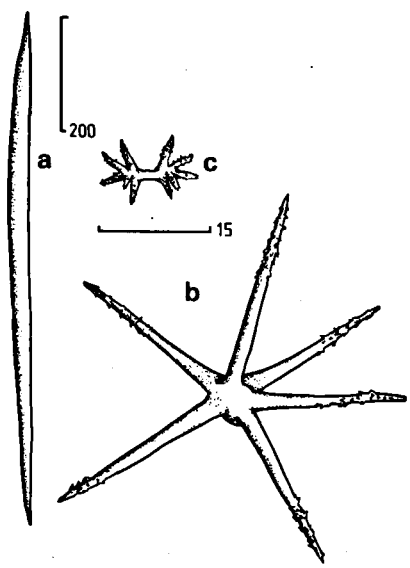

FIGURE 13. *Asteropus simplex*, a. oxeote megasclere, b. oxyaster, c. sanidaster.

Choanosome: radial architecture of huge oxea; sanidasters concentrated in the ectosomal region, oxyasters becoming abruptly abundant 3 mm beneath the surface, leaving the area inbetween devoid of microscleres.
Spicules: large choanosomal fusiform-tapering oxeotes: 1100–2400 by 20–75 μm; ectosomal sanidasters with 5–7 rays on each end of the shaft: 7.5–22 μm, choanosomal oxyasters with 6–10 rays: 30–60 μm.

Ecology: Apparently quite rare at 153 m.

Distribution: Barbados, Haiti (?), Australia, New Zealand, Indo-West Pacific, Hong Kong (e.g. BERGQUIST, 1968, VAN SOEST, 1981b).

Discussion: BERGQUIST (1968) listed the spicule sizes of some *Asteropus simplex* records and from these it is clear that the present specimen cannot be separated from them, although a cup-shaped habit has not been recorded before. The present specimen is the first reliable record of the genus from the Atlantic region.

The genus *Asteropus* is suspect, because it differs only marginally from *Stellettinopsis* Carter (1879) (no sanidasters) and *Stryphnus* Sollas (1888) (triaenes). The upholding of a separate family Jaspidae for Ancorinidae-like sponges in which triaenes are absent (or have not been found) seems to be not justified. The rarity or instability of triaenes in some undeniable Ancorinids makes a strong case for uniting the two families.

Asteropus syringiferus n.sp.

Holotype: ZMA POR. 5307, Off Holetown, 100 m.
Paratypes: ZMA POR. 5308, Off Holetown, 100 m (4 fragmentary specimens).

Description (Pl. V figs 1–2, text-fig.14):

The holotype is a round mass of 2.5 cm in diameter incrusted with dead shells, bearing two conspicuous hollow fistules; the larger fistule of 2 cm long, 4 mm in diameter, is closed at the apex, the shorter one bears an apical oscule; the paratypes are smaller fragmentary specimens; of each the surface is rough to the touch; the consistency is cartilaginous.
Colour (spirit): the main body is grey, the fistules are off-white.
Ectosome: a crust of tangential megascleres carrying numerous sanidasters.
Choanosome: (para-)tangential in the fistule walls, confusedly radiate in the main body.

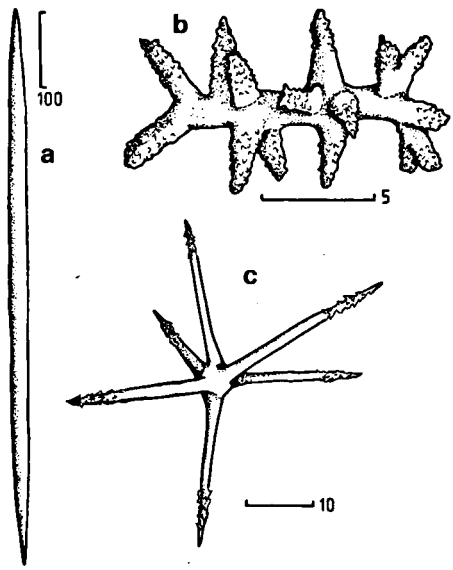

FIGURE 14. *Asteropus syringiferus* n. sp., a. oxeote megasclere, b. sanidaster, c. oxyaster.

Spicules: oxeotes fusiform-tapering: 600–1900 by 15–45 μm; slim, thin sanidasters, verging towards verticillate microrhabds, with up to 15 rays: 12–20 μm; oxyasters with 8–12 rays: 40–60 μm.

Etymology: The name refers to similar habits in *Monosyringa* and *Disyringa*.

Ecology: In shelly substrate, rare.

Distribution: Known only from the type locality.

Discussion: The new species differs from *A.simplex* in habit and spicule size and form; the spicule sizes, and particularly the form of the sanidasters, approach those of *Stellettinopsis ketostea* De Laubenfels (1950), which is here transferred to *Asteropus;* habit and minor size differences of the spicules separate the two species. *A. ketostea* was found to encrust the rocks at 1 m depth.

There seems to be a cluster of related forms with roughly the same external fistule shape, differing in the possession or lack of certain spicule

categories, for which reason they have been distributed over different genera and families. These are *Tribrachium* Weltner (1882), *Disyringa* Sollas (1888), *Monosyringa* Brøndsted (1924), and *Kapnesolenia* De Laubenfels (1934). A comparative study of all these might result in the conclusion that all are closely related (including our present new species), and should bear the same generic name (i.e. *Tribrachium*). In any case, it is almost certain that *Kapnesolenia fisheri* De Laubenfels (1934) is a junior synonym of *Tribrachium schmidti* Weltner; this is suggested by the conspecificity of De Laubenfels' types (USNM 22370) and a specimen identified as *T. schmidti* by Wilson (1902) (USNM 7656).

WEST INDIAN ANCORINIDS

15 Ancorinids (table II) are known from deeper waters in the West Indian region, two of which (*S. tenuispicula* and *Kapnesolenia fisheri*) are regarded as junior synonyms. Five species are ill-known, among which is *Dactylella rhaphoxea* De Laubenfels (1934). The holotype slide preparation in the USNM (22203) does not match De Laubenfels' description; spicules in the slide include small oxy(sphaer-)asters and acanthose rhabds, neither of which are mentioned in the description. The slide belongs to the genus *Tethyorrhaphis* Von Lendenfeld.

Family **PACHASTRELLIDAE** Carter (1875)

Genus **Pachastrella** Schmidt (1868)

Definition: Pachastrellidae with more or less isoactine triaenes (calthrops?).

Pachastrella abyssi Schmidt (1870)

Pachastrella abyssi Schmidt, 1870: 64, pl. VI fig. 4; Schmidt, 1880: 68; Carter, 1876: 407; Sollas, 1888: 104, pl. X fig. 15, pl. XI; Topsent, 1892: 41.
Pachastrella monilifer; Topsent, 1904: 92, pl. II fig. 2; Topsent, 1928: 132 (not: Schmidt, 1868: 15, pl. III fig. 7).

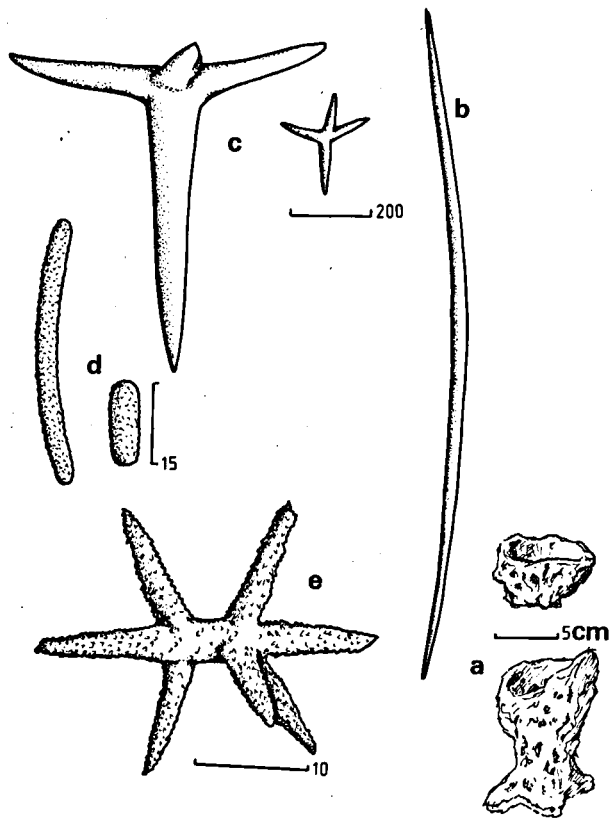

FIGURE 15. *Pachastrella abyssi*, a. habit of a larger and a smaller specimen, b. oxeote megasclere, c. calthrops-like triaenes, d. acanthose microxea, e. rugose amphiaster.

Material: ZMA POR. 5301, Off Paynes Bay, 1978/80, 153 m, 6 fragments.
ZMA POR. 5312, Off Paynes Bay, 8-VI-1978, 153 m.

Description (Pl. V figs 3–6, text-fig.15):

Irregular cups of up to 20 cm long, 10 cm in diameter, with walls of up to 2 cm thick, surface bumpy, flaky, but smooth; oscules small, dispersed; consistency (dry) stony, crumbly, easy to cut.
Colour (dry): mottled yellow-brown, with dark mauve spots.
Ectosome: a thick crust of microrhabds.

Choanosome: a confused mass of mainly triaene megascleres, with relatively few oxeotes.
Spicules: thick, fusiform oxeotes: up to 2 mm by 25–40 μm; calthrops-like triaenes, in widely different sizes: ray lengths varying between 60/5 μm and 650/115 μm; long-rayed rugose amphiasters: 15–26 μm; centrotylote microrhabds with roughened surface: 15/5 μm; acanthose microstrongyles and microxea: 30–35 by 1 μm.

Ecology: Apparently common below 153 m, but occurring as shallow as 108 m.

Distribution: West Indies.

Discussion: TOPSENT (1894) synonymized *P. abyssi* from Florida with the northern Atlantic *P.monilifera* Schmidt (1868). Comparison of the present material with recently collected Norwegian specimens of *P. monilifera* yielded quite a few quantitative differences: Norwegian specimens reach a larger size and their triaenes are considerably bigger; also the cup-shaped habit is absent in the northern material. These differences are here considered evidence of specific distinctness. *Stellettinopsis annulata* Schmidt (1880: 75), redescribed as *Sphinctrella* by TOPSENT (1923) is another deep water species of *Pachastrella* with large (560/20 μm) acanthose oxea.

Genus **Poecillastra** Sollas (1888)

Definition: Pachastrellidae with orthotriaenes.

Poecillastra sollasi (Topsent, 1890)

Characella sollasi TOPSENT, 1890: 70; TOPSENT, 1892: 40, pl. II fig. 3, pl. VIII fig. 6.
Pachastrella dilifera DE LAUBENFELS, 1934: 1.

Material: ZMA POR. 5298, Off Paynes Bay, 1978/80, 216 m.
ZMA POR. 5299, Off Paynes Bay, 1978/80, 153 m, numerous fragments.
ZMA POR. 5300, Off Paynes Bay, 11-V-1979, 162–170 m, 3 fragments.

Description (Pl. VI figs 1–3, text-fig.16):

Flabellate forms, up to 10 cm long by 7 cm high, 15 mm thick; oscules (?) evenly distributed, about 1 mm in diameter and several mm deep; no special oscular and poral surfaces; consistency soft, crumbly.

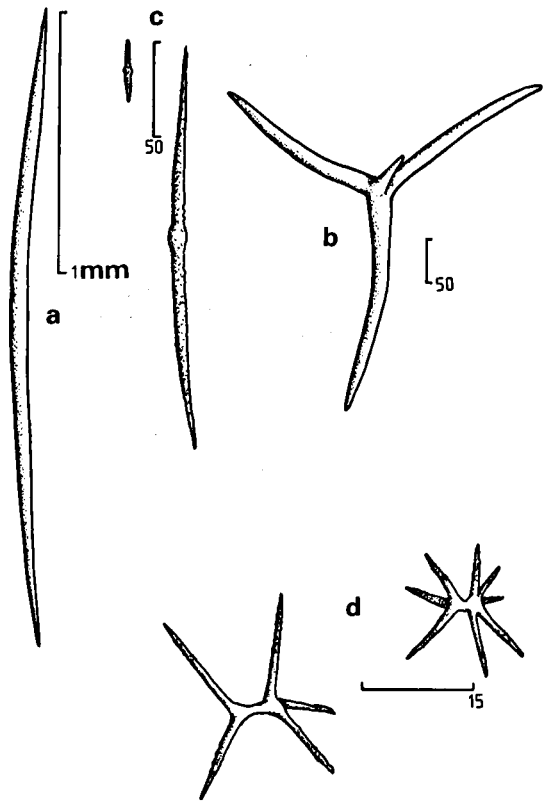

FIGURE 16. *Poecillastra sollasi*, a. oxeote megasclere, b. orthotriaene, c. roughened microxea, in two size categories, d. amphiasters.

Colour (dry): light grey to ochre-yellowish.
Ectosome: a feltwork of amphiasters and small oxea, supported by tangential bundles of large oxea.
Choanosome: confused, non-radiate, with dominant microxea and very few amphiasters, possibly due to the abraded condition of the peripheral region.
Spicules: large oxeotes: up to 4 mm by 60 μm; orthotriaenes, including many curious malformations: rays 200–340 by 13–30 μm; rugose amphiasters with long thin rays, probably dividable into true metasters and spiras-

ter-like ones: 15–30 μm; microxea in two distinct size categories, finely acanthose, often (large ones) or always (small ones) centrotylote: 155–220 by 5 μm, and 36–60 by 2 μm.

Ecology: Common between 108 and 216 m, elsewhere down to 736 m.

Distribution: N-Atlantic, West Indies.

Discussion: The similarity in spiculation of our material and TOPSENT's North Atlantic material is so great, that conspecificity is likely. DE LAUBENFELS' specimen (USNM 22331) of *Pachastrella dilifera* exactly matches the present specimens; his comparative remarks on microrhabds of *Pachastrella* are incorrect.

The genus *Characella* Sollas (1888) is considered to be a junior synonym of *Poecillastra*, because the triaenes of *Poecillastra* are here interpreted as orthotriaenes and not calthrops s.s. The generic distinctness of *Poecillastra* and *Sphinctrella* Schmidt (1870) is doubtful, since it is based on oscule morphology and other habit characters. If they should eventually be united, then *Sphinctrella* has priority.

Poecillastra aspera (Sollas, 1886)

Characella aspera SOLLAS (1886): 186; SOLLAS, 1888: 92, Pl. XL. fig. 6.
Neothenea enae DE LAUBENFELS, 1934: 5.

Material: ZMA POR. 5303, Off Paynes Bay, 144–153 m.
ZMA POR. 5304, Off Paynes Bay, 144–153 m, 13-VI-1978.
ZMA POR. 5305, Off Paynes Bay, 153 m, 14-IX-1978 (5 spec.).
ZMA POR. 5306, Off Paynes Bay, 108–135 m, 25-VIII-1978.

Description (text-fig.17):

Irregular, plate-like lumps which may grow out to form irregular folded-flabellate or shallow cup-shaped masses of up to 15 by 15 by 10 cm; oscules indistinct, infrequent, on the rims; surface undulate, smooth in 'valleys', rough on rims and ridges, and on the inner side of cups; smooth areas flaky, consistency (dry) tough, crumbly.

Colour (dry): ochre-yellow to ochre-brown.

Ectosome: the smooth surface parts are covered by a crust of tangential microxea, carried by a few paratangential large oxea.

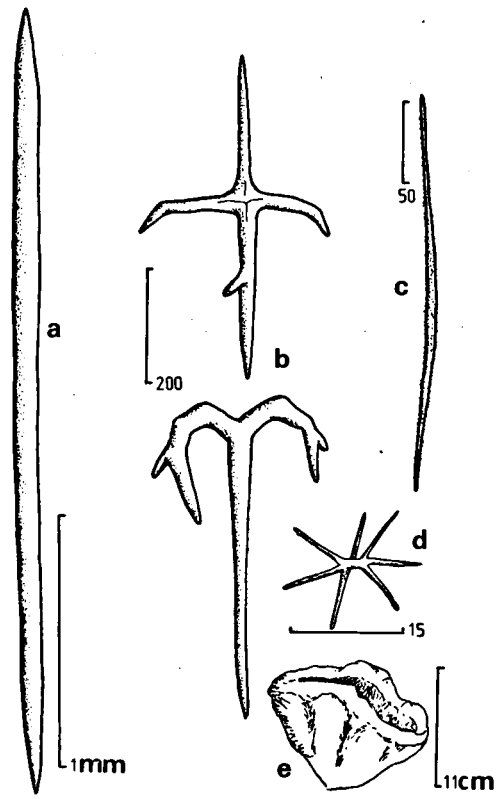

FIGURE 17. *Poecillastra aspera*, a. oxeote megasclere, b. orthotriaenes/dichotriaenes, c roughened microxea, d. amphiaster, e. habit.

Choanosome: confused-radiate with felt-like masses of microxea lining the canal system.

Spicules: large oxeotes: 2–4 mm by 20–100 μm; orthotriaenes, including many curious malformations and dichotriaene modifications: cladome 250–750 by 30–55 μm, clads 200–350 by 15–45 μm; thin-rayed amphiasters: 11–17 μm; roughened microxea, sometimes with centrotylote swelling: 155–250 by 3–7 μm (a few very small microxea of 40 by 1 μm were found.

Ecology: Not uncommon between 108 and 153 m.

Distribution: Barbados, off Brazil.

Discussion: A striking similarity in spiculation is found in *P.aspera* and *P.sollasi*, despite their strongly diverging habit and consistency. Differences are the (virtual) absence of a smaller category of microxea and the rarity of amphiasters in *P.aspera*; also the size and form of the megascleres is somewhat different. Possibly, *Pachastrella connectens* Schmidt (1870: 65) is a synonym of the present species.

WEST INDIAN PACHASTRELLIDS

11 species (table II) have been recorded from deep waters in the West Indian region, two of which are synonyms of well-established species. Four of the remaining ones are ill-known, leaving 5 recognized valid species.

Family **THROMBIDAE** Sollas (1887)

Genus **Thrombus** Sollas (1886)

Thrombus kittoni (Carter, 1874)

Corticium kittoni CARTER, 1874: 253, pl. XV fig. 48a, b, c.

Material: ZMA POR. 3836, 0.5 mile off Holetown, 100 m.

Description (text-fig.18):

A thin incrustation of several mm² on vermetid tubes; no oscules apparent; consistency soft and fragile.

Colour (spirit): dark brown.

Ectosome: organic, carried by subectosomal spicules.

Choanosome: confusedly arranged spicules with much organic material; architecture difficult to study.

Spicules: acanthodichotriaenes, normally tri-forked ('trichotriaenes'), but plagiotriaene and dichotriaene growth stages are common: rhabd 75–120 by 12–20 μm, chord 65–150 μm.

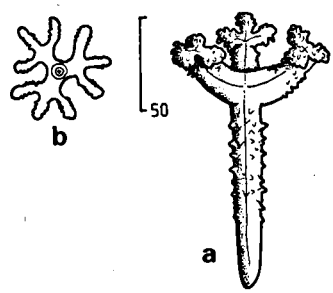

FIGURE 18. *Thrombus kittoni*, a. acanthotrichotriaene, b. dichotriaene growth stage.

Ecology: Apparently rare, incrusting on vermetids.

Distribution: Barbados, Atlantic coast of Panama.

Discussion: The present species differs from the other Atlantic forms (*T.abyssi* (Carter, 1873) and *T.niger* Topsent, 1904) in the absence of amphiasters and the generally larger triaenes. It is closest to the Indo-Pacific *T.challengeri* (Sollas, 1886), but they are considered specifically distinct in view of the geographic separation. No other Thrombidae have been recorded from West Indian waters.

OTHER WEST INDIAN DEEP-WATER ASTROPHORIDA

The family Theneidae is not represented in our material but *Thenea muricata* (Bowerbank, 1858) (with junior synonym *Stelletta profunditatis* Schmidt, 1880) is reliably recorded from the West Indian region. *Thenea fenestrata* (Schmidt, 1880, as *Tisiphonia*) and *Thenea schmidti* Sollas, 1888 (replacement name for *Tisiphonia agariciformis* sensu Schmidt, 1870) are ill-known.

Order **SPIROPHORIDA**

Family **TETILLIDAE** Sollas (1886)

Genus **Cinachyra** Sollas (1886)

Cinachyra kuekenthali Uliczka (1929)

Synonymy: cf. WIEDENMAYER (1977) and VAN SOEST & SASS (1981).

Material: ZMA POR. 3813, 0.5 mile off Holetown, 100 m.
ZMA POR. 3822, 0,5 mile off Holetown, 100 m.
ZMA POR. 5268, Off Paynes Bay, 135–144 m, 15-VI-1978.

Description (text-fig.19):

Globular to pear-shaped; small specimens (1–2 cm in diameter) are shaggy-pilose, with only a few porocalyces, larger specimens (up to 10 cm) have an optically smooth surface and evenly distributed porocalices; the latter are 2–4 mm in diameter and are surrounded by a palissade of large oxeotes, which may become abraded in older specimens; consistency tough, hard.

Colour: pale yellow to ochre, brown porocalices; yellow-grey in spirit.

Ectosome: a confused feltwork of microxea, some arranged tangentially, others are erect; this layer may be up to 4 mm in thickness.

Choanosome: radiate architecture, consisting almost exclusively of large oxea.

Spicules: large radiating oxeotes, with many stylote modifications: 3100–4000 by 45–70 μm; shorter oxea: 800–1200 by 30–60 μm; protriaenes, rare in large specimens: 900–2400 by 12 μm, clads 60/10 μm; anatriaenes, equally rare in large specimens: 1200–1900 by 10 μm, clads 28–70 by 7 μm; sigmaspires: 17–22 μm; microxea, microscopically roughened: 115–160 by 4–4.5 μm.

Ecology: Down to 44 m, elsewhere the species also occurs in shallow water.

Distribution: West Indies.

TABLE II

ASTROPHORIDA FROM DEEP WATER (> 50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS.

Family Geodiidae:	
Geodia gibberosa Lamarck, 1814	valid species
Geodia megastrella Carter, 1876	valid species
Geodia pachydermata (Sollas, 1886) (as *Isops*)	?
Geodia thomsonii Schmidt, 1870	?
Geodia apiarium (Schmidt, 1870) (as *Caminus*)	?
Geodia spherastra Lévi, 1964	valid species
Caminus sphaeroconia Sollas, 1886	valid species
Erylus alleni De Laubenfels, 1934 (= *E. transiens*)	junior syn.
Erylus discophorus (Schmidt, 1870) (as *Stelletta*)	?
Erylus transiens (Weltner, 1882) (as *Stelletta*)	valid species
Erylus euastrum (Schmidt, 1880) (as *Stelletta*) (= not Schmidt, 1868)	junior syn.
Pachymatisma geodiformis n. sp.	valid species
Family Ancorinidae:	
Stelletta anancora (Sollas, 1886) (as *Pilochrota*)	valid species
Stelletta tenuispicula Sollas, 1886 (= S. *anancora*)	junior syn.
Stelletta fibrosa (Schmidt, 1870) (as *Ancorina*)	valid species
Stelletta sp. aff. *pumex* (Nardo, 1847)	valid species
Stelletta pygmaeorum Schmidt, 1880	?
Stelletta gigas (Sollas, 1886) (as *Pilochrota*)	valid species
Stelletta individua (Schmidt, 1870) (as *Ancorina*)	?
Penares mastoidea (Schmidt, 1880) (as *Stelletta*)	valid species
Asteropus simplex (Carter, 1875) (as *Stellettinopsis*)	valid species
Asteropus syringiferus n. sp. (= *Stellettinopis* spec. Hartman, 1965)	valid species
Tethyorrhaphis rhaphoxea (De Laubenfels, 1934) (as *Dactylella*)	valid species
Tribrachium schmidti Weltner, 1882	valid species
Tribrachium fisheri (De Laubenfels, 1934) (= ? *T. schmidti*)	junior syn.?
Ancorina fenimorea De Laubenfels, 1934	?
Ancorina demera (De Laubenfels, 1934) (as *Hezekia*)	valid species
Family Pachastrellidae:	
Pachastrella abyssi (Schmidt, 1870)	valid species
Pachastrella agassizi Sollas, 1886	valid species
Pachastrella connectens Schmidt, 1870	?
Pachastrella lithistina Schmidt, 1880	?
Pachastrella enae (De Laubenfels, 1934) (as *Neothenea*) (= *P. aspera*)	junior syn.
Poecillastra aspera (Sollas, 1886) (as *Characella*)	valid species
Poecillastra dilifera (De Laubenfels, 1934) (as *Pachastrella*) (= *P. sollasi*)	junior syn.
Poecillastra pachastrelloides (Schmidt, 1870) (as *Ancorina*)	?
Poecillastra sollasi (Topsent, 1920) (as *Characella*)	valid species
Sphinctrella annulata (Schmidt, 1880) (as *Stellettinopsis*)	?
Sphinctrella horrida Schmidt, 1870	valid species

Family Thrombidae:	
Thrombus kittoni (Carter, 1874) (as *Corticium*)	valid species
Family Theneidae:	
Thenea schmidti Sollas, 1888 (= *Tisiphonia agariciformis;* Schmidt, 1870)	?
Thenea fenestrata (Schmidt, 1880) (as *Tisiphonia*)	?
Thenea muricata Bowerbank, 1858 (as *Tethea*)	valid species
Thenea profunditatis (Schmidt, 1880) (as *Stelletta*) (= *T. muricata*)	junior syn.

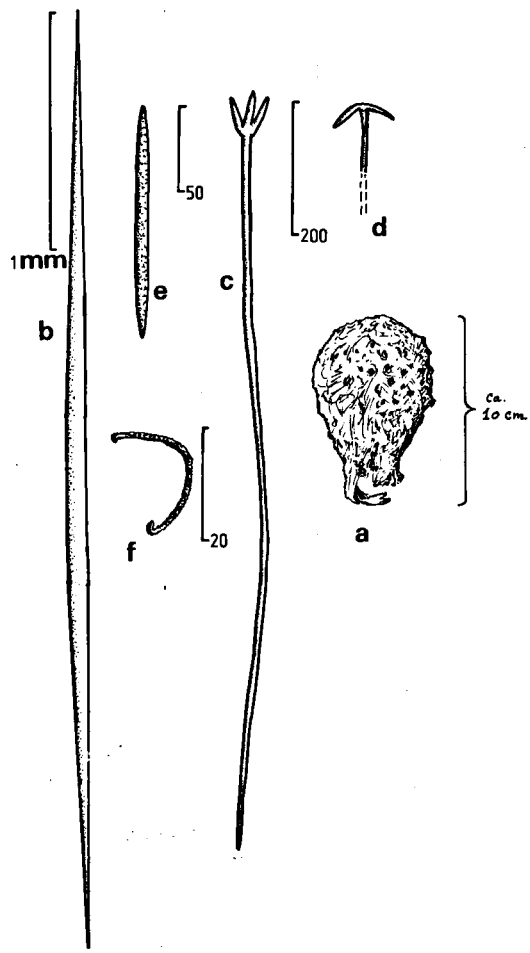

FIGURE 19. *Cinachyra kuekenthali*, a. habit, b. oxeote megasclere, c. protriaene, d anatriaene, e. rugose microxea, f. sigmaspire.

Discussion: The specific identification is made mainly on account of the roughened microxea. The discrepancy between larger and smaller specimens in the triaene content is illustrative for the instability of these spicules in *Cinachyra*, and it is a strong indication for the likelihood, that sigmaspire-bearing sponges described in other families are really Tetillids, e.g. *Trachya globosa* Carter (1886a), *Trachygellius cinachyra* De Laubenfels (1936a), *Spirasigma aculeata* (Whitelegge, 1906) and *Rhaphidotethya enigmatica* Burton (1934).

Cinachyra arenosa n.sp.

Material: Holotype, ZMA POR. 5266, Off Paynes Bay, 153 m.
Paratypes, ZMA POR. 5267, Off Paynes Bay, 153 m (2 spec.).

Description (Pl. VI fig. 4, text-fig.20):

Small, globular, heavily incrusted with foreign material, which seems to have been accumulated; size up to 1.5 cm in diameter; porocalices prominent, with a collar of long stiff spicules; they number four in the holotype, two and three in the paratypes; each specimen has a root system of long spicules.

Colour (dry): grey; porocalices have white collars.

Ectosome: hispid due to projecting megascleres.

Choanosome: the usual radiate architecture with a prominent subdermal layer of collagenous material; the internal architecture is cavernous, and the dry specimens collapse when cut.

Spicules: radiating large oxeotes: 750–3600 by 30–80 μm; protriaenes and prodiaenes: 2400–2800 by 12–15 μm, with clads of 70–140 μm by 7 μm; anatriaenes: 800–1200 by 5–6 μm, with clads of 60–65 by 4 μm; rhaphides (often in trichodragmata): 100–120 by 0.5 μm; sigmaspires: 12–15 μm.

Etymology: The name refers to the accumulated foreign material in this species.

Ecology: apparently rare at 153 m.

Distribution: known only from the type locality.

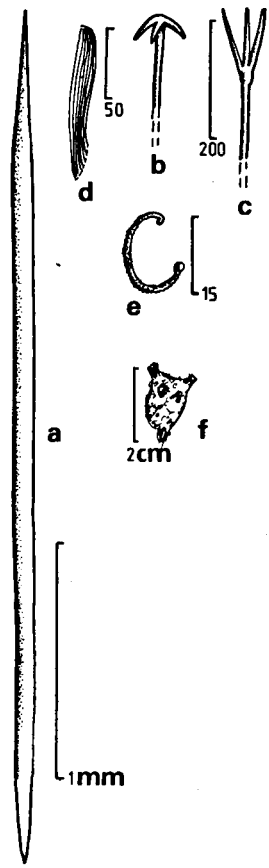

FIGURE 20. *Cinachyra arenosa* n. sp., a. oxeote megasclere, b. anatriaene, c. protriaene, d trichodragma, e. sigmaspire, f. habit of holotype.

Discussion: Among West Indian *Cinachyra* species this new form stands out by the possession of rhaphides. It resembles *C.eurystoma* (Keller, 1891) (with its synonym *Tetilla barodensis* Dendy, 1916) from the Indian Ocean very closely. In fact the only difference of importance seems to be the absence of protriaenes in that species, instead of which it has orthotriaenes. In habit the new species resembles *Fangophilina submersa* Schmidt (1880), a species kept in a separate genus by TOPSENT (1920, redescription), BURTON (e.g. 1956, 1959) and LÉVI (1973). The generic distinctness of this form seems dubious.

Genus **Acanthotetilla** Burton (1959)

Acanthotetilla gorgonosclera Van Soest (1977)

Hymerhaphia verticillata; SCHMIDT, 1870: 63, pl. V fig. 3 (Not: BOWERBANK, 1866: 145).
Acanthotetilla gorgonosclera VAN SOEST, 1977: 7, Pls I e–f,II a, III a–d, IV a–d, text-figs 4–6.

Material : ZMA 3814 (holotype), 0.5 mile off Holetown, 100 m.

Diagnosis: Size 6 × 3.5 × 4.5 cm; surface highly pilose; numerous porocalices; spiculation includes smooth radiating large oxeotes: 770–1600 by 3–17 μm, protriaenes: 1260–1540 by 4–9 μm with clads 41–81 by 3–7 μm, anatriaenes with clads of 42–64 by 4–6 μm, sigmaspires: 9–16 μm, and megacanthoxea: 228–371 by 24–35 μm.

The synonymy quotation is based on examination of a slide in the BMNH collection, reg. no. 1870:5:3:21 (1870, Prof. MARQUESAS, Florida, 140 fms, 'Hymeraphia verticillata', in SCHMIDT's handwriting). It contains a spicule mass including oxeotes of 990 by 8 μm, and the characteristic megacanthoxea of 285 by 30 μm.

TABLE III

SPIROPHORIDA RECORDED FROM DEEP WATER (> 50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS.

Family Tetillidae	
Cinachyra alloclada Uliczka, 1929	valid species
Cinachyra arenosa n. sp.	valid species
Cinachyra cinachyra (De Laubenfels, 1936a) (as *Trachygellius*)	?
Cinachyra kuekenthali Uliczka, 1929	valid species
Acanthotetilla gorgonosclera Van Soest, 1977 (= *Hymerhaphia verticillata Schmidt, 1870)*	*valid species*
Tetilla sigmophora (Schmidt, 1870) (as *Ancorina*)	?
Tetilla minuta (Wilson, 1902) (as *Chrotella*)	?
Fangophilina submersa Schmidt, 1880	valid species
Craniella cranium (Müller, 1776)	?
Craniella insidiosa Schmidt, 1870	?
Craniella lens Schmidt, 1870	?
Craniella oscari (Lendenfeld, 1903) (as *Tethya*)	?
Craniella schmidti Sollas, 1886 (= C. oscari)	junior syn.
Craniella tethyoides Schmidt, 1870	?

14 Spirophorids (cf. table III) have been reported from deep waters in the West Indian region, one of which is an obvious synonym. Five species are valid with certainty; a large proportion (eight) are ill-known.

Order **LITHISTIDA**

Remark: For convenience's sake all Lithistids are here treated in a single order, although the systematic place of forms such as *Lithobubaris tenens* (cf. below) is uncertain. LÉVI's (1973) subdivision of Lithistids in Desmophorida (sharing true tetraxone spicules) and non-Desmophorida (lacking true tetraxones) is not followed here, because there are strong indications in the microsclere and ectosomal spicules of non-Desmophorids pointing to relationship with tetractinellid sponges. It is inevitable that the polyphyletic Lithistida will have to be divided up amongst Tetractinellids and Halichondrids/Hadromerids.

Family **THEONELLIDAE** Von Lendenfeld, 1903

Genus **Theonella** Gray, 1867

Definition: Theonellidae with dichotriaene-like phyllotriaenes and roughened microrhabds as microscleres.

Theonella atlantica n.sp.

Material: Holotype, ZMA POR. 5259, Off Paynes Bay, 144–153 m, 13-VI-1978.
Paratypes: ZMA POR. 5620, Off Paynes Bay, 144–153 m, 13-VI-1978 (3 spec.)
ZMA POR. 5261, Off Paynes Bay, 144–153, 13-VI-1978 (5 spec.).

Description (Pl. VI figs 5–6, text-fig.21):

Ramose, with thick blunt-ending branches oriented in all directions; occasionally branches anastomose; young specimens are short, finger-shaped; size of full-grown specimens up to 6 cm high, branches up to 1.5 cm

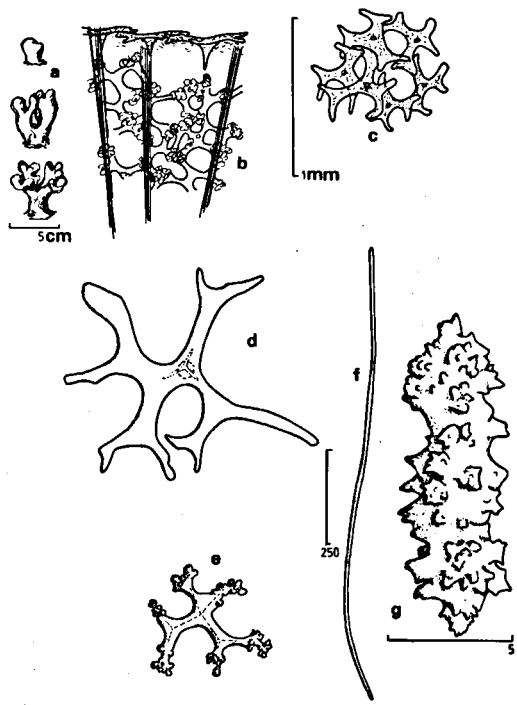

FIGURE 21. *Theonella atlantica* n. sp., a. habits of characteristic specimens, b. perpendicular section through peripheral skeleton, showing the position of the ectosomal phyllotriaenes, the desma reticulum and the supporting bundles of oxeotes, c. tangential view of ectosomal skeleton, d. ectosomal phyllotriaene, e. choanosomal desma, f. oxeote, g. acanthose microrhabd.

in diameter: surface smooth, glistening, without distinct pores or oscules.
Colour: bright orange alive, pale ochreous to light brown when dried.
Ectosome: a detachable crust of phyllotriaenes covered by numerous microscleres. Individual microscopical pores are regularly distributed between the clads of the phyllotriaenes.
Choanosome: subdermally, well-developed bundles of oxeotes support the ectosome in between the desma-reticulum, which is rather irregular and open.
Spicules: desmata with smooth branches and highly warty apices, tending

to be thicker and more heavily warty towards the interior: shaft 250 by 20–50 μm; smooth oxeotes, normally with strongylote apices: up to 1200 by 10 μm; dichotraene-like phyllotriaenes with smooth margins: cladome 100–210 by 40 μm, clads 220–400 μm; acanthose microrhabds: 8–15 by 2 μm.

Ecology: not uncommon at 144–153 m.

Distribution: known only from the type locality.

Discussion: This is the first reliable record of the genus *Theonella* in the West Indies. VON LENDENFELD (1903) referred *Collectella avita* Schmidt (1879), of which all material appears to be lost (cf. SOLLAS, 1888:410), to *Theonella* without any motivation.

The present species approaches *T.cylindrica* Wilson (1925) from the Philippines, but differs sufficiently in habit and spicule sizes.

Genus **Discodermia** Du Bocage (1879)

Definition: Theonellidae with discotriaenes and microscleres differentiated in microxea and microrhabds.

Discodermia polydiscus Du Bocage (1879)

For synonymy cf. SOLLAS (1888), and VON LENDENFELD (1903).
Further synonyms:
Discodermia ramifera TOPSENT, 1892: 50, pl. VI. fig. 10, pl. VIII fig. 1; TOPSENT, 1904: 57, pl. VIII fig. 4.
Discodermia verrucosa TOPSENT, 1928: 99, pl. I figs 14–15, pl. IV fig. 14.
Discodermia polydiscus; VACELET, 1969: 164, fig. 2.

Material: ZMA POR. 5256, Off Paynes Bay, 153 m.
ZMA POR. 5257, Off Paynes Bay, 108–153 m.
ZMA POR. 5258, 0.5 mile off Holetown, 100 m.

Description (Pl. VII fig. 1, text-fig.22):

Shape irregular, variously creeping, ramose, sprawling or mushroom – shaped, riddled with depressions and holes (which are probably caused by symbionts); size up to 8 × 5 × 4 cm; surface smooth; oscules 1 mm, mostly in small groups.

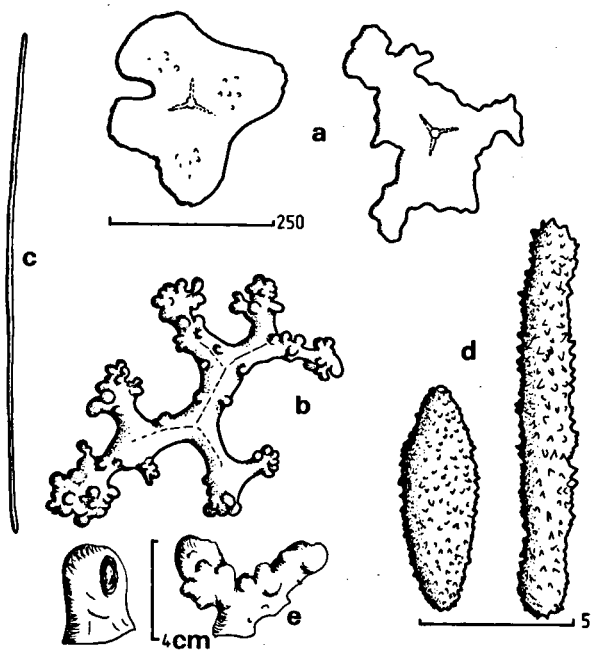

FIGURE 22. *Discodermia polydiscus*, a. ectosomal discotriaenes, b. desma, c. oxeote, d acanthose microxea/microrhabd, e. habits of characteristic specimens.

Colour (dry): yellowish white.

Ectosome: a distinct detachable skin consisting of discotriaenes covered by moderate amounts of microscleres.

Choanosome: subdermally, there are well-developed bundles of oxeotes supporting the ectosomal skeleton, rising up from between the desma reticulum, which is irregular, but tight-meshed with very intricate zygoses.

Spicules: desmata with relatively smooth shafts and heavily warty branches: 250–400 by 30–60 μm; discotriaenes with irregularly rounded or oval, smooth, crenulated or shallowly indented rims, often with a fine denticulation on the discs: rhabd 150–170 by 20–35 μm, disc 200–500 μm in diameter; oxeotes with stylote modifications: 600–900 by 3–10 μm; roughened microxea: 25–38 by 1.5–3 μm; acanthose microrhabds: 11–18 by 2–4 μm.

Ecology: Not uncommon, from 100 m downwards.

Distribution: Barbados, Portugal, Azores, Mediterranean.

Discussion: This species shows an extreme variation of growth forms not found in other Lithistids. Following VACELET (1969) *Discodermia ramifera* Topsent (1892) and *D.verrucosa* Topsent (1928) are considered synonymous.

Genus **Racodiscula** Von Zittel (1878)

Rimella SCHMIDT, 1879.

Definition: Theonellidae with spirasters or amphiasters among the microscleres.

Racodiscula asteroides Von Zittel (1878)

Discodermia polydiscus; SCHMIDT, 1870: 24, pl. III figs. 8–9; SCHMIDT, 1879: 22.
(not: *Discodermia polydiscus* DU BOCAGE, 1869).
Racodiscula asteroides VON ZITTEL, 1878: 126, 151, pl. I fig. 4.
Discodermia nucerium SCHMIDT, 1879: 25, pl. I fig. 4, pl. III figs 1–2.

Material: ZMA POR. 5262, Off Paynes Bay, 144–153 m, 27-X-1978 (2 spec.).
ZMA POR. 5263, Off Paynes Bay, 108–170 m, 9-IX-1978 (3 spec.).
ZMA POR. 5254, Off Paynes Bay, 153 m (dozens of spec.).

Description (text-fig. 23):

Subspherical to pyriform, with irregular grooves and undulations, with oscular depressions on the top; size up to 4 cm high, 4.5 cm in diameter; surface smooth, faintly shining; oscules provided with iris-type diaphragm. Colour: reddish brown to chamois-red alive; pale grey to yellowish brown when dry.

Ectosome: a crust of phyllotriaene-like discotriaenes covered by microscleres.

Choanosome: an irregular, tight-meshed desma reticulum, with very heavy zygoses.

Spicules: desmata with highly warty shafts and equally warty and compli-

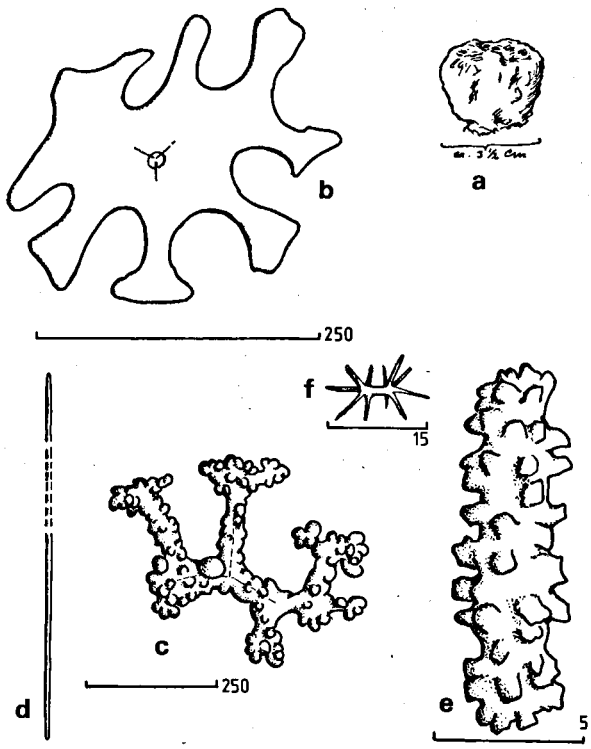

FIGURE 23. *Racodiscula asteroides*, a. habit, b. ectosomal discotriaene, c. desma, d. oxeote, e. acanthorhabd, f. amphiaster.

cated clads: shaft 200–250 μm; discotriaenes with phyllotriaene-like lobate clads and distinct central triactine axial canals: cladome 70–150 by 40 μm, disc up to 420 μm in diameter; microrhabds spined, streptaster-like: 8–12 by 1–2 μm; amphiasters with thin rays: 12–22 μm; oxeotes are rare and invariably broken, so no length can be given.

Ecology: Common below 108 m.

Distribution: Tropical Atlantic.

Discussion: The present species differs from its nearest relative, *R.clava* (Schmidt, 1879) in the more phyllotriaene-like triaenes, the size of the

spicules, and in the absence of microrhabds in the latter. VACELET, *et al.* (1976) reserve the use of the genus *Racodiscula* for Theonellids with exclusively spirasters (not amphiasters); this seems untenable. The distinction between Theonellid genera must be reexamined, because at present it seems artificial, based on primitive characters.

WEST INDIAN THEONELLIDS

13 species (table IV) have been reported from deep water in the West Indian region, four of which represent synonyms, and four must be considered ill-known, leaving five well-established species.

Family **CORALLISTIDAE** Sollas (1886)

Genus **Corallistes** Schmidt (1870)

Corallistes typus Schmidt (1870)

Corallistes typus SCHMIDT, 1870: 22, pl. III fig. 3; SOLLAS, 1888: 301, pl. 34 figs. 14–18; BURTON, 1929: 5.

Material: ZMA POR. 3814, 0.5 mile off Holetown, 100 m (3 spec.).
ZMA POR. 3825, 0.5 mile off Holetown, 100 m (2 spec.).
ZMA POR. 5239, Off Paynes Bay, 108–170 m (numerous spec.).

Description (Pl. VII figs. 2–4, text-fig. 24):

Of variable shape but tending to form shallow or flattened cups/plates, often with undulating or infolded rims; occasionally ear-shaped or funnel-shaped; younger specimens are club-shaped; in the cup walls there are often irregular holes; size up to 20 cm in diameter; surface smooth, with distinct ectosomal crust on the outside/underside; oscules indistinct.

Colour: pale ochre, with faintly rosy-pink tinge alive; ochreous brown in spirit; ochreous yellow in dry condition.

Ectosome: a distinct crust of ectosomal dichotriaenes with smooth clads, covered by loosely distributed microscleres.

Choanosome: the ectosome is carried by bundles of long oxea, which in their turn are anchored in the choanosomal desma reticulum.

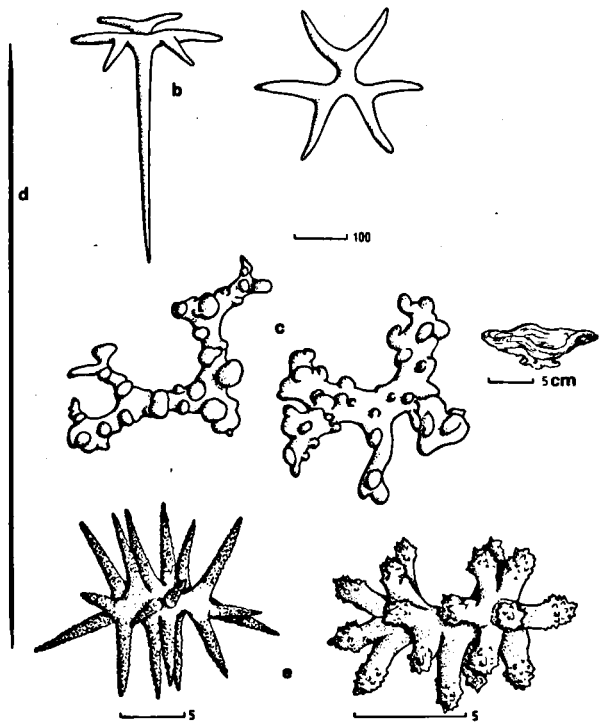

FIGURE 24. *Corallistes typus*, a. habit, b. ectosomal dichotriaenes, c. desmata, d. oxeote, e. spiraster/amphiaster.

Spicules: monocrepid desmas with axial 'pith': 300–360 by 15–24 μm; ectosomal dichotriaenes, smooth, normally biclad, clads sometimes with recurved apices: diameter of cladome 90–300 μm, clads 40–130 by 20–27 μm, rhabd 130–380 by 15–24 μm; smooth oxeotes: 700–1260 by 4–8 μm; spirasters, distinctly verging towards amphiasters, but quite variable: 14–26 μm.

Ecology: Very common below 100 m.

Distribution: Tropical Atlantic, South Africa.

Discussion: In general shape, this species may approach *Gastrophanella*

implexa Schmidt (1879); in fact both were initially confused. *G.implexa* is more definitely in the shape of a hollow inverted cone and also lacks a distinct ectosomal crust (no dichotriaenes). The habit of *C.typus* also overlaps with *C.paratypus* n.sp. (cf. below); these are small, ear-shaped cups, differing distinctly in the shape of their microscleres.

Corallistes paratypus n.sp.

Material: Holotype: ZMA POR. 5240, Off Paynes Bay, 108 m.
Paratypes: ZMA POR. 5241, Off Paynes Bay, 108 m (14 spec.).
ZMA POR. 5242, Off Paynes Bay, 153 m, 8-V-1980.

Description (Pl. VII figs 5–6, text-fig. 25):

Ear- or cup-shaped, up to 6 cm in diameter, 6 cm high; generally much like *C.typus* from which it can be separated with certainty only on spicule characters.

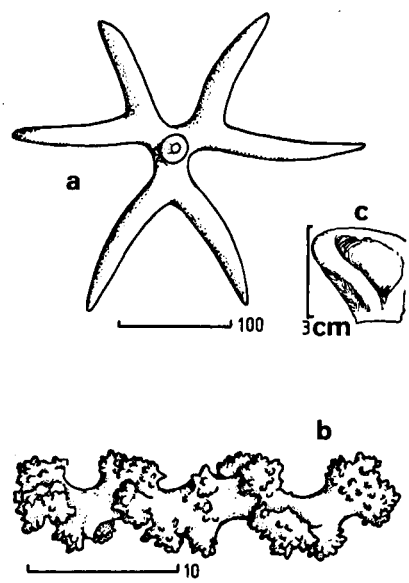

FIGURE 25. *Corallistes paratypus* n. sp., a. ectosomal dichotriaene, b. spiraster, c. habit.

Colour: ochreous.
Ectosome: a distinct crust consisting of dichotriaenes and microscleres, just as in *C.typus*.
Choanosome: as in *C.typus*.
Spicules: desmas 300–350 by 30–40 µm; dichotriaenes smooth, biclad: cladome 200–340 µm in diameter, clads 80–136 by 18–30 µm, rabds 250–560 by 18–25 µm; subectosomal oxeotes: 1000–1350 by 5 µm; spirasters of very characteristic '*Cliona*' -shape, with long undulating shaft and short spines: 22–35 µm.

Etymology: The name reflects its similarity to *C.typus*.

Ecology: Not uncommon below 108 m.

Distribution: Known only from the type locality.

Discussion: The new species is distinguished from *C.typus* primarily on the shape of the spirasters, which is a constant feature of all the 17 specimens examined. Although the spirasters of *C.typus* are quite variable, they never approach the *Cliona*- like form so characteristic for the present species. The dichotriaenes are more robust than those of *C.typus*.

Corallistes tubulatus n.sp.

Material: Holotype: ZMA POR. 5235, Off Paynes Bay, 234–270 m, 11-V-1979.
Paratypes: ZMA POR. 5236, Off Paynes Bay, 234–280 m, 11-V-1979 (2 spec.).
ZMA POR. 5237, Off Paynes Bay, 108 m (2 spec.).
ZMA POR. 5238, Off Paynes Bay, 153 m (numerous spec.).

Description (Pl. VIII figs 1–2, text-fig. 26):

Single or clustered thick-walled little tubes or calices, characteristically 3–4 cm high, but up to 5 cm; pseudoscule or vent 5–8 mm in diameter, mostly shallow, but occasionally extending up to 1 cm into the interior; specimens without pseudoscule occur too, but these retain the lobate shape and generally are similar to the more tube-shaped forms; surface of unmacerated specimens smooth.
Colour: whitish grey with a rosy pink tinge alive; when dry, it becomes grey.
Ectosome: a distinct crust of neatly arranged dichotriaenes of characteristic

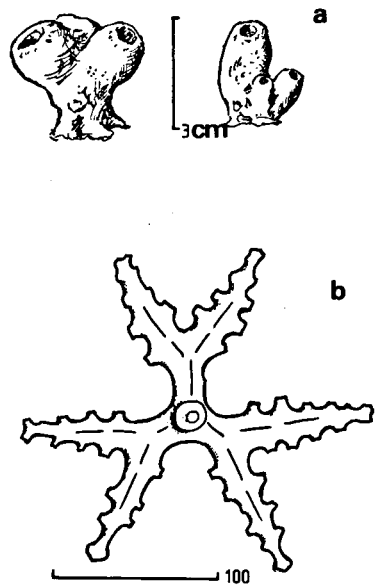

FIGURE 26. *Corallistes tubulatus* n. sp., a habit of characteristic specimens, b. ectosomal dichotriaene.

shape; irregularly distributed oxeotes and abundant microscleres are also found at the surface.

Choanosome: a regular tight-meshed desma reticulum.

Spicules: monocrepid desmas with almost smooth shafts and heavily tuberculated clads: shaft 350–450 μm; ectosomal dichotriaenes imitating phyllotriaenes by having their deuteroclads regularly tuberculated laterally (not at the upper- and undersurface), occasionally triclads are found: clads 170–190 (measured from the dichotomous junction) by 20–25 μm; elongated conical rhabds 115–152 by 12–19 μm; small oxeotes, quite smooth and regularly curved: 180–200 by 3.5–10 μm; amphiasters: 11–18 μm.

Etymology: The name refers to the characteristic habit.

Ecology: Common below 108 m.

Distribution: Known only from the type locality.

Discussion: The skeletal characters of this species resemble those of *Macandrewia cavernicola* Vacelet & Vasseur (1964) from Madagascar, later transferred to *Callipelta* by VACELET, *et al.* (1976). Points of difference are the shorter rhabds of the dichotriaenes (30–50 by 9 μm in *cavernicola*) and the small size of the amphiasters (only 9–12 μm); furthermore the habit was incrusting.

The new species forms part of a complex of species with tuberculate dichotriaenes, together with *C.nolitangere* Schmidt (1870) (E-Atlantic) and *C.microstylifer* Lévi & Lévi (1983). *C.nolitangere* sensu Topsent (1892, 1904) differs from our new species in the length of the rhabds of the dichotriaenes (1 mm or more in *nolitangere*), in the more regular warts on the dichotriaene clads, and in the smaller size of the microxea.

C.microstylifer has styles in stead of oxea.

WEST INDIAN CORALLISTIDS

A fourth *Corallistes* species was reported by HARTMAN (1964), viz. *C.clavatella* Schmidt (1870). SCHMIDT's species, however, is a *Discodermia*, probably *D.polydiscus*.

Family **SCLERITODERMIDAE** Sollas (1888)

Genus **Scleritoderma** Schmidt (1879)

Definition: Scleritodermidae with acanthose microstrongyles.

Scleritoderma cyanea n.sp.

Material: Holotype, ZMA POR. 5248, Off Paynes Bay, 216 m.
Paratypes, ZMA POR. 5247, Off Paynes Bay, 216 m (fragments).

Description (text-fig. 27):

Rather thinly incrusting with raised and fortified 'pores' of 1 mm in diameter, which are presumably exhalant; vene-like canal-system present,

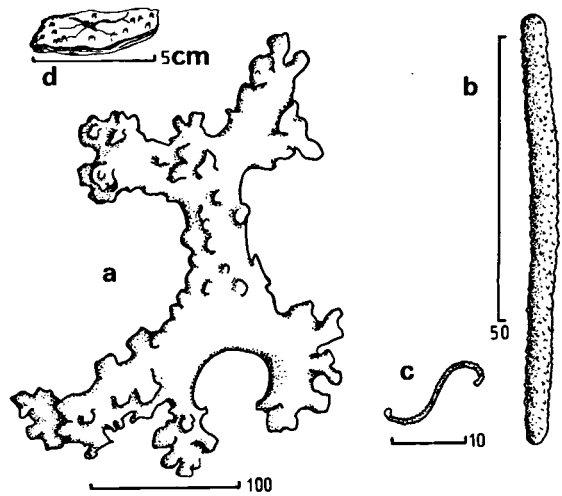

FIGURE 27. *Scleritoderma cyanea* n. sp., a. desma, b. ectosomal acanthostrongyle, c. sigmaspire, d. habit.

even in dry specimens; surface smooth; the holotype is 5.5 cm in diameter and 1 cm high.

Colour: navy blue alive, pale yellowish grey when dry.

Ectosome: a thin tangential layer of acanthostrongyles overlies the desma-reticulum; in between are moderate amounts of sigmaspires.

Choanosome: a reticulum of stout desmas.

Spicules: robust, warty desmas: 300–380 by 38–50 μm; ectosomal acanthostrongyles, short, slender, slightly curved, thickened in the middle, entirely acanthose: 65–90 by 4–5.5 μm; sigmaspires: 12–20 μm.

Etymology: The name refers to the blue colour.

Ecology: Rare at 216 m.

Discussion: The species is closest to *Scleritoderma flabelliformis* Sollas (1888) from Indo-Australian waters, but that species has a fan-shaped habit and thicker acanthostrongles. The sympatric *S.packardi* Schmidt (1879) is cup-shaped and it has oxea in addition to the acanthostrongyles, which are also three times as long as those of the present species. The blue colour

reminds of *Azorica pfeifferae* (Carter, 1873) pictured by TOPSENT (1892): pl. I fig. 11). Is is possible that the blue colour is due to symbiont prokaryotes.

Genus **Amphibleptula** Schmidt (1879)

Microscleroderma KIRKPATRICK (1903)
Taprobane DENDY (1905)

Definition (emended): Scleritodermidae with special ectosomal desmas, more intricately branched than those of the choanosome, without ectosomal microstrongyles.

Amphibleptula madrepora Schmidt (1879)

Amphibleptula madrepora SCHMIDT, 1879: 28, pl. I fig. 6.

Material: ZMA POR. 5243, Off Holetown, 100 m.
ZMA POR. 5244, Off Paynes Bay, 108–162 m (3 spec.).
ZMA POR. 5245, Off Paynes Bay, 135–216 m (3 spec.).
ZMA POR. 5246, Off Paynes Bay, 153 m (numerous spec.).

Description (Pl. VIII figs 3–5, text-fig. 28):

Variable in shape, but usually bluntly conical with a widely sprawling base and characteristic 'cut-off' cones; up to 4.5 cm in height and 7 cm in diameter; surface smooth, but bearing characteristic, slightly elevated 'pores' (0.2–0.5 mm in diameter); possibly there are two forms represented, viz. those specimens with evenly distributed single pores, and those with raised warty structures containing two or three pores each and separated by smooth surface; however, some intermediates occur and no skeletal differences could be found between the two forms.
Colour: whitish grey alive, changing little when dried.
Ectosome: smooth parts are built up by tangentially branched monocrepid desmas covered with moderate amounts of microscleres; elevated 'pores' are surrounded by palissades of oxeotes protruding beyond the ectosome, producing sometimes a hairy appearance of the sponge.
Choanosome: a reticulum of monocrepid desmas and smooth oxeotes.

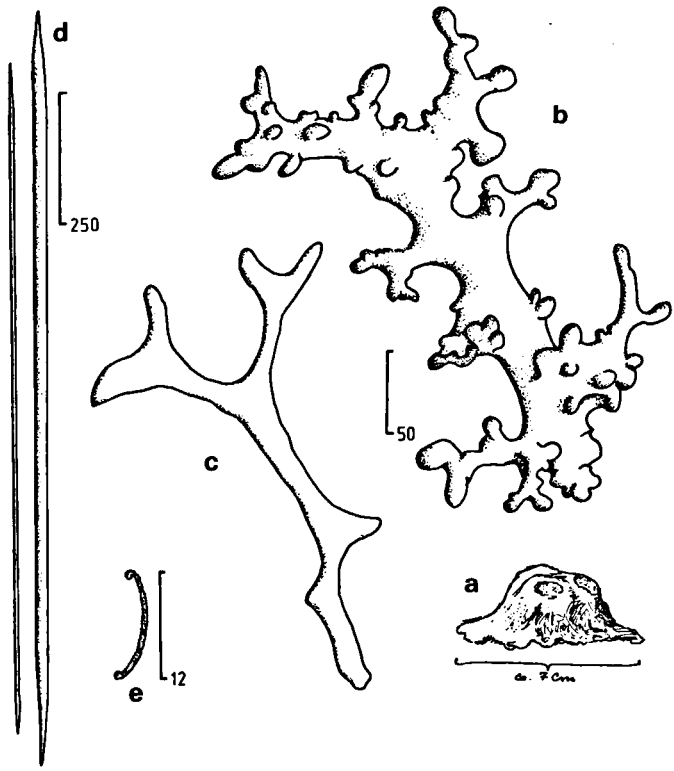

FIGURE 28. *Amphibleptula madrepora*, a. habit, b. desma, c. growth stage of desma, d. oxeotes, e. sigmaspire.

Spicules: highly warty desmas: 250–400 by 30–40 μm; many younger, smooth growth stages form a special ectosomal crust: smooth oxeotes: 500–1200 by 1–12 μm, the ectosomal ones are 1–3 μm, those in the choanosome 10–12 μm; sigmaspires: 8–12 μm.

Ecology: Common from 100 m downwards.

Distribution: Barbados, Cuba.

Discussion: This identification is made with confidence, because of the great similarity between SCHMIDT's (1879) drawing and the present speci-

mens. SOLLAS' (1888) redescription missed out on the presence of sigmaspires, which may have been lost in the macerated specimens.

In all respects, *Amphibleptula madrepora* conforms to *Microscleroderma* Kirkpatrick (1903) (type: *M.hirsutum* Kirkpatrick, 1903). Is is obvious that *Taprobane herdmani* Dendy (1905) also belongs in this genus (cf. also WILSON, 1925, and LÉVI & LÉVI, 1983). The present species is close to, if not identical to the West African *Taprobane spirophora* Lévi (1960), the main difference being the thickness of the desma-shafts (15 μm in *spirophora*).

Genus **Aciculites** Schmidt (1879)

Definition: Scleritodermidae with ectosomal tangential acanthose anisostrongyles, without sigmaspires.

Aciculites higginsi Schmidt (1879)

Aciculites higginsi SCHMIDT, 1879: 29, pl. II figs 1 m–s, 4 a–d, 13.
?Tremaulidium geminum SCHMIDT, 1879: 31, pl. II figs 1 a–l, 2, pl. IV figs 1–2.

Material: ZMA POR. 5249, Off Paynes Bay, 108–198 m, 22-VIII-1978 (3 spec.).
ZMA POR. 5250, Off Paynes Bay, 108–153 m (numerous spec.).

Description (Pl. VIII figs 6–7, text-fig. 29):

Pear-shaped to subcircular with a more or less flat upper surface bearing many raised oscules; at the base, there is a well-developed disc; laterally, there are quite characteristic oblong to round depressions (as if the sponge has been squeezed recently), size up to 4 cm high, 6 cm in diameter; surface smooth, due to distinct cortex-like ectosome, which is however absent in the lateral depressions.

Colour: pale yellow-grey alive, changing little when dried.

Ectosome: a halichondroid tangential feltwork of anisostrongyles.

Choanosome: the ectosomal skeleton is carried by weakly developed perpendicular columns of anisostrongyles, and by the desma reticulum.

Spicules: desmas with warts all-over, including the shafts: 250–370 by 30–38 μm; anisostrongyles with tylote modifications, shaft smooth, tyles spined: 310–500 by 7.5–11 μm.

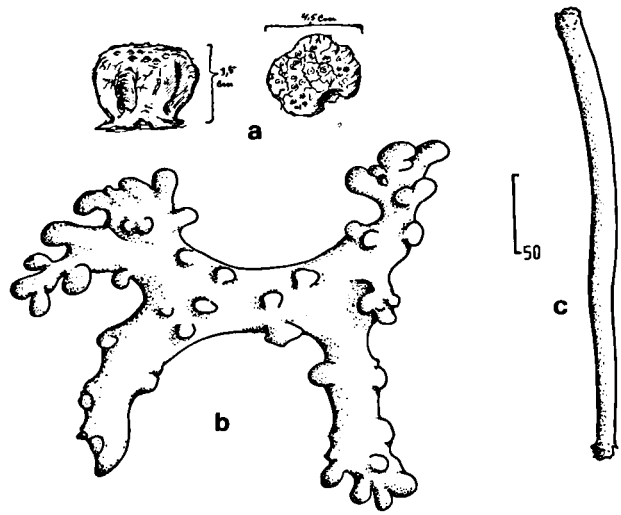

FIGURE 29. *Aciculites higginsi*, a. habit, b. desma, c. ectosomal anisostrongyle.

Ecology: Common below 108 m.

Distribution: Barbados, Cuba.

Discussion: The present material conforms closely to SOLLAS' (1888) redescription of *Aciculites higginsi*. All species described in *Aciculites* so far have been summarized in table V, from which may be concluded that *A.higginsi* can be distinguished from *A.orientalis* only on the habit. Apparently, *A.orientalis* lacks the raised oscules and the lateral depressions. *A.higginsi* is also close to the species described below.

The perplexing original description of *Tremaulidium geminum* Schmidt (1879) might just possibly be of an *Aciculites* species.

Aciculites cribrophora (Schmidt, 1880)

Azorica cribrophora SCHMIDT, 1880: 89, pl. V fig. 4.
Sympyla cribriphora (sic); SOLLAS, 1888: 353.

Material: ZMA POR. 5251, off Paynes Bay, 153–207 m, 23-IX-1979.

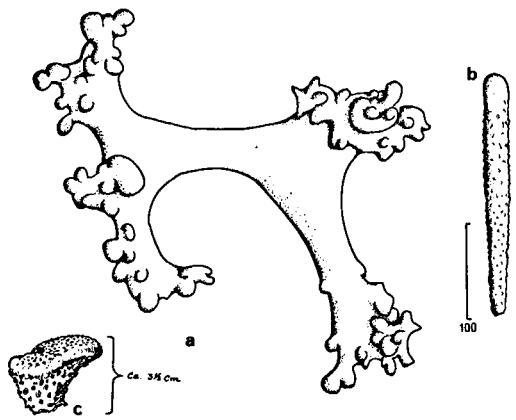

FIGURE 30. *Aciculites cribrophora*, a. desma, b. ectosomal acantostrongyle, c. habit.

Description (Pl. IX fig. 3, text-fig. 30):

The specimen is a fragment of a regularly vase-shaped sponge of 5 cm in diameter and 3.5 cm high, provided with a shallow excentric depression; the inner/upper surface bears numerous raised circular 'pores' (presumably oscules); the outer/under surface bears less numerous, raised, oval to irregular 'pore'-systems; rim of the vase without any of these 'pores'; surface between 'pores/pore-systems' smooth.

Colour: dark brown alive; this is more or less retained in the dry condition.

Ectosome: a tangential crust of anisostrongyles.

Choanosome: a regular desma reticulum with subdermal single perpendicular anisostrongyles, but no special subdermal spicules as reported in other fan-shaped or lamellate *Aciculites*-species.

Spicules: desmas with relatively smooth shaft, though heavily warty zygoses: 350–400 by 45–65 μm; entirely spined anisostrongyles with distinct tylote apices: 150–320 by 6–12 μm.

Ecology: 153–180 m.

Distribution: West Indies.

Discussion: This species differs from the sympatric *A.higginsi* in shape and surface characters, in the relatively smooth condition of the more

robust desmas, and especially in the entirely spined anisostrongyles. Although there is some variation in the spination of the heads of the anisostrongyles in *A.higginsi* entirely spined ones are not found. It is apparently a stable character, shared also with the cushion-shaped *A.spinosa* Vacelet & Vasseur (1971) (Madagascar) and *A.papillata* Lévi & Lévi (1983) (New Caledonia). It is likely that *A.cribrophora* forms a complex of twin species with these Indo-Pacific forms reflecting a former Tethyan distribution of their common ancestor: the same may be said for *A.higginsi* and *A.orientalis*.

The generic distinctness of *Scleritoderma* and *Aciculites* is not well-established, because they differ only in the presence or absence of sigmaspires, a character which is unfit for defining species groups.

WEST INDIAN SCLERITODERMIDS

6 species (table IV) have been reported from deep waters in the West Indian region, only one of which remains ill-known (*Tremaulidium geminum*).

Family **SIPHONIDIIDAE** Sollas (1888)

Definition: Lithistida with ectosomal skeleton made up of desmas without zygosis.

Genus **Siphonidium** Schmidt (1879)

Definition (emended): Siphonidiidae with peculiar fistular habit and tylostyles as accessory spicules.

Siphonidium ramosum (Schmidt, 1870)

Leiodermatium ramosum SCHMIDT, 1870: 21, pl. III fig. 1.
Siphonidium ramosum; SCHMIDT, 1879: 28, pl. I fig. 8.

Material: ZMA POR. 5253, Off Paynes Bay, 153 m (numerous spec.).

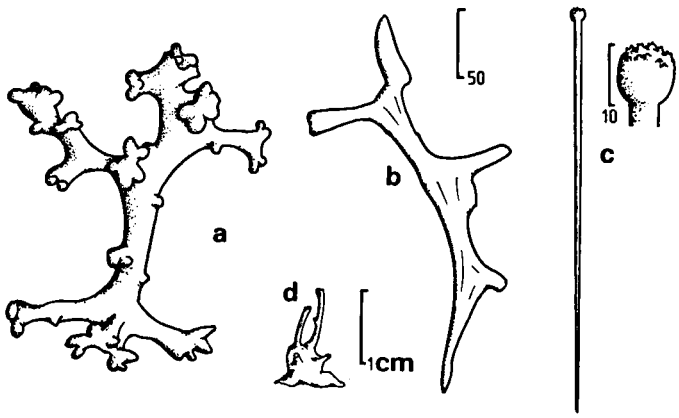

FIGURE 31. *Siphonidium ramosum*, a. choanosomal desma, b. ectosomal desma, c. tylostyle, with enlarged detail of rugose apex, d. habit.

Description (text-fig. 31):

Small fistulate cushions; many fistules with a characteristic cut-off appearance, although blind ones are also common; size up to 2 cm high, 1 cm in diameter; fistules up to 1 cm high, 2 mm in diameter; surface smooth.

Colour (dry): pale yellow.

Ectosome: no special skeleton.

Choanosome: a tight desma reticulum with complicated zygoses; young desmas (not zygoted) are concentrated in the subectosomal regions.

Spicules: desmas: 180–220 by 20–40 μm; tylostyles with rugose heads: 160–220 by 2–3 μm.

Ecology: Common at 153 m.

Distribution: Barbados, Florida, Mediterranean.

Discussion: A second species of *Siphonidium*, *S.capitatum* Sollas (1888), from Indo-Pacific waters, differs in having special, highly branched ectosomal desmas. SOLLAS made this a character of the genus, but in view of its absence in *S.ramosum* this cannot be maintained.

Genus **Gastrophanella** Schmidt (1879)

Definition: Siphonidiidae with ectosomal (sub-)tylostrongyles and (sub-)tylostyles arranged perpendicular to the surface.

Gastrophanella implexa Schmidt (1879)

Gastrophanella implexa SCHMIDT, 1879: 29, pl. I fig. 7, pl. III fig. 8; MACINTYRE & RÜTZLER, 1983: 135, fig. 83b.

Material: ZMA POR. 5252, Off Paynes Bay, 153 m (numerous spec.).

Description (Pl. IX figs 4–6, text-fig. 32):

Predominantly cup-shaped but tube-forms are also present: easily confused with specimens of *Corallistes typus*; size up to 16 cm in diameter, 7 cm high; on the average, however, specimens are about 7 cm by 5–6 cm, in the form of a cup with deep cavity: outer surface smooth, punctiform; inner surface with shiny, organic skin.

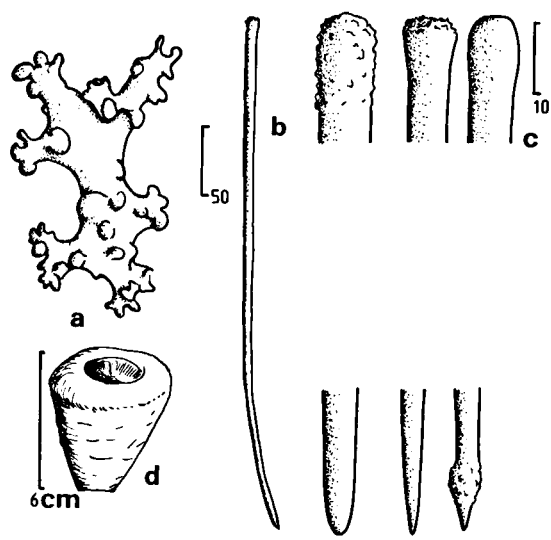

FIGURE 32. *Gastrophanella implexa*, a. desma, b. subtylostyle, c. variations of apices of subtylostyles, d. habit.

Colour (dry): brown.
Ectosome: perpendicular subtylostyles protrude beyond the surface.
Choanosome: a tight-meshed reticulum of strongly warty desmas; younger, smoother desmas concentrated at the surface; subdermally there are weakly developed bundles of subtylostyles and tylostrongyles.
Spicules: desmas: 150–220 by 20–25 μm; subtylostyles, subtylostrongyles, tylostyles en tylostrongyles, normally with slightly rugose tyles, but occasionally entirely smooth: 200–395 by 3–6.5 μm.

Ecology: Common at 153 m.

Distribution: Barbados, Antilles.

Discussion: Although the cup-shape was not described by SCHMIDT, it is obvious that these specimens belong to the same species as the tube-shaped specimens. Both the macroscopical characters (including the canal system, visible when a specimen is cut in half), and the microscopical details, are quite similar. Tube-shaped specimens were recently found in a shallow-water cave by MACINTYRE & RÜTZLER (1983). *Gastrophanella mamilliformis* Burton (1929) from South Africa is close to the present species.

The tylostrongyles seem to be the same spicule type as those found in *Siphonidium* (and also those described in '*Aciculites*' *oxytylota* Lévi & Lévi (1983)). In spite of the difference in habit, the genera *Siphonidium* and *Gastrophanella* must probably be united, but a revision of all Lithistids will have to be awaited before this is implemented. LÉVI (1973) attributes oxeote spicules to *Siphonidium*, but this is incorrect.

Genus **Leiodermatium** Schmidt (1870)

Definition: Siphonidiidae without special ectosomal desmas, with smooth oxeote accessory spicules.

Leiodermatium lynceus Schmidt (1870)

Leiodermatium lynceus SCHMIDT, 1870: 22, pl. III fig. 2
(Further synonymy cf. VON LENDENFELD, 1903: 148).

Material: ZMA POR. 5255, Off Paynes Bay, 216 m, 17-IX-1978 (4 spec. + fragments).

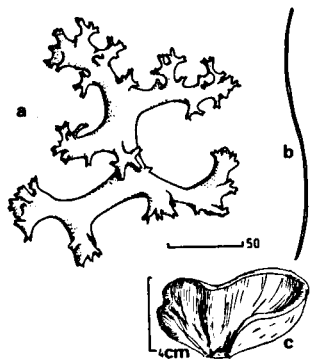

FIGURE 33. *Leiodermatium lynceus*, a. desma, b. oxeote, c. habit.

Description (text-fig. 33):

Resembling *Vetulina stalactites* in its folded-flabellate habit; a distinct difference, however, is the presence of regularly distributed raised 'pores'; size up to 8 cm long, 4 cm wide, folds 0.5 cm thick; surface smooth.
Colour(dry): yellow- or grey-white.
Ectosome: on the inner side of the sponge there is a tangential skeleton of thin oxeotes.
Choanosome: subdermally there are perpendicular bundles of oxeotes, between the usual reticulum of monocrepid desmas.
Spicules: desmas with few but quite characteristic bifid warts and a relatively smooth, thin shaft: 180–300 by 15–25 μm; thin whispy oxeotes: 190–230 by 1 μm.

Ecology: Rare below 216 m.

Distribution: Tropical-subtropical Atlantic.

Discussion: Through its type species *L.lynceus*, the genus *Leiodermatium* is probably quite close to *Siphonidium*, but differs in having smooth oxeotes in stead of acanthose tylostyles.

9 species (table IV) have been reported from deeper waters in the West Indian region, five of which remain ill-known. The generic diversity in this family is unusually great: 8 genera for 9 species.

?Family **VETULINIDAE** Von Lendenfeld (1903)

Genus **Vetulina** Schmidt (1879)

Definition: Lithistids with acrepid polyclad desmas.

Vetulina stalactites Schmidt (1879)

Material: ZMA POR. 5254, Off Paynes Bay, 153–216 m, 28-IX-1978 (2 spec.)

Description (text-fig. 34):

Irregular, undulating, leaf-like, subflabellate structures, often combined with tubular or vasiform formations; up to 19 cm in width, 10 cm high; thickness of the 'leaves' 3–6 mm; the edges are often slightly swollen; surface smooth, perforated by very small 'pores' on the insides.

Colour: orange-brown alive, ochre-yellow to yellow-white in the dry state.

Ectosome: no special skeleton.

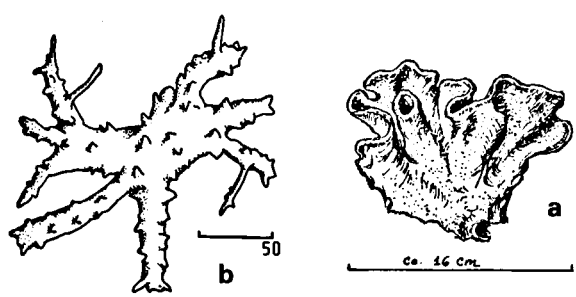

FIGURE 34. *Vetulina stalactites*, a. habit, b. desma.

Choanosome: an irregular tight-meshed desma reticulum, in which zygosis occurs between clads and centres of desmas, instead of clad-clad zygosis. Spicules: polyclad desmas (up to 6 or 7 clads on the average), highly warty, with the ends of the clads finely branched and spiny, while some are quite stocky, almost plate-like: 150–220 by 20–30 μm; some broken spicules may represent the strongyles reported for this species by SOLLAS (1885).

Ecology: Common below 153 m.

Distribution: Known only from Barbados.

Discussion: Although here LÉVI's (1973) system is followed, there can be little doubt that this species fits in the same family as *Siphonidium* and *Leiodermatium*. It is likely that the peculiar desmas are derived from modified ectosomal desmas found *Siphonidium*, and also in *Gastrophanella*.

Family **DESMANTHIDAE** Topsent (1893)

Genus **Lithobubaris** Vacelet (1969)

Definition: Desmanthidae with monocrepid desmas and special 'crochet'-type clads.

Lithobubaris tenens Vacelet (1969)

Lithobubaris tenens VACELET, 1969: 184, fig. 21.

Material: ZMA POR. 5265, Off Paynes Bay, 216 m.

Description (text-fig. 35):

Thinly incrusting round patches on dead corals and lithistid remains, appearing as an extremely 'hairy' crust; size several cm^2.

Colour (dry): grey.

Ectosome: unknown (dry specimens).

Choanosome: huge single styles are erect on a basal desma reticulum, which overlies the substrate; desmas loosely arranged, without definite zygoses; style heads fit into circular outcrops of the clads of the desmas ('crochets').

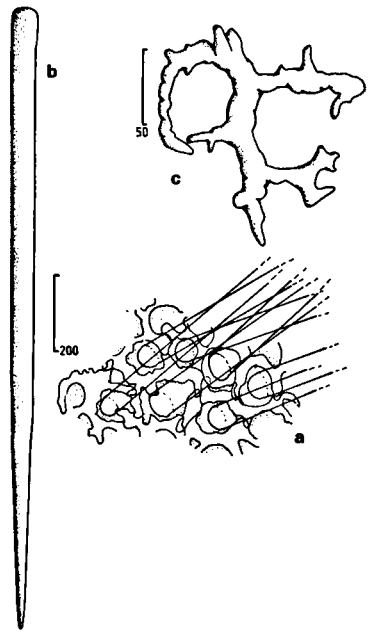

FIGURE 35. *Lithobubaris tenens*, a. architecture of the skeleton, with basal desmata and perpendicular huge styles, b. style, c. desma.

Spicules: monocrepid desmas with shaft of about 150/35 µm; huge styles up to 1500/48–63 µm.

Ecology: Incrusting dead corals at 216 m.

Distribution: Barbados, Mediterranean.

Discussion: *Lithobubaris* was placed in the family Bubaridae by VACELET (and also by PULITZER-FINALI, 1983), because the family Desmanthidae (with *Desmanthus*) was reserved for species possessing tetracrepid desmas; in our opinion this distinction is not important at the family level (cf. the distribution of mono- and tetracrepid desmas over the various lithistid families), and maybe not even for the genus level. The systematic position of the sub-lithistids such as the present remains undecided.

The related *Desmanthus incrustans* Topsent (1889) was originally described from the West Indian region, but has subsequently been found in the Mediterranean; with *Lithobubaris tenens* it is the other way around.

TABLE IV

LITHISTIDA FROM DEEP WATER (> 50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS.

Family Theonellidae	
Theonella atlantica n. sp.	valid species
Theonella avita (Schmidt, 1880) (as *Collectella*)	?
Discodermia amphiaster Schmidt, 1879	?
Discodermia clavatella (Schmidt, 1879) (as *Corallistes*) (= *D. polydiscus*?)	junior syn.
Discodermia dissoluta Schmidt, 1880	valid species
Discodermia imperfecta (Schmidt, 1880) (as *Neopelta*) (= *D. polydiscus*)	junior syn.
Discodermia inscripta (Schmidt, 1879) (as *Collinella*)	?
Discodermia nodosa Schmidt, 1879	?
Discodermia perfecta (Schmidt, 1880) (as *Neopelta*) (= *D. polydiscus*?)	junior syn.
Discodermia polydiscus Du Bocage, 1869	valid species
Racodiscula asteroides Von Zittel, 1878	valid species
Racodiscula nucerium (Schmidt, 1879) (as *Discodermia*) (= *R. asteroides*)	junior syn.
Racodiscula clava (Schmidt, 1879) (as *Rimella*)	valid species
Family Corallistidae	
Corallistes typus Schmidt, 1870	valid species
Corallistes paratypus n. sp.	valid species
Corallistes tubulatus n. sp.	valid species
Corallistes clavatella sensu Hartman in Lewis, 1965 (not: *C. clavatella* Schmidt, 1870)	?
Family Scleritodermidae	
Aciculites cribrophora (Schmidt, 1880) (as *Azorica*)	valid species
Aciculites geminum (Schmidt, 1879) (as *Tremaulidium*)	?
Aciculites higginsi Schmidt, 1879	valid species
Scleritoderma paccardi Schmidt, 1879	valid species
Scleritoderma cyanea n. sp.	valid species
Amphibleptula madrepora Schmidt, 1879	valid species
Family Siphonidiidae	
Siphonidium ramosum (Schmidt, 1870) (as *Leiodermatium*)	valid species
Leiodermatium lynceus Schmidt, 1870	valid species
Leiodermatium pfeifferae (Carter, 1873) (as *Azorica*)	valid species
Gastrophanella implexa Schmidt, 1879	valid species
Sulcastrella clausa Schmidt, 1879	?
Poritella decidua Schmidt, 1879	?
Setidium obtectum Schmidt, 1879	?
Jereopsis schmidti Sollas, 1888	?
Lyidium torquilla Schmidt, 1870	?

Family Vetulinidae?
Vetulina stalactites Schmidt, 1879 — valid species

Family Desmanthidae
Desmanthus incrustans Topsent, 1889 — valid species
Lithobubaris tenens Vacelet, 1969 — valid species

Order **HADROMERIDA**

Family **POLYMASTIIDAE** Gray (1867)

Genus **Polymastia** Bowerbank (1864)

Polymastia sol (Schmidt, 1870)

Radiella sol SCHMIDT, 1870: 48, pl. IV fig. 6; SCHMIDT, 1880: 77; DE LAUBENFELS, 1936a: 150, pl. 22 fig. 2; BURTON, 1954: 222; VACELET, 1969: 173.
Polymastia sol; KOLTUN, 1966: 79, pl. XXX figs 8–10, pl. XXXI figs 10–11.

Material: ZMA POR. 5319, 0.5 mile off Holetown, 200 m.

Description (Text-fig. 36):

A flattened disc of 1.5 cm in diameter, 0.7 cm high, with one central papilla and characteristic peripheral fringe of long spicules; upper surface pilose, with some fine sediment adhering; under surface heavily incrusted with rubble.

Colour (spirit): grey.

Ectosome: smaller tylostyles form a dense palissade.

Choanosome: radial arrangement of larger tylostyles, with smaller ones concentrated in the subectosomal region.

Spicules: tylostyles (no stylote modifications could be found), of widely ranging sizes, divisible in two categories, those of the ectosomal palissade:

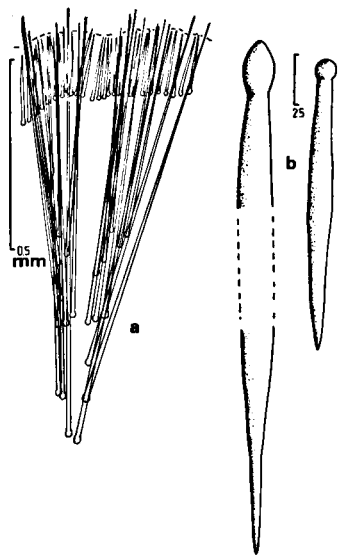

FIGURE 36. *Polymastia sol*, a. perpendicular section through peripheral skeleton, b. spicules in two size categories.

150–600 by 4–25 μm, and those of the radiating choanosomal skeleton: 1500–4300 by 7–15 μm.

Ecology: occurring down to at least 1800 m.

Distribution: Barbados, Cuba, Florida, Belize, Mediterranean, Arctic Ocean.

Discussion: The present specimen exactly matches DE LAUBENFELS" (1936a) description. The species exhibits an unusually large geographic distribution.

We agree with KOLTUN (1966) that the genus *Radiella*, of which the present species is the type, is a synonym of *Polymastia*.

Family **TETHYIDAE** Gray (1867)

Genus **Aaptos** Gray (1867)

Aaptos aaptos (Schmidt, 1864)

Restricted synonymy:
Ancorina aaptos SCHMIDT, 1864: 33, pl. IV fig. 11.
Amorphina duchassaingi TOPSENT, 1889: 44; TOPSENT, 1894: 33 (as *Tuberella*).
Tuberella aaptos; TOPSENT, 1900: 285, pl. VIII figs. 12–13 (with extensive synonymy); WILSON, 1902: 388.
Epipolasis angulospiculata; DE LAUBENFELS, 1936: 162.
Aaptos bergmanni DE LAUBENFELS, 1950: 101, fig. 46; VAN SOEST, 1981: 7.

Material: ZMA POR. 3823, 0.5 mile off Holetown, 100 m.

Description (text-fig. 37):

Small branchlet of 2.5 cm long, 0.8 cm in diameter. Surface rough to the touch. No apparent oscules. Consistency tough, compressible.
Colour (spirit): purplish grey (probably yellowish alive).
Ectosome: perpendicular spicules carry the organic dermis.
Choanosome: radial architecture, with the smaller spicule category concentrated in the ectosomal region.
Spicules: large fusiform (occasionally oxeote) styles (cf. WIEDENMAYER, 1977: fig. 52): 1000–1400 by 10–30 μm; small perfect styles, occasionally sinuous: 180–260 by 2–4 μm.

Ecology: From shallow water down to at least 100 m.

Distribution: Barbados, Gulf of Mexico, Curaçao, Bermuda, Mediterranean.

Discussion: It is here suggested that the Mediterranean (including the neighbouring Eastern Atlantic, teste a specimen from Madeira in the ZMA collection) and West Indian specimens are conspecific. There seems to be no clear difference despite DE LAUBENFELS' (1950) remarks about spicule size (*Aaptos aaptos* would have fusiform styles of up to 1800/45 μm, *A.bergmanni* of 950/15 μm). Literature data indicate that many specimens have intermediate sizes. If in a future study other, more definite differences between populations of both areas would be discovered, then the West Indian species would have to be named *A.duchassaingi* (Topsent, 1889) with

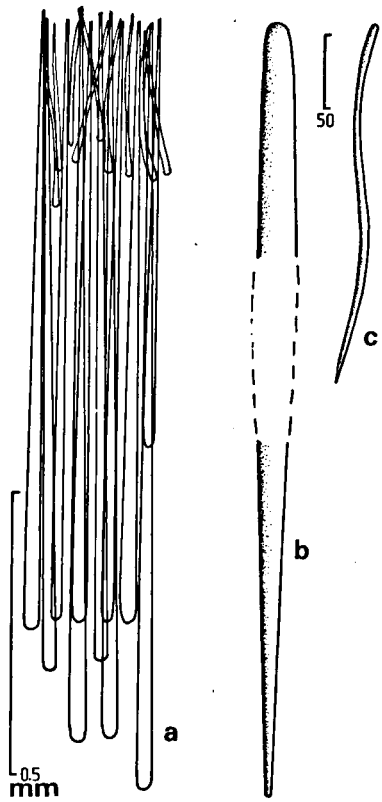

FIGURE 37. *Aaptos aaptos*, a. perpendicular section through peripheral skeleton, b megasclere, c. small style.

A.bergmanni as a junior synonym. Speculations about the occurrence of the present species in Indo-Pacific waters are beyond the scope of this study.

The specimen described by DE LAUBENFELS (1936) as *Epipolasis angulospiculata* (Carter, 1882) (USNM 22445) was found to belong to the present species. *Suberites angulospiculatus* Carter is a senior synonym of *Plakortis zyggompha* (De Laubenfels, 1934).

Genus **Pseudotrachya** Hallmann (1914)

Anomolissa De Laubenfels (1934).

Definition: Tethyidae (?) with a dense ectosomal palissade of small oxea.

Pseudotrachya hystrix (Topsent, 1892)

Trachya hystrix Topsent, 1892: 75, pl. I figs 8–10, pl. XI figs 12–14.
Sollasella hystrix; Topsent, 1904: 142, pl. III fig. 4; Kirkpatrick, 1903: 247.
Pseudotrachya hystrix; Hallmann, 1914: 286; Vacelet, 1969: 178, fig. 13.
Anomolissa amaza De Laubenfels, 1934: 17.
Pseudotrachya oxystyla Sara, 1959: 1, fig. 1.

Material: ZMA POR. 5360, 0.5 mile off Holetown, 100 m, 3 samples.

Description (Pl. X fig. 1, text-fig. 39):

Thickly incrusting on coral rubble, surface hispid due to projecting megascleres. No apparent oscules. Consistency fairly tough.
Colour (spirit): dirty white to brownish.
Ectosome: large megascleres project beyond the distinct cortex consisting of a dense palissade of erect small oxea.
Choanosome: radiate architecture, consisting almost exclusively of large megascleres, with only a few (probably misplaced) small oxea intermingled: spicular content high.
Spicules: large fusiform styles/strongyloxea: 1000–1700 by 20–40 μm; small oxea from the ectosomal palissade: 120–150 by 3–4 μm.

Ecology: On coral rubble at 100 m depth, elsewhere at 30–153 m.

Distribution: Barbados, Puerto Rico, Azores, Mediterranean, South Africa.

Discussion: De Laubenfels (1934) described arcuate isochelae in the type specimen (USNM 22348) of *Anomolissa amaza*, but subsequent examination of it (made possible trough the courtesy of Dr. K.Rützler) did not reveal sufficient quantities of these microscleres to consider them proper. Among the moderately abundant foreign spicules in the present sample also

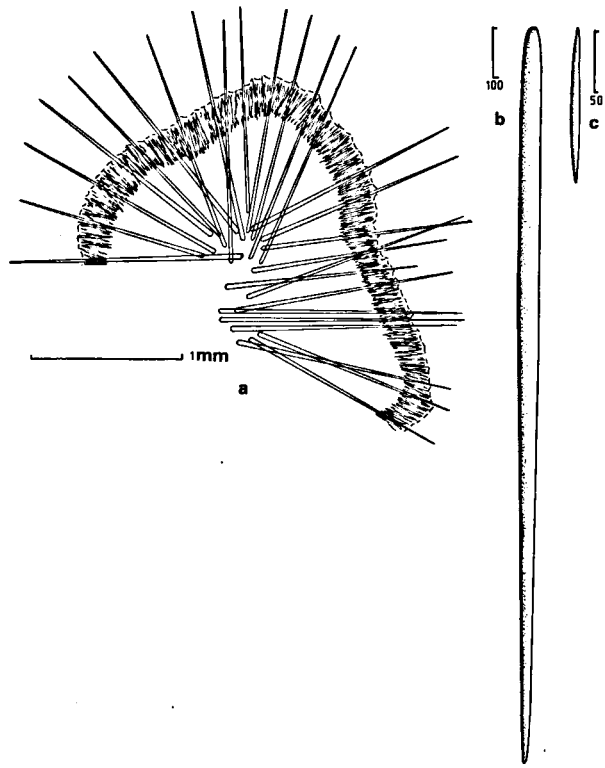

FIGURE 38. *Pseudotrachya hystrix*, a. perpendicular section, b. megasclere, c. microxea.

some chelae of diverse shape were found. In other details DE LAUBENFELS' specimen and his description closely match the present samples; both are clearly Hadromerids and not Poecilosclerids. The structure of the skeleton is similar to that described for *Trachya hystrix* Topsent (1892), although the megascleres of the latter were much longer (up to 7000 μm). CARTER's (1870) genus *Trachya* (erected for the species *pernucleata*) was judged to be the wrong group for this species at a later date (TOPSENT, 1904), and it was referred to *Sollasella* Von Lendenfeld (1888). HALLMANN (1915) concluded that *Sollasella* also could not hold the species, and consequently erected a new genus, viz. *Pseudotrachya*. SARA (1959) described *P.oxystyla* from Naples, but VACELET (1969) clearly showed the overlap in characters between both forms and concluded to their probable synonymy.

The genus *Heteroxya* Topsent (1894) is close to *Pseudotrachya*, but differs in having acanthose small oxea in the dermal palissade.

WEST INDIAN HADROMERIDS

19 species (table VI) of deep water Hadromerids have been reported from the West Indian region, three of which can be regarded as synonyms. Three must be considered ill-known.

TABLE V

HADROMERIDA FROM DEEP WATER (>50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS.

Family Polymastiidae	
Suberites lobiceps Schmidt, 1870	valid species?
Prosuberites spec. sensu Hartman in Lewis, 1965	?
Ridleia dendyi De Laubenfels, 1934	valid species
Polymastia sol (Schmidt, 1870) (as *Radiella*)	valid species
Stylocordyla stipitata (Carter, 1876) (= *Stylorhiza stipitata* Schmidt, 1880)	valid species
Stylocordyla gracilior (Schmidt, 1870) (as *Cometella*)	?
Stylocordyla muta (Schmidt, 1880) (as *Bursalina*)	?
Family Tethyidae	
Tethya actinia De Laubenfels, 1936	valid species
Tethya thyris (De Laubenfels, 1934) (as *Tethycordyla*)	valid species
Aaptos aaptos (Schmidt, 1864)	valid species
Pseudotrachya hystrix (Topsent, 1892) (as *Trachya*)	valid species
Pseudotrachya amaza (De Laubenfels, 1934) (as *Anomolissa*) (= *P. hystrix*)	junior syn.
Family Clionidae	
Timea stellata (Schmidt, 1870) (as *Cometella*)	valid species
Timea cometes (Schmidt, 1880) (as *Tethya*) (= *T. stellata*)	junior syn.
?*Latrunculia cratera* De Bocage, 1869	valid species
Latrunculia regalis (Schmidt, 1870) (as *Sceptrella*)	valid species?
Latrunculia india (De Laubenfels, 1934) (as *Alcyospongia* (= ? *L. cratera*)	junior syn. ?
Placospongia melobesioides Gray, 1867	valid species
Family Chondrillidae	
Chondrosia collectrix (Schmidt, 1870) (as *Cellulophana*)	valid species

Order **HALICHONDRIDA**

Family **HALICHONDRIIDAE** Vosmaer (1887)

Genus **Topsentia** Berg (1889)

Topsentia roquensis Diaz, Alvarez & Van Soest, 1987

Topsentia roquensis DIAZ, ALVAREZ & VAN SOEST, 1987: 34, pl. I B-C, text-fig. 2.

Material: ZMA POR. 5408, 0.5 mile off Holetown, 100 m (4 spec.).
ZMA POR. 5409, Off Paynes Bay, 108–126 m.

Description (text-fig. 39):

Irregular sprawling masses of up to 8.5 cm long, 3.5 cm in diameter, with many, partly hollow fistular outgrowths of various diameters, reaching lengths of several cm^2; surface without apparent oscules, optically smooth, but rough to the touch; consistency corky-crumbly.

Colour (spirit): light beige.

Ectosome: microhispid due to projecting spicules; a definite halichondroid tangential arrangement of the larger spicules is also present, although it is not easily detachable.

Choanosome: cavernous; between the holes a completely confused, dense arrangement of spicules makes up most of the interior.

Spicules: oxea of various sizes: 190–720 by 5–18 µm, three main sizes seem to be present: approx. 200 µm, 400–450 µm, and 600–700 µm, but considerable overlap occurs; the larger spicules may frequently exhibit double bends, as has been described for *Amorphinopsis* Carter (1886); a few stylote modifications are also present.

Ecology: Rare at 100–130 m, elsewhere known from reefs 10–30 m.

Distribution: Barbados, Venezuela, Curaçao.

Discussion: The present material shows some discrepancies with the original material, which was described from reefs in the Southern Caribbean. Large hollow fistules as found in our specimens are apparently not

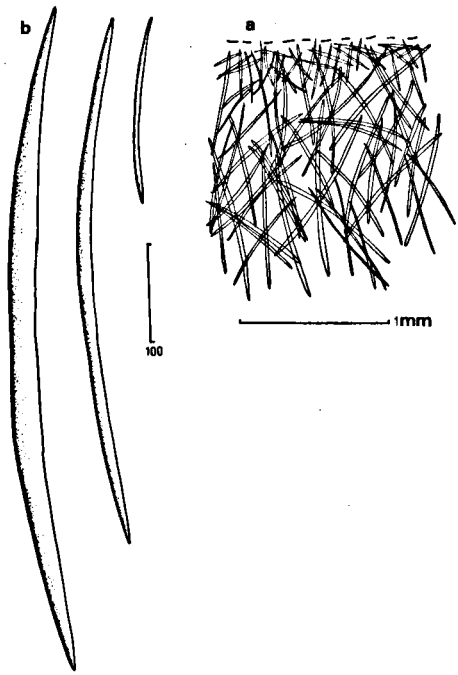

FIGURE 39. *Topsentia roquensis*, a. perpendicular section through peripheral skeleton, b. spicules in three size categories.

known from the reefs. However, other characters such as consistency, skeletal architecture and spicule sizes are similar, so conspecificity is likely. Several other *Topsentia* species are known to occur in more shallow West Indian waters (e.g. VAN SOEST, 1981), but reliable descriptions are not yet available. *Rhaphisia ambrosia* De Laubenfels (1936), from 70 m off Florida, may be another species of *Topsentia*, which is distinguished from the present species by life colour (golden yellow) and the apparent absence of the smallest category of spicules (holotype USNM 22445 examined).

Topsentia shows affinities with *Spongosorites* Topsent (1896) and *Amorphinopsis* Carter (1866), through the apparent size categories found in the megascleres and through the double-bent nature of many of them. The genus *Laminospongia* Pulitzer-Finali (1983) may prove to be a synonym of *Topsentia*. The genus *Coelocalypta* Topsent (1925) is also a synonym of *Topsentia*, for reasons given below.

Topsentia porrecta (Topsent, 1928)

Coelocalypta porrecta TOPSENT, 1928: 167, pl. II fig. 6, pl. IV fig. 14.

Material ZMA POR. 5410, Off Paynes Bay, 216 m, 12-IX-1978.
ZMA POR. 5411, Off Paynes Bay, 144–153 m, 13-VI-1978.
ZMA POR. 5412, Off Paynes Bay, 144–153 m.

Description (Pl. X fig. 2, text-fig. 40):

Turnip-shaped masses, up to 10 cm in diameter, with hollow tapering fistules of up to 6.5 cm long; surface of basal mass smooth but rough to the

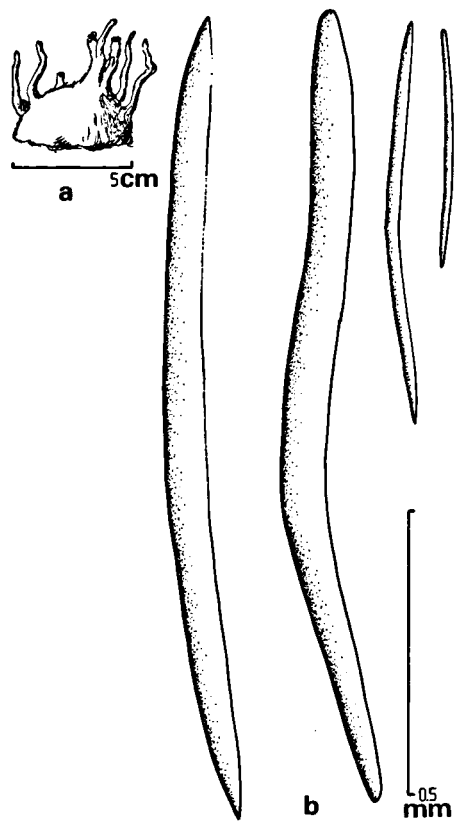

FIGURE 40. *Topsentia porrecta*, a. habit, b. spicules in three size categories.

touch; fistule surface typically grooved, but otherwise as main body; fistules thick-walled, up to 0.8 cm in diameter; consistency (dry) tough, incompressible, crumbly.
Colour (dry): the main body is brown due to attached mud, fistules tend to be white.
Ectosome: barely differentiated from the choanosome; most spicules are arranged (para-)tangentially and are of intermediate size.
Choanosome: largely confused with high spicular density; fistules are supported by strongly developed, spongin-enforced spicule tracts.
Spicules: oxea, probably divisible into three size categories: small ones 310–420 by 7–10 µm, intermediates 475–680 by 10–15 µm, and large ones: 670–1500 by 40–65 µm (the latter with many stylote and some strongylote modifications).

Ecology: Common between 144 and 216 m.

Distribution: Barbados, Azores.

Discussion: The genus *Coelocalypta* Topsent (1928) was erected for fistulose forms with size-differentiated oxea; however, if we disregard growth form as a generic character, there is no need to separate the present species from *Topsentia*. The genus *Ciocalypta* Bowerbank (1862) has a superficial resemblance in habit and architecture, but its spiculation consists of stylotes with only rarely some oxeote malformations.

Genus **Epipolasis** De Laubenfels (1936a)

For a discussion of this genus see DIAZ, ALVAREZ, & VAN SOEST, 1987.

Epipolasis reiswigi Diaz, Alvarez & Van Soest, 1987

Epipolasis reiswigi DIAZ, ALVAREZ, & VAN SOEST, 1987: 36, pl. ID, text-fig. 4.

Material: ZMA POR. 5371, 0.5 mile off Holetown, 100 m.
ZMA POR. 5370, Off Paynes Bay, 108 m (5 fragments).

FIGURE 41. *Epipolasis reiswigi*, a. megascleres in two size categories, b. trichodragma.

Description (text-fig. 41):

Upright single branches issuing from a basal mass; branches up to 4–5 cm long, 2 cm in diameter. Surface rough to the touch, optically smooth, with a few meandering grooves not unlike those of *Myrmekioderma styx*; consistency crumbly.

Colour (spirit): grey, with brown choanosome.

Ectosome: a paratangential felted mass of smaller megascleres.

Choanosome: a confused mass of mostly large oxea; some spongin is in

evidence, binding ill-defined tracts of several spicules in thickness; rhaphides are concentrated in the choanosome.
Spicules: large smooth oxea: 495–905 by 15–35 μm; small smooth oxea: 190–335 by 5.5–12 μm; rhaphides in sinuously curved or twisted dragmata (sometimes found curled around bundles of megascleres): 57–262 by 5–19 μm (individual rhaphides less than 0.5 μm thick).

Ecology: Occurring at 100–110 m, elsewhere known from 23 m on reefs.

Distribution: Barbados, Venezuela.

Discussion: The habit of the present material differs somewhat from that of the type material from deep-reef localities off the coast of Venezuela. Just as with *Topsentia roquensis* the deeper material tends to have branches and thin outcrops, possibly related to the more sheltered conditions in deeper water. Skeletal architecture and spicule sizes are closely similar.

Judged on the description this species is close to *Rhaphisia spelaea* Pulitzer-Finali (1983) (Mediterranean); differences are the habit, but also the ecology: PULITZER-FINALI's material originated from shallow-water caves. The species is here transferred to *Epipolasis*. *Rhaphisia* is a Haplosclerid genus, related to and probably congeneric with *Haliclona* (cf. DE WEERDT & VAN SOEST, 1986). The present material is also very similar to *Myrmekioderma styx* (cf. below), differing mainly in the smooth condition of the ectosomal megascleres. Although the habit is different and the thickness of the dragmata is greater, these point to specific rather than to generic difference.

As has been noted before (DIAZ, ALVAREZ & VAN SOEST, 1987) this species is also similar to *Didiscus flavus* Van Soest (1984) in surface characters and colour. The genus *Epipolasis* was erected for the type species *Spongosorites suluensis* Wilson (1925), and some other forms, which do not seem to be all that closely related. WIEDENMAYER (1977) discussed the genus at length but misinterpreted it by disregarding the trichodragmata, of which WILSON (1925) especially noted, that they were "... frequently curved, sometimes spirally, round two or three of the larger megascleres...". WIEDENMAYER's (1977) *Epipolasis lithophaga* must be referred to the genus *Aaptos*. He also assigned *Suberites angulospiculatus* Carter (1882) to *Epipolasis*; this is a senior synonym of *Roosa zyggompha* De Laubenfels (1934) (a slide of the type specimen was examined in the British Museum

(Nat. Hist.), which is referred to the genus *Plakortis* Schulze (1880) by HECHTEL (1965). The correct name for that common species is thus: *Plakortis angulospiculatus*.

Epipolasis rea (De Laubenfels, 1934)

Anacanthaea rea DE LAUBENFELS, 1934: 11.

Material: ZMA POR. 5400, 0.5 mile off Holetown, 100 m(3 fragm.).

Description (Pl. X figs 3–4, text-fig. 42).

Irregular, massive lumps, 11 × 7 × 2.5 cm, with smooth but mamillate surface; vaguely discernible meandering grooves are firmly roofed over by the ectosomal crust; no oscules apparent; consistency tough, but fairly easily broken.

Colour (spirit): greyish white.

Ectosome: the skeleton forms a paratangential crust of completely confusedly arranged megascleres of all sizes; spicules protruding obliquely or perpendicularly for a short distance beyond the surface cause the sponge to feel rough.

Choanosome: confused mass of oxea of all sizes; some choanosomal cavities are apparent; no spongin.

Spicules: smooth or terminally roughened oxea, often stair-stepped, occasionally stylote, not divisible into two distinct size categories, rather giving the impression of uniform size: 297–458 by 4–10 μm; trichodragmata in two size categories: small, straight packets, concentrated in the ectosomal region: 15–26 by 6–7 μm, and larger sinuously or spirally twisted ones: 96–148 by 5–6.5 μm.

Ecology: Rare at 60–100 m.

Distribution: Barbados, Puerto Rico.

Discussion: The absence of a size differentiation of the megascleres is unusual for the genus, but the occurrence of the sinuous trichodragmata seems sufficient evidence for a congenericness of the present species and the previous one. The size categories of trichodragmata are characteristic for the present species.

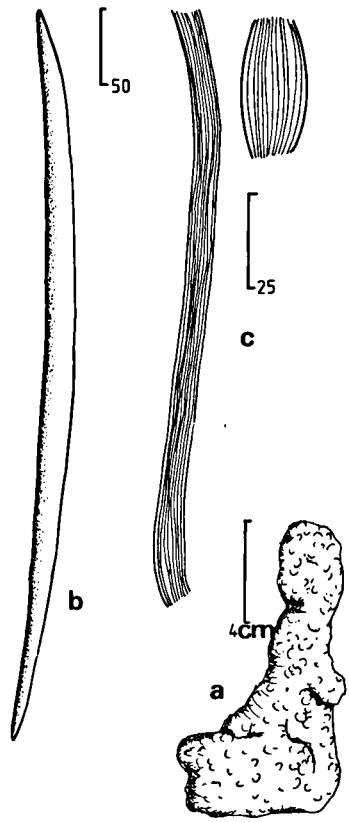

FIGURE 42. *Epipolasis rea*, a. habit, b. megasclere, c. trichodragmata in two size categories.

The holotype of *Anacanthaea rea* De Laubenfels (1934) (USNM 22301) is closely conforming to our material. DE LAUBENFELS apparently overlooked the trichodragmata. It is quite possible, that the genus *Anacanthaea* Row (1911) also belongs to the group of genera with large confusedly arranged oxeotes and polygonally grooved surface, such as *Epipolasis, Myrmekioderma,* and *Didiscus.* The roughened condition of many megascleres may be evidence of close relationship between *Epipolasis* and *Myrmekioderma.*

Genus **Myrmekioderma** Ehlers (1870)

For a discussion of this genus and synonymy quotations cf. BERGQUIST (1965).

Myrmekioderma styx De Laubenfels (1953)

Material: ZMA POR. 5368, Off Paynes Bay, 144–153 m, 22-VI-1978.
ZMA POR. 5369, 0.5 mile off Holetown, 100 m.

Description (Pl. X figs 5–6, text-fig. 43):

Massive, irregular to rounded, with a few oscular elevations and tubular outcrops. Size up to 8 cm in cross section; surface irregularly areolated by meandering grooves (less regular than in other *Myrmekioderma* species); much sand adhering to the surface; consistency crumbly.
Colour (dry): pale yellowish to ochre-yellow.
Ectosome: a detachable crust of paratangential felted acanthoxea.
Choanosome: architecture completely confused, with large smooth oxea arranged densely, without apparent order.
Spicules: large smooth oxea, mostly lightly curved, stout, rather bluntly pointed: 650–1010 by 17–47 μm; small acanthoxea, often lightly but abruptly bent in the middle: 210–418 by 8–14 μm; rhaphides, mostly in sinuously curved dragmata, less than 0.5 μm in thickness, size of dragmata: 90–139 by 19–40 μm.

Ecology: Occurring from 100–155 m.

Distribution: Barbados, Florida, Puerto Rico (cf. below).

Discussion: The present specimens differ from the type of *M.styx* in the thickness of the smooth megascleres (17–47 against 11–16 μm) and the length of the rhaphides (90–139 μm against 20–50 μm). The ZMA collection holds another specimen of this species from 90 m depth near Puerto Rico (ZMA POR. 3361), which is similar to the present material, but of much larger size. BERGQUIST (1965) suggested that *M.styx* is close to, if not conspecific with, *M.granulata* (Esper, 1794), a wide-spread shallow-water species from the Indo-Pacific. In view of the (admittedly slight) spicular differences and the geographic separation it is here proposed to keep the two species separate until more information is available.

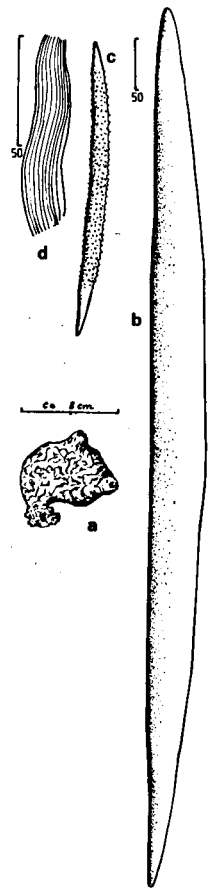

FIGURE 43. *Myrmekioderma styx*, a. habit, b. megasclere, c. acanthoxea, d. trichodragma.

The genus *Myrmekioderma* differs from *Epipolasis* De Laubenfels (1936a) only in the acanthose condition of the smaller megascleres. The genus *Heteroxya* Topsent (1904), although its spicules are quite similar to those of *Myrmekioderma*, differs quite fundamentally in architecture, and must be refferred to the Hadromerid family Tethyidae, along with *Aaptos* Gray (1867) and *Pseudotrachya* Hallmann (1915).

?Genus **Halichondria** Johnston (1842)

?Halichondria ruetzleri n.sp.

Material: ZMA POR. 5320, Off Paynes Bay, 108–153 m.

Description (text-fig. 44):

Oblong, irregular masses riddled with vermetid tubes; surface smooth; oscules slightly raised; consistency (dry) corky, hard.
Colour (dry): black (probably yellowish alive).
Ectosome: a tangential crust of confusedly arranged single spicules and vague tracts.
Choanosome: a dense confused mass of spicules.
Spicules: oxea, with stair-stepped or ragged apices, in all sizes: 100–590 by 1–9.5 µm (possibly there are two size categories).

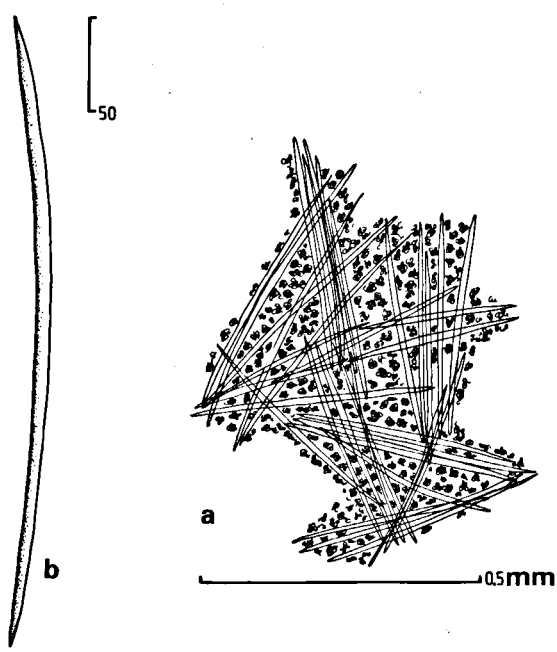

FIGURE 44. ?*Halichondria ruetzleri* n. sp., a. tangential view of ectosomal skeleton including heavy pigmentation of dermis, b. spicule.

Ecology: fairly common at 108–153 m.

Distribution: Barbados.

Etymology: Named after Dr KLAUS RÜTZLER, for his invaluable contributions to sponge ecology and taxonomy.

Discussion: The specimens look superficially similar to *Spongosorites siliquaria* n.sp. because they are riddled by gastropod shells; both species differ in colour and spicule form. At first it was thought the present specimens were referable to *H.melanodocia* De Laubenfels, 1936a, but communications with Drs. S. A. POMPONI and M. C. DIAZ (Sea Pharm, Florida) led to the conclusion that the present material belongs to a new species, differing from *melanodocia* in the shape of the spicules and also in the more crust-like ectosome. *H.melanodocia* is a typical member of shallow-water lagoon habitats.

The shape of the spicules reminds of *Anacanthaea nivea* Row, 1911 from the Red Sea; it is uncertain whether *Anacanthaea* can be differentiated from *Halichondria*.

Genus **Spongosorites** Topsent, 1896

Definition: Halichondriidae with ill-developed tangential ectosomal skeleton and curious twice-bent, often centrotylote spicules.

Spongosorites siliquaria n.sp.

Material: Holotype: ZMA POR. 5233, Off Paynes Bay, 108–170 m, 14-IX-1978.
Paratypes: ZMA POR. 5234, Off Paynes Bay, 108–170 m (3 spec.).

Description (Pl.XI figs 1–2, text-fig.45):

Flattened, rounded masses, riddled with Vermetid gastropod tubes of the genus *Siliquaria*; the incorporated shells are often randomly orientated chaotic, tangled, but sometimes they show a parallel orientation, with the spiral, pale, young whorls concentrated on one side of the sponges, whereas the old, brownish, spiky whorls are projecting from the other side; the latter side (upper surface) is often overgrown with epibionts (Alcyonacea and Scleractinia); size up to more than 20 cm in diameter (holotype 9 × 8 × 4 cm); surface smooth, velvety; oscules rare, small (2 mm), irregularly

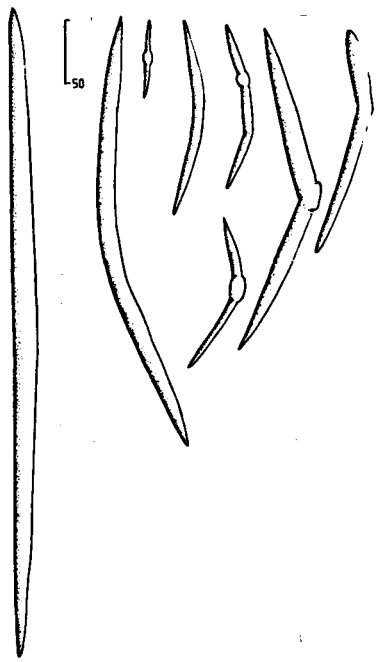

FIGURE 45. *Spongosorites siliquaria* n. sp., variation of spicules.

distributed among the numerous holes made by the vermetids; consistency (dry) rather tough and hard.
Colour: pale green-yellow alive, chocolate brown to black when dried.
Ectosome: a distinct crust of dermal spicule brushes; oxea smaller than those of the choanosome.
Choanosome: irregularly cavernous, holes 50–100 μm in diameter; between them a dense, confused mass of spicules.
Spicules: characteristally angularly bent, centrotylote oxeote spicules form the major type, occasionally these are verging towards triactines (they look as if two spicules are partly fused at a sharp angle), but also smooth normal oxea are found, size range large: 34–375 by 1.5–12 μm.

Etymology: The name reflects its symbiosis with the vermetid genus Siliquaria.

Ecology: Deep water beyond the reefs, apparently with an obligatory relationship with the vermetid.

Distribution: Barbados, Jamaica.

Discussion: The new species is close to the type of the genus *Spongosorites*, viz. *S.placenta* Topsent (1896), differing mainly in colour (lilac or white in *placenta*), and in the thickness of the largest spicules (only 6 μm in *placenta*). It is possible, that the sponge described as *Spongosorites sp.* by PULITZER-FINALI (1983: Bay of Naples, colour black) is close to if not conspecific with our new species. PULITZER-FINALI (1983) described two other *Spongosorites* spp., which seem to be clearly different in life colour and spicule size.

Spongosorites has been associated with *Epipolasis* De Laubenfels (1936a) by WIEDENMAYER (1977), but this is incorrect. *Epipolasis* has larger and normal shaped oxea and trichodragmata as microscleres (cf.above). ANNANDALE (1915) declared *Spongosorites* to be a synonym of the genus *Amorphinopsis* Carter (1887). The type of this is *A.excavans* Carter (1887), an excavating sponge, excellently redescribed by ANNANDALE (loc.cit.). It is possible that this sponge with its angularly bent oxea among the spicules will prove to be closely related to *Spongosorites*, although the frequent occurrence of styles in *excavans* prevents this synonymization at present. *Cliona coralliophila* Stephens (1914) seems to be another species of *Amorphinopsis*. BURTON's (1959) use of the genus *Amorphinopsis* probably goes foo far.

Family **HYMENIACIDONIDAE** De Laubenfels, 1934

Genus **Leucophloeus** Carter, 1883

Leucophloeus lewisi n.sp.

Material: Holotype: ZMA 5401, 0.5 mile off Holetown, 100 m.
Paratypes: ZMA 5402, 0.5 mile off Holetown, 100 m (1 complete spec. and three fragm.).

Description (text-fig.46).

Irregular upright and sprawling, thick branches; length up to 10 cm, diameter 2–3 cm; surface irregularly but finely conulose, with a tendency to become clathrous in places; a subdermal system of meandering grooves adds to the general irregular aspect; (pseud-)oscules may be represented by a few more or less rounded, deep depressions; surface rough to the touch

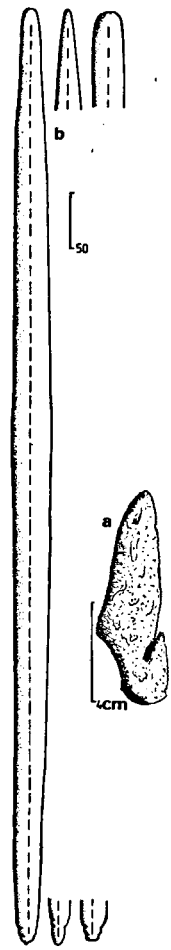

FIGURE 46. *Leucophloeus lewisi* n. sp., a. habit, b. style, including variation of apices.

but nevertheless covered by a continuous, strong dermal membrane, which may be detached fairly easily; consistency toughly compressible.
Colour(spirit): pinkish grey.
Ectosome: an organic dermal membrane charged with tangential spicules.
Choanosome: at first glance the structure of the skeleton is confused, with single styles lying scattered in all directions; however, towards the centre of

the sponge some organization into vaguely reticulated tracts, strengthened by spongin becomes evident.
Spicules: smooth curved styles, with the blunt end typically thinner than the shaft, and stair-stepped pointed ends: 610–800 by 7–19 μm; occasionally both ends are stair-stepped or alternatively both ends are blunt.

Etymology: The species is named after Dr JOHN B.LEWIS in recognition of his pioneering efforts in describing the marine benthic communities of Barbados.

Ecology: Rare at 100 m.

Distribution: Known only from the type locality.

Discussion: The generic allocation of the present species remains somewhat uncertain, because the type of *Leucophloeus*, viz. *L.massalis* Carter (1883) (from West Australia) shows important differences in the choanosomal architecture. *L.massalis* is described as snow-white in colour and built like *Halichondria panicea* (Pallas, 1766). The shape of the spicules, however, and the irregular surface seem to be points of similarity. *Leucophloeus* differs from *Hymeniacidon* Bowerbank (1866) in the shape of the spicules (which are perfect styles in the latter) and in details of the ectosomal skeleton (much more developed).

TABLE VI

HALICHONDRIDA FROM DEEP WATER (> 50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS.

Family Halichondriidae	
?Halichondria ruetzleri n. sp.	valid species
Topsentia roquensis Diaz, Alvarez & Van Soest, 1987	valid species
Topsentia porrecta (Topsent, 1928) (as *Coelocalypta*)	valid species
Topsentia ambrosia (De Laubenfels, 1934) (as *Rhaphisia*)	valid species
Topsentia profunditatis (Schmidt,1870) (as *Pellina*)	?
Epipolasis reiswigi Diaz, Alvarez & Van Soest, 1987	valid species
Epipolasis rea (De Laubenfels, 1934) (as *Anacanthaea*)	valid species
Myrmekioderma styx De Laubenfels, 1953	valid species
Spongosorites siliquaria n. sp.	valid species
Family Hymeniacidonidae	
Leucophloeus lewisi n. sp.	valid species

11 species (table VI) of deep water Halichondrids have been reported from the West Indian region, one of which must be regarded as ill-known.

Order AGELASIDA?

Family AGELASIDAE Verrill (1907)

Genus Agelas Duch. & Mich. (1864)

Agelas clathrodes (Schmidt, 1870)

For synonymy cf. WIEDENMAYER, 1977: 131.

Material: ZMA POR. 5355, Off Paynes Bay, 108–135 m, 5-IX-1978.
ZMA POR. 5356, Off Paynes Bay, 144–153 m, 13-VI-1978.

Description (text-fig.47):

Irregularly flabellate, 10 cm broad, 8 cm high; on one side (outer ?) with protruding warts and ridges, the other relatively smooth, porous, with shallow meandering grooves roofed over by organic skin; the outer side has characteristic stellate oscules.
Colour (dry): pale brown.
Ectosome: organic.
Choanosome: a close-meshed system of spongin fibres without distinction in primary and secondary fibres; diameter 20–75 μm, mesh size 100–500 μm; coring infrequent, up to 4 spicules per cross section; echinating spicules regularly distributed over the fibres, sometimes in groups of two; average distance of echinators: 40–60 μm.
Spicules: acanthostyles: 100–142 by 5–8 μm, with 9–12 whorls of spines.

Ecology: Down to 153 m; elsewhere common in the deeper parts of the reefs.

Distribution: Tropical western Atlantic.

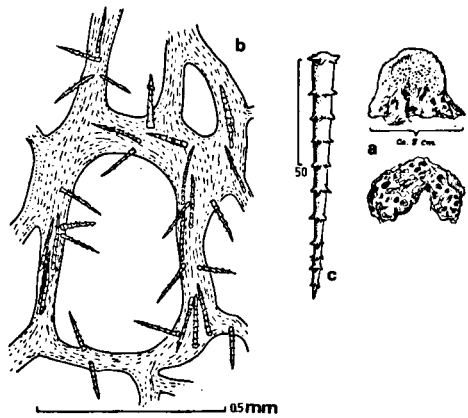

FIGURE 47. *Agelas clathrodes*, a. habit of characteristic specimens, b. choanosomal spongin skeleton with coring and echinating spicules, c. verticillate acanthostyle.

Discussion: Compared to shallow-water specimens from the Curaçao reefs of this species, the spicules are smaller and have less whorls; in other respects the specimens approach each other closely.

Agelas spec.

Material: ZMA POR. 5357, Off Paynes Bay, 144–153 m, 20-VII-1978 (fragment only).

Description (text-fig.48):

Bowl-shaped, up to 15 cm high and 24 cm in widest expansion (a fragment is all that remains of the specimen); outside surface warty-knotty, with stellate oscular patterns; inner surface relatively smooth, porous; consistency tough, resembling cork.

Colour(dry): ochre.

Ectosome: organic.

Choanosome: the usual close-meshed system of stratified spongin fibres, in this case sparingly cored and echinated by acanthostyles; fibre diameter 20–70 μm, mesh size 150–200 μm; coring up to 4 spicules in cross-section, but only in the peripheral region; towards the interior spicules become quite rare; this also applies to echinating spicules.

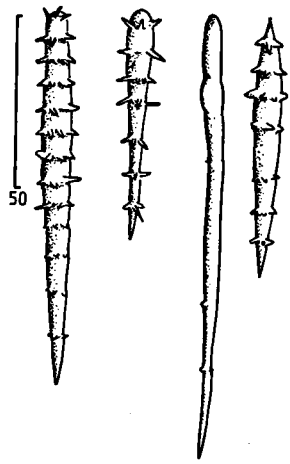

FIGURE 48. *Agelas* spec., variation of spicules.

Spicules: acanthostyles: 57–120 by 3–6.5 μm, with 9–13 whorls of spines; strongylote and oxeote modifications as well as smooth or only warty spicules are common.

Discussion: The specimen is close if not conspecific with *A.clathrodes*, which is known to form irregular bowls or cups; it differs in the sparse spicule content, especially in the interior. Since the variability of these features is not well-known, we preferred to describe this specimen separately.

Agelas sceptrum (Lamarck, 1814)

Alcyonium sceptrum LAMARCK, 1814: 397.
Ectyon sceptrum; TOPSENT, 1933: 33,pl.II fig.5.

Material: ZMA POR. 3811, Off Holetown, 100 m.

Description (text-fig. 49)

Creeping ramose branches of variable diameter: 3–20 mm; greatest length 20 cm; surface smooth, but finely grooved, microscopically hispid and with only few pores; oscules distinctly stellate; consistency spongy, compressible.

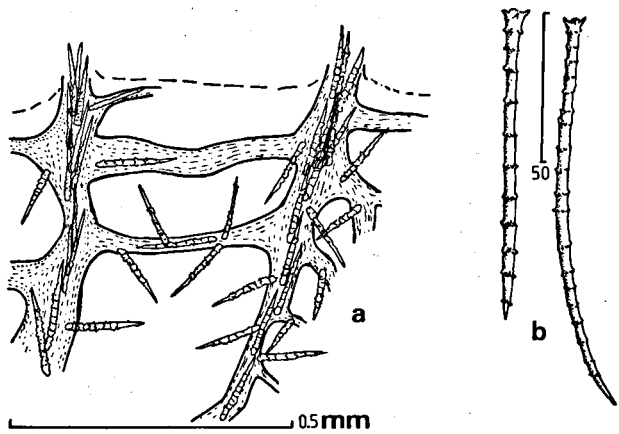

FIGURE 49. *Agelas spectrum*, a. perpendicular section through peripheral region, b. verticilla te acanthostyles.

Colour (spirit): tan.
Ectosome: organic.
Choanosome: an irregular system of spongin fibres, with distinct primary fibres running perpendicularly to the surface, where they end in spicule brushes of up to 15 spicules; coring 2–6 spicules per cross section, but diminishing towards the interior; primary fibres lying at distances of 500–700 μm, diameter up to 80 μm; secondary fibres free of coring spicules, up to 30 μm in diameter; both primary and secondary fibres echinated moderately to heavily; distance of the echinators 20–80 μm; the fibre system becomes isotropic towards the interior.
Spicules: acanthostyles: 80–195 by 2.5–15 μm, with 10–20 whorls of spines.

Ecology: Down to 100 m; elsewhere known from shallow-water reefs.

Distribution: Tropical western Atlantic.

Discussion: Compared to shallow-water specimens from the Curaçao and Puerto Rican reefs, the present specimens are more thinly ramose and the skeletons are less compact (the primary fibres lie at greater distances). In other details the specimens all agree closely.

Agelas schmidti Wilson (1902)

Siphonochalinopsis spec.; SCHMIDT, 1880: 80.

Agelas schmidti WILSON, 1902: 398; Lewis, 1965: 1052. (Not: HECHTEL, 1969=? *Agelas clathrodes*; nec:WIEDENMAYER, 1977: 129, pl.27 fig.1 = *Agelas wiedenmayeri*).

Material: ZMA POR. 3810, 0.5 mile off Holetown, 100 m (many fragm.).
ZMA POR. 5758, Off Paynes Bay, 144–153 m (4 fragm.).
ZMA POR. 5759, Off Paynes Bay, 108 m (4 fragm.).

Description (text-fig.50):

Hollow creeping branches issuing from basal hollow or extremely clathrous masses; surfaces riddled with holes, which are covered by the tough skin; diameter of branches 0.8–2 cm, length indefinite but at least 20 cm; consistency firmly spongy.
Colour: orange-red to brick-red alive, yellow-brown in spirit.
Ectosome: organic.
Choanosome: the hollow interior is surrounded by a thin layer of flesh and

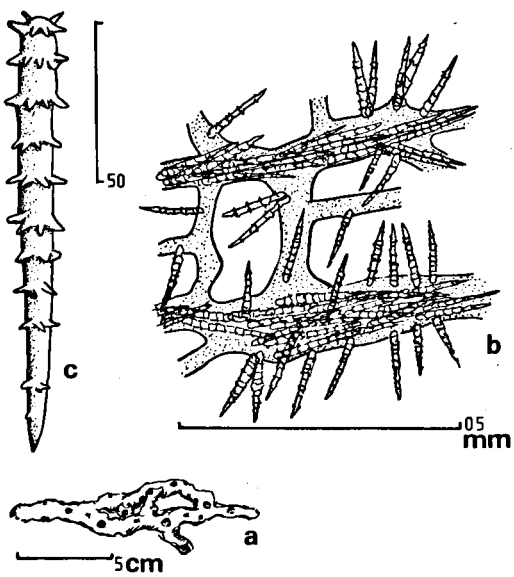

FIGURE 50. *Agelas schmidti*, a. habit, b. choanosomal skeleton with heavily cored spongin fibres, c. verticillate acanthostyle.

fibres; the latter form a loose system of predominantly longitudinal, heavily echinated spongin main fibres, in places flattened out into heavily echinated spongin plates; interconnecting fibres perpendicular to the surface, sparingly cored by 1–3 spicules per cross section, often completely free from inclusions.
Spicules: acanthostyles: 100–190 by 6–8 μm with 10–16 whorls of spines.

Ecology: From 100 m downwards; elsewhere (Puerto Rico) from 36 m downwards.

Distribution: Barbados, Puerto Rico.

Discussion: This seems to be a predominantly deeper water species. WIEDENMAYER (1977) described a hollow-tubed specimen under this name from 20 fms, but this does not seem to be conspecific with our and WILSON's material. ALCOLADO (1984) described *A.wiedenmayeri* for these and similar specimens. Three other species of *Agelas* are known to occur in the West Indian region, viz. *A.dispar* Duch.&Mich. (1864), *A.conifera* (Schmidt, 1870) and a tube-shaped species, so far undescribed, but often pictured (e.g. GOREAU & HARTMAN, 1966: COLIN, 1978: 56). Thus the total number of West Indian species seems to be at least nine, a high number when compared to the Indo-Pacific waters. It appears that within the West Indian region there has been a post-Tethyan radiation of *Agelas*, a phenomenon which must be explained in an ecological and historical framework.

All species known from deeper waters in the West Indian region are represented in the present material (see table VII).

Order **AXINELLIDA**

Family **AXINELLIDAE** Ridley & Dendy (1887)

Genus **Phakellia** Bowerbank (1862)

Phakellia folium Schmidt (1870)

Phakellia folium SCHMIDT, 1870: 62.
Phakellia sp. SCHMIDT, 1880: 81.

Material: ZMA POR. 5414, Off Paynes Bay, 162 m, 22-VI-1978 (8 spec.).

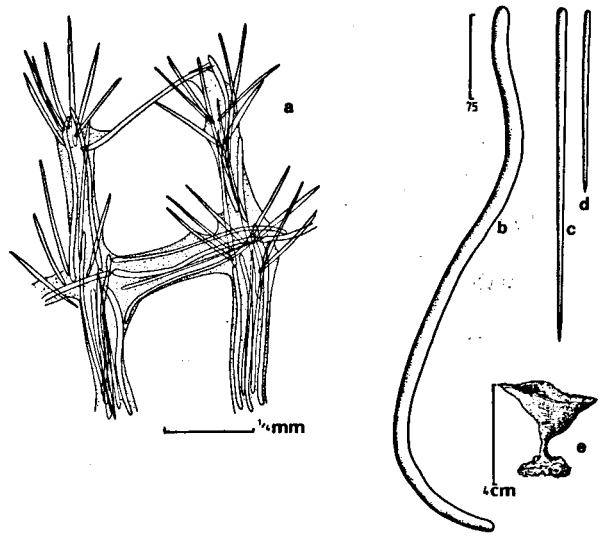

FIGURE 51. *Phakellia folium*, a. perpendicular section through peripheral region, b. sinuous strongyle, c. coring style, d. echinating small style, e. habit.

Description (Pl.XIfig.3, text-fig.51):

Funnel-shaped, usually with a short stalk and basal disc; size up to 5 cm high, 5.5 cm in diameter, funnel wall about 1 mm in thickness, regularly reticulated, without apparent veins (strengthened spicule tracts); surface slightly hispid; consistency fragile.

Colour: whitish grey alive, pale yellow in dry state.

Ectosome: hispid due to projecting spicules.

Choanosome: a regular isodictyal skeleton of primary lines and interconnecting spicules is present throughout the cup-wall, right from the stalk outwards; no extra-strongly developed spicule tracts ('veins'); tracts consist of sinuous strongyles (up to 7 in cross section); interconnecting spicules may be either sinuous strongyles or straight styles or both; at the connections brushes of short styles echinate the tracts.

Spicules: sinuous strongyles: 415–520 by 7.5–8.5 μm; straight styles 115–300 by 3.5–6 μm (possibly in two size categories).

Ecology: Not uncommon at 162 m; elsewhere occurring down to 600 m.

Distribution: Barbados, Florida, St.Vincent.

Discussion: *Phakellia folium* was described from a leaf-shaped specimen dredged near Florida; later (1880) SCHMIDT described funnel-shaped specimens from Barbados and St.Vincent, which he referred hesitatingly to *Phakellia ventilabrum* Bowerbank (1862), pointing out the resemblance of these small specimens with BOWERBANK's (1874) PI.XXII fig.4. There can be no doubt about the specific distinctness of the two forms: *P.ventilabrum* are yellow-brown alive, thicker and coarser, and also have definite 'veins' supporting the funnel wall. Spicule sizes differ significantly. SCHMIDT's (1880) records of *P.ventilabrum* proper from the West Indies must be verified since no descriptions are provided. *Phakellia tenax* Schmidt (1870) was redescribed in the genus *Endectyon* by TOPSENT (1920).

Genus **Auletta** Schmidt (1870)

Definition: Axinellidae with plumose instead of reticulate skeletal plan.

Auletta sycinularia Schmidt (1870)

Auletta sycinularia SCHMIDT, 1870: 45, pl.IV fig.5; Topsent, 1904: 143, pl.III fig.7.
Auletta sessilis TOPSENT, 1904: 144, pl.XVIII fig.3.

Material: ZMA POR. 5403, 0.5 mile off Holetown, 100 m.

Description (text-fig.52):

Flabelliform habit, caused by fusion of four long and one short tube; size 4.5 cm high, 3 cm wide, 1 cm thick; tubes are represented by apical thick-walled oscules 3 mm in diameter; the specimen is gradually tapering into a stalk of which the length is unknown, because it was apparently cut off the substrate by the dredge; surface finely hispid to shaggy, with small pores evenly distributed between projecting spicule brushes; consistency crumbly on the outer parts, tough in the interior.

Colour(spirit): brown.

Ectosome: choanosomal tracts end at the surface in spicule brushes.

Choanosome: consisting of a hollow axis from which issue thin heavily echinated spicule tracts at right angles; the axis, which has a diameter of 2 mm in the stalk, consists of flexuous strongyles, arranged in longitudinal direction; the axis forms the main support of the stalk and the inner tube

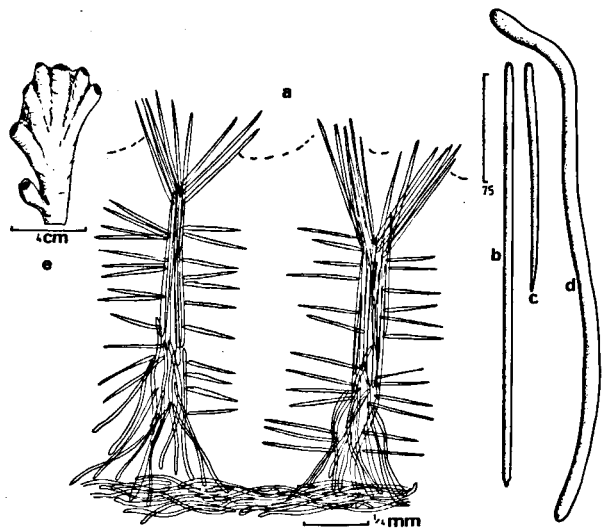

FIGURE 52. *Auletta sycinularia*, a. perpendicular section through peripheral skeleton, b. style of peripheral brushes and colums, c. echinating small style, d. sinuous strongyle of central axis, e. habit.

walls; choanosomal spicule tracts of up to 500 μm in diameter run towards the surface; the inner half of them is made up of strongyles, but these are replaced by styles in the outer half; all echinating spicules are short styles. Spicules: flexuous strongyles: 272–545 by 7–8.5 μm; styles, possibly in two size categories: 161–310 by 4–7 μm.

Ecology: Rare at 100 m; elsewhere down to 200 m.

Distribution: Barbados, Florida, Azores.

Discussion: The present specimen differs somewhat in habit from SCHMIDT's and TOPSENT's specimens, in which the tubes are discrete and only anastomosing in their lower parts; also these specimens were apparently much more hispid. It is quite plausible, however, that the growth form is variable, and that the hispid surface of our specimen was abraded by sand. SCHMIDT's description of the skeleton and the spicules matches the present specimen. TOPSENT's (1904) *A.sessilis* is described intermediate between our material and SCHMIDT's, and is considered synonymous accordingly.

The genus *Auletta* is here upheld, although it is very close to *Phakellia*; emphasis is laid on the almost Clathriid appearance of the perpendicular choanosomal spicule tracts, against the more reticulated tracts in *Phakellia*. Future revisions should evaluate whether these differences have any phylogenetic significance.

Genus **Acanthella** Schmidt, 1862

Acanthella vaceleti n.sp.

Material: Holotype: ZMA POR. 5418, Off Paynes Bay, 108 m, 8-V-1979.

Description (text-fig.53):

In life it forms strongly indented, nearly branched, lobate masses; it shrinks strongly when dried and becomes coarsely conulose with a jagged appearance; size about $10 \times 5 \times 4.5$ cm; surface smooth; consistency rather soft and spongy alive, stiff when dried; at the end of some of the protrusions groups of zoanthids are present.

Colour: light yellow-orange alive, pale yellow in dry condition.

Ectosome: a tough organic skin charged with a few stylote spicules is stretched over the endings of the choanosomal spicule tracts.

Choanosome: a dendritic skeleton of extremely thick spicule tracts, which diverge and thin out towards the surface, where they create coarse conules separated by large subdermal cavities.

Spicules: sinuous strongyles of the thick spicule tracts: 700–1800 by 5–9 μm; straight styles with a wide axial lumen, concentrated in the ectosomal region: 650–820 by 16–22 μm.

Etymology: The species is named after Dr JEAN VACELET (Marseille) in recognition of his many important contributions to spongology.

Ecology: Rare at 108 m.

Distribution: Known only from the type locality.

Discussion: The present specimen, which is the first record of the genus *Acanthella* from the West Indies, resembles the Mediterranean *A.acuta* Schmidt (1862) in habit, architecture and shape of the strongyles. In *A.acuta*, however, the strongyles are shorter (up to 1000 μm) and the

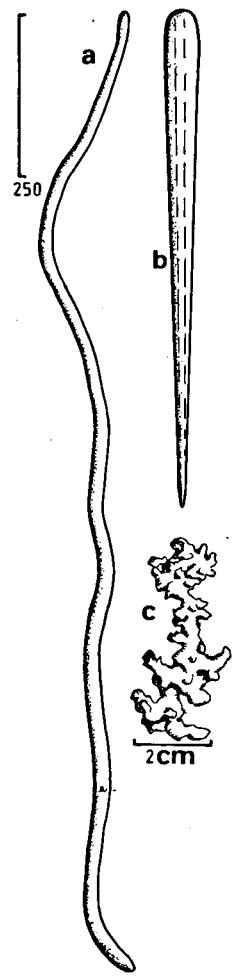

FIGURE 53. *Acanthella vaceleti* n. sp., a. sinuous strongyle, b. style, c. habit.

straight styles are much less robust (only 300–400 by 2–9 μm). In view of these differences, and the geographical separation, both are considered separate (probably vicariant) species.

Genus **Bubaris** Gray, 1867

Bubaris rugosa (Schmidt, 1870)

Axinella rugosa SCHMIDT, 1870:61, pl.IV fig.14 (Not: *Axinella* (as *Dictyocylindrus*) *rugosa* (BOWERBANK, 1866).
?*Bubaris sosia* TOPSENT, 1904: 147, pl.III fig.11, pl.XIII figs 6–8.

Material: ZMA POR. 5361, Off Paynes Bay, 205–212 m, 11-V-1979.
ZMA POR. 5362, Off Paynes Bay, 153 m, 8-V-1980 (2 spec.).
ZMA POR. 5363, Off Paynes Bay, 1978–80 (numerous spec.).
ZMA POR. 5407, 0.5 mile off Holetown, 200 m (5 spec.).

Description (Pl.XI figs 4-5, text-fig.54):

Erect, club-shaped branches, with a more or less distinct basal disc; normally single, but occasionally apically branched into a broader, spatulate form; size up to 4 cm high, 0.5–1 cm in diameter; the surface has a

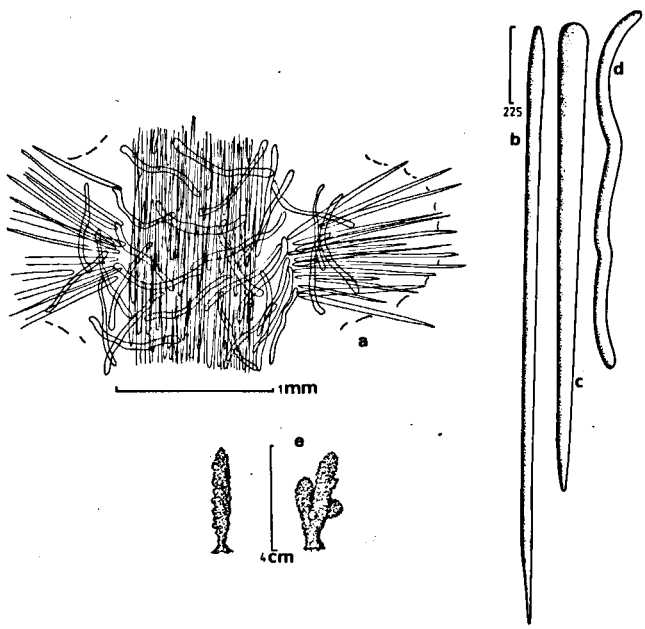

FIGURE 54. *Bubaris rugosa*, a. longitudinal section showing central axis of thick styles with enveloping sinuous strongyles and peripheral brushes of slender styles, b. slender style, c. thick style, d. sinuous strongyle, e. habits of characteristic specimens.

'woolly'-warty appearance due to projecting spicule brushes. Between the rounded spicule brushes there are deep (1–2 mm) furrows, often penetrating right down to the spicular axis, consistency tough.
Colour: pale ochre-yellowish to honey-yellow alive, keeping its colour when dried.
Ectosome: the organic dermis is draped over the spicule brushes, roofing the furrows.
Choanosome: a densely spiculate axis of 1–2 mm in diameter, from which originate the radiating spicule brushes, which may be up to 1.5 mm in widest expansion; spicules of the axis include thick, more or less straight styles in the core, which are kept together, often at right angles, by strongly curved sinuous strongyloxea; ectosomal spicule brushes consist entirely of straight styles.
Spicules: sinuous strongyloxea of widely different shape and size: 250–500 by 8–22 μm; straight styles, occasionally curved: 700–1200 by 12–30 μm.

Ecology: Common between 153 and 305 m.

Distribution: Barbados, Cuba, ? Azores.

Discussion: *Axinella rugosa* Schmidt (1870) is certainly conspecific with the present material. Although this combination is already preoccupied by *Axinella rugosa* (Bowerbank, 1866), the West Indian species is not congeneric, so the specific name may be conserved (as *Bubaris*). TOPSENT's (1904) *Bubaris sosia* seems very similar, although some peculiarities preclude definite synonimization.

The family Bubaridae Hentschel (1923) (also used by LÉVI, 1973) was erected for *Bubaris* and some closely related forms all with sinuous spicules. However, this character is also found in members of the family Axinellidae (e.g. *Phakellia*); it is here proposed to abandon the use of the family Bubaridae.

Bubaris flagelliformis n.sp.

Dictyocylindrus virgultosus var.? SCHMIDT, 1880: pl.X fig.11 (Not: BOWERBANK, 1866 = *Raspailia virgultosa*).

Material: Holotype: ZMA POR. 5366, 1 mile off Holetown, 200 m.
Paratypes: ZMA POR. 5364, Off Paynes Bay, 153 m, 23-IX-1978.

ZMA POR. 5365, 1 mile off Holetown, 200 m (3 spec.).
ZMA POR. 5367, Off Paynes Bay, 153 m (numerous spec.).

Description (Pl. XI fig.6, text-fig.55):

Small, squat cones with extended, often flagelliform apex; up to 2 cm high, but apical extension often considerably longer; diameter less than 1 cm; surface corrugated, hispid, due to protruding isolated megascleres; no distinct oscules; consistency rather soft; easily damaged.
Colour: whitish grey with yellow tinge.
Ectosome: numerous individual spicules are arranged tangentially in the direction of the apical extension; some of them are protruding obliquely.
Choanosome: a central axis of spicules is not found immediately on the supporting substrate, but is evident at some distance above it, usually near the apex where it forms the root of the flagelliform extension; the main body has a loose, halichondroid, confused skeleton of all kinds of spicules intermingled; in the apical extension, the straight thick strongyloxea and styles predominate; the 'echinating' spicules are also straight.
Spicules: more or less straight or slightly but evenly curved oxea-strongyloxea-styles: 800–1600 by 12–45 μm (a small percentage has a few spines on the pointed end); sinuously curved oxea (probably not constituting a separate category): 400–1400 by 10–45 μm; smaller straight, fusiform styles, lightly spined in the lower third of the shaft near the pointed apex: 260–475 by 12–20 μm.

Etymology: The name refers to the pronounced apical extension.

Ecology: Common between 150 and 200 m.

Distribution: Known only from Barbados (origin of SCHMIDT's specimen is unknown).

Discussion: The new species stands out among *Bubaris* species through its lightly spined small styles, thus approaching perhaps the genus *Rhabdoploca* Topsent (1904), which has entirely spined styles, and perhaps also *Cerbaris* Topsent (1893), which has spined sinuous strongyles. The distinct growth form of the present species makes it fairly certain that SCHMIDT's (1880) pl. X fig.11 can be referred to it. SCHMIDT gives the name *Dictyocylindrus virgultosa* var.? in the legenda of the plate, but he fails to provide a description. It is indeed similar to BOWERBANK's (1874) pl.XIX fig. 14, but this material conforms to *Raspailia* Schmidt (1862).

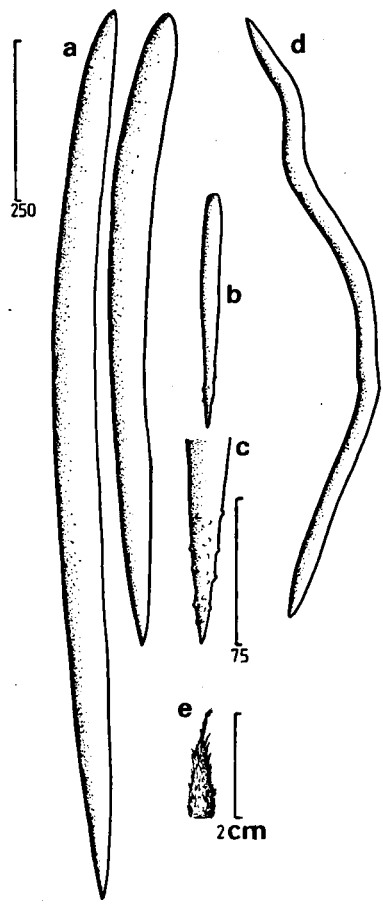

FIGURE 55. *Bubaris flagelliformis* n. sp., a. stylote megascleres, b. acanthose small styles, c. detail of spined basal part of small style, d. sinuous oxea, e. habit.

Other West Indian *Bubaris* species, next to the ones treated above, are *B.mastophora* (Schmidt, 1870) from Florida (this has a smooth surface and the habit consists of a complex of small lobes), *Viles ophiraphidites* De Laubenfels (1934) from Puerto Rico (holotype (USNM 22334) examined: this is a subspherical mass of 2 × 3 × 4 cm with spicules typical for *Bubaris*; as it is the type of the genus *Viles* De Laubenfels (1934) this becomes a junior

synonym of *Bubaris*), and finally *B.ammosclera* Hechtel (1969) (which seems close to *ophirhaphidites* in the form of the sinuous strongyles, but differs in having tylostyles instead of oxeotes for main spicules). On paper, *Stylospira mona* De Laubenfels (1934) from Puerto Rico (USNM 22324) also sounds as a *Bubaris*, but examination of type material revealed this to be a species related to *Rhabderemia* through its possession of rhabdostyles; the characteristic sigma-like microscleres are lacking, though.

Family **RASPAILIIDAE** Hentschel (1923)

Genus **Raspailia** Nardo (1847)

Raspailia cf. tenuis Ridley & Dendy (1886)

Raspailia tenuis Ridley & Dendy, 1886: 482; Ridley & Dendy, 1887: 188, pl.XXXIX figs 2–2a, pl.XL figs 8,8a–b.

Material: ZMA POR. 5413, Off Paynes Bay, 153 m, 28-IX-1978 (fragm.).

Description (Pl.XI fig.7, text-fig.56):

Slender, erect, distally forked branch issuing from a basal disc, which surrounds a piece of coral rubble (so-called intraclast); height 8.5 cm, diameter 1.5–2 mm; surface hispid; consistency (dried) tough.

Colour (dried): pale ochre-yellowish.

Ectosome: hispid due to projecting long slender styles.

Choanosome: axis well-developed, consisting of a lattice-work of longitudinal and perpendicular spicule tracts; spongin strongly developed in the innermost axial parts, projecting spicules in brushes.

Spicules: styles and oxea of the axial core: 400–470 by 8–10 μm; styles of the radiating bundles: 350–400 by 15–20 μm; long styles of the ectosomal brushes: up to 720/10 μm.

Ecology: Rare at 153 m; elsewhere occurring more shallow.

Distribution: Barbados, Brazil.

Discussion: Considerable differences appear to exist between the present fragment and the type from Bahia, notably the absence of acanthostyles (which were, however, reported to be rare in the type), but also the size of

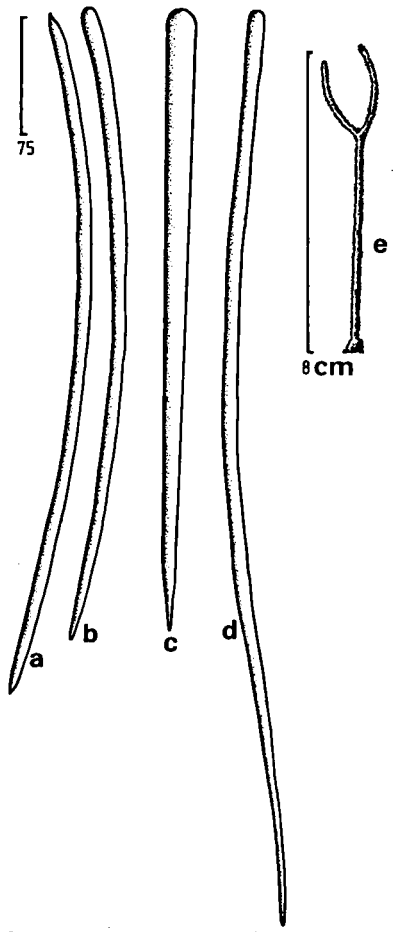

FIGURE 56. *Raspailia* cf. *tenuis*, a. oxea, b. style of the axial core, c. style of the radiating bundles, d. long style of the ectosomal brushes, e. habit.

the shorter styles. Nevertheless, in view of the great resemblance in habit, and bearing in mind that our fragment may have lost its acanthostyles in the proces of drying, conspecificity of both forms is considered likely.

A second thinly ramose West Indian Axinellid is *Axinella ramosa* Burton (1954) from Grenada. From the description it is clear that this is a proper *Axinella* species.

TABLE VII

AXINELLIDA AND AGELASIDA FROM DEEP WATER (>50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS.

Family Axinellidae	
Axinella clava Schmidt, 1870	?
Axinella burtoni (De Laubenfels, 1934) (as *Oxeostilon*)	valid species
Homaxinella spec. sensu Hartman in Lewis, 1965	?
Teichaxinella shoemakeri De Laubenfels, 1936	valid species
Auletta sycinularia Schmidt, 1870	valid species
Phakellia folium Schmidt, 1870	valid species
Phakellia ventilabrum sensu Schmidt, 1880 (= *P. folium*?)	junior syn.
Acanthella vaceleti n. sp.	valid species
Bubaris mastophora (Schmidt, 1870) (as *Axinella*)	valid species
Bubaris rugosa (Schmidt, 1870) (as *Axinella*)	valid species
Bubaris flagelliformis n. sp.	valid species
Bubaris ophirhaphidites (De Laubenfels, 1934) (as *Viles*)	valid species
Bubaris spec. sensu Hartman in Lewis, 1965	?
Dragmatyle topsenti Burton, 1954	valid species
Family Desmoxyidae	
Higginsia strigilata (Lamarck, 1814)	valid species
Family Plocamiidae	
Plocamia gymnazusa Schmidt, 1870	?
Plocamia clopetaria Schmidt, 1870	?
Family Cyamonidae	
Cyamon vickersi (Bowerbank, 1864) (as *Dictyocylindrus*)	valid species
Family Rhabderemiidae	
Rhabderemia mona (De Laubenfels, 1934) (as *Stylospira*)	valid species
Family Raspailiidae	
Raspailia tenuis (Ridley & Dendy, 1886) (as *Axinella*)	valid species
Raspailia tenax (Schmidt, 1870) (as *Phakellia*)	?
Family Agelasidae	
Agelas clathrodes (Schmidt, 1870) (as *Chalinopsis*)	valid species
Agelas dispar Duch. & Mich., 1864	valid species
Agelas sceptrum (Lamarck, 1814) (as *Alcyonium*)	valid species
Agelas schmidti Wilson, 1902	valid species
Agelas spec. (present paper)	?

21 species (table VIII) of deep water Axinellida have been reported from the West Indian region, one of which is a probable synonym. Six are ill-known.

Order **POECILOSCLERIDA**

Family **DESMACELLIDAE** Ridley & Dendy (1887)

Biemnidae Hentschel, 1923; LÉVI, 1973; VAN SOEST, 1984.

Genus **Desmacella** Schmidt, 1870

Desmacella annexa Schmidt, 1870

Synonymy cf. HOOPER, 1984: 53.

Material: ZMA POR. 3820, 0.5 mile off Holetown, 100 m (incrusting on *Dactylocalyx pumiceus*).

Description (text-fig.57):

Thin film, growing in and over dead parts of the hexactinellid.

Skeleton: architecture difficult to assess, but probably plumoreticulate, because both plumose brushes of tylostyles as well as long tracts are found in the microscopic slide, which is almost all that remains of the specimen.

Spicules: tylostyles with prominent knobs: 280–700 by 2.5–8 μm; sigmata in the usual two size categories: 28–42 and 11–15 μm; sinuous ('toxiform') rhaphides: 53–115 by 0.5–2 μm.

Ecology: Deep water, down to 1280 m.

Distribution: According to published records almost cosmopolitan.

Discussion: Some discrepancies in the reported spicules sizes of specimens from different areas are apparent, but these may be the result of random variation.

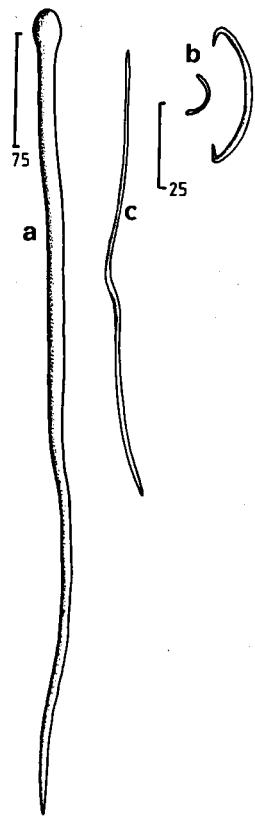

FIGURE 57. *Desmacella annexa*, a. tylostyle, b. sigmata in two size categories, c. toxiform rhaphide.

Desmacella polysigmata Van Soest (1984)

Desmacella polysigmata VAN SOEST, 1984: 138, pl.IX fig. 3, text-fig.54.

Material: ZMA POR. 4762, 0.5 mile off Holetown, 100 m (holotype).
ZMA POR. 5399, specimen from the same locality.

Diagnosis: Rounded-globular; surface incrusted, rough to the touch; oscules indistinct; consistency crumbly; confused skeleton with relatively few megascleres and extremely abundant microscleres; spicules: styles / strongylostyles 513–635 by 10–19 μm, sigmata 30–42 and 10–15 μm.

Genus **Biemna** Gray (1867)

Biemna oxeata n.sp.

Material: Holotype, ZMA POR. 5420, Off Paynes Bay, 108–126 m.

Description (text-fig.58):

Cone-shaped mass of 3.5 × 3 × 3 cm, without apparent oscules; surface (dried) irregular, flaky in places; consistency crumbly, fragile.

Colour (dry): tan.

Ectosome: a tangential crust of debris and irregularly crossing spicule tracts (3–5 spicules in cross-section).

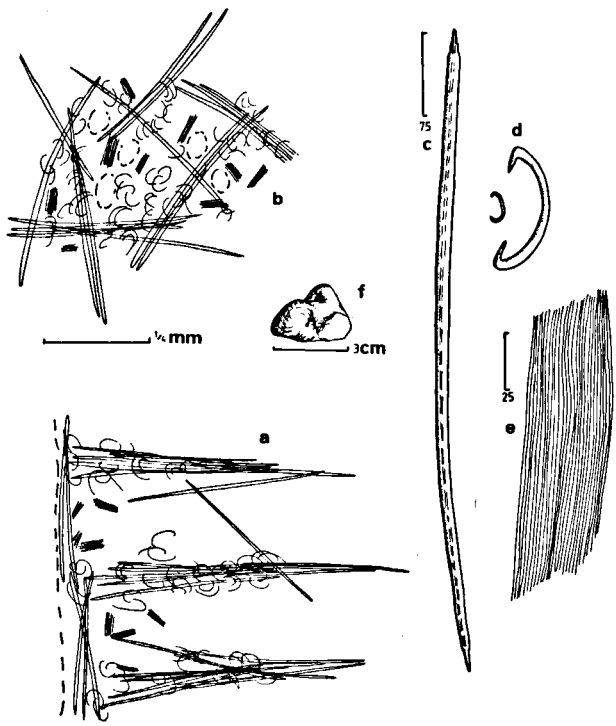

FIGURE 58. *Biemna oxeata* n. sp., a. perpendicular section of peripheral skeleton, b. tangential view of ectosomal skeleton, c. megasclere, d. sigmata in two size categories, e. trichodragma, f. habit.

Choanosome: ill-defined spicule tracts (3–5 spicules) run to the surface at distances of 200–300 μm; numerous microscleres and some megascleres are strewn in confusion between the tracts.
Spicules: oxeotes, with irregular stair-stepped endings and wide axial canals: 420–610 by 8–11 μm; sigmata in two distinct size categories: 53–72 μm and 14–17 μm; rhaphides, mostly in dragmata: 60–140 μm (dragmata 30–50 μm in thickness).

Etymology: The name reflects the oxeote nature of the (normally stylote) megascleres.

Ecology: Rare at 60–70 fms.

Distributions: Known only from the type locality.

Discussion: The new species stands out among the other *Biemna* species in the oxeote nature of the megascleres, but is otherwise quite typical. From *Neofibularia* Hechtel (1965), which is a Desmacellid genus with diactinal megascleres, *B.oxeata* n.sp. differs in the plumose architecture (against reticulate in *Neofibularia*), and the absence of acanthose microxea.
HOOPER (1984) gave a useful literature survey of the family Desmacellidae including in it the genus *Sigmaxinella* Dendy (1897) and assigning it to the order Axinellida. While we agree that *Desmacella*, *Biemna* and *Sigmaxinella* belong in the same family, we prefer to keep the family Desmacellidae (= Biemnidae of VAN SOEST, 1984) in the order Poecilosclerida on account of similarities with Mycalids.

Family **MYCALIDAE** (?)

Genus **Phlyctaenopora** Topsent (1904)

Phlyctaenopora halichondrioides n.sp.

Material: Holotype: ZMA POR. 5419, Off Paynes Bay, 306–319 m, 12-V-1979).
Paratypes: ZMA POR. 5508, Off Paynes Bay, 153 m (2 spec.).

Description (text-fig.59):

Irregularly massive to lobate, up to 5 cm high, 5.5 cm in diameter; surface (dry condition) smooth but wrinkled, skin clearly detachable; the surface in

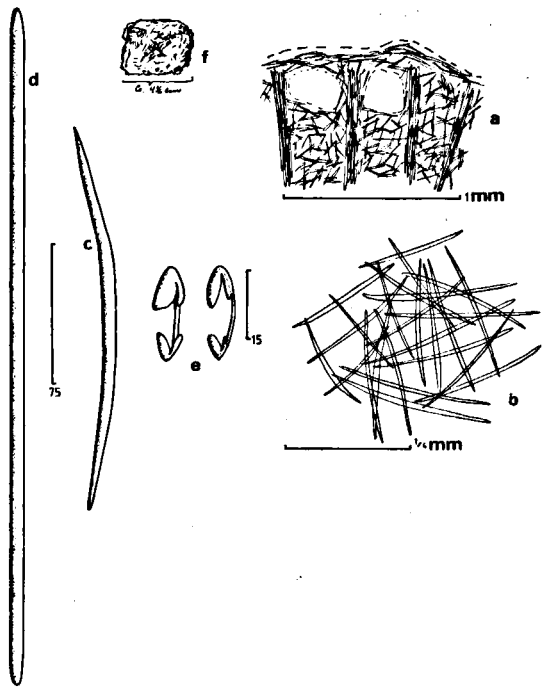

FIGURE 59. *Phlyctaenopora halichondrioides* n. sp., a. perpendicular section through peripheral skeleton, b. tangential view of ectosomal skeleton, c. oxea, d. strongyle of radiating bundles, e. anisochelae, f. habit.

the holotype shows grooves radiating from a collapsed single oscule, which might very well have been fistule-like; the paratypes have several 'oscules' in the form of broken-off fistules, consistency (dried) corky.

Colour (dry): pale yellow.

Ectosome: a crust-like feltwork of confused tangential oxea.

Choanosome: perpendicular to the surface there are long spicule tracts consisting of strongyles (7–10 per cross-section); between these tracts a confused mass of oxea is found; the architecture is halichondroid.

Spicules: oxea of the ectosome and the choanosome, often curved rather abruptly once or twice, often rather irregular in outline: 194–240 by 3–7 μm; smooth straight strongyles of the spicule tracts: 368–392 by 6–7 μm; palmate anisochelae (reminding of European *Esperiopsis lobata* (Montagu, 1818) in the barely different alae size): 14–19 μm.

Etymology: The name refers to the halichondroid architecture.

Ecology: Rare between 153 and 319 m.

Distribution: Known only from the type locality.

Discussion: The genus *Phlyctaenopora* Topsent (1904) is now more firmly established by the discovery of a third species. The new species differs from the type species, *P.bitorquis* Topsent (1904) in the absence of sigmata and the size of the oxea. *P.bocagei* Lévi & Lévi (1983) deviates rather strongly by the possession of styles next to curved, tapering oxea; it is a doubtful *Phlyctaenopora* also in view of the possession of discorhabd-like microscleres; the genus *Barbozia* seems the proper assignment for that species. *Phlyctaenopora* was associated with the family Coelosphaeridae by TOPSENT, but in view of the lack of special ectosomal tylotes this seems incorrect. In any case, the family Coelosphaeridae is suspect, because it is differentiated from Myxillids only through the fistulose habit. The familial placement of the present genus remains obscure; for the time being it may be best assigned to the Mycalidae on account of its anisochelae and confused architecture. Relationship with the Desmacidids is possible, because of the similarity in the microscleres between the new species and *Esperiopsis lobata*. Similarities are lso evident with the genus *Amoibodictya* Zahn, Müller & Müller (1977); the ectosomal crust reminds of the Haplosclerid *Calyx podatypa* (De Laubenfels, 1934) (see below).

Family **MYXILLIDAE** Topsent (1928)

Genus **Acarnus** Gray (1867)

Acarnus souriei (Lévi, 1952)

Acanthacarnus souriei LÉVI, 1952: 54; VAN SOEST, 1984: 62, text-fig.23.

Material: ZMA POR. 3833, 0.5 mile off Holetown, 100 m.

Diagnosis: Thinly incrusting; red; surface smooth; consistency soft; architecture halichondroid; ectosomal tylotes with microspined apices 230–340 by 2.5–4 μm; acanthostyles 66–81 by 2–3 μm; styles with microspined heads 270–380 by 4.5–5.5 μm; acanthocladotylotes 160–230 by 3–5 μm; palmate

isochelae 12–21 μm; toxa in three categories viz. thin small ones 45–180 μm, thin long ones 160–228 μm, and thick ones 50–90 by 2.5–4 μm. Distribution: Barbados, Curaçao, Puerto Rico, Jamaica, West Africa, Mediterranean, Indian Ocean.

Genus **Forcepia** Carter (1874)

Forcepia trilabis (Boury-Esnault, 1973)

Ectoforcepia trilabis BOURY-ESNAULT, 1973: 280; VAN SOEST, 1984: 65, pl.VI figs 1–2, text-fig.24.

Material: ZMA POR. 4564, 0.5 mile off Holetown, 100 m.

Diagnosis: Thinly incrusting, with smooth surface and soft consistency; tylotes 336–359 by 4–7 μm; large arcuate isochelae with reduced teeth 22–38 μm; normal anchorate isochelae 15–19 μm; large acanthose forcipes 209–258 by 3.5–4.5 μm; small acanthose forcipes 40/1 μm. Distribution: Barbados, Brazil.

Family **CRELLIDAE** Hentschel (1923)

Genus **Crella** Gray (1867)

Crella chelifera Van Soest (1984)

Crella chelifera VAN SOEST, 1984: 76, text-fig.28.

Material: ZMA POR. 4565 (holotype), 0.5 mile off Holetown , 100 m.

Diagnosis: Thinly incrusting, soft, with easily detachable ectosomal crust of tangential acanthoxea; basal acanthostyles erect on the substrate; plumose columns of smooth tornotes; acanthoxea 117–141 by 2.5–3.5 μm; smooth tornotes with pointed apices and shafts near them slightly swollen, 289–320 by 2.5–4 μm; acanthostyles 72–300 by 3.5–7 μm; arcuate isochelae 19–24 μm. Distribution: Barbados.

Family MICROCIONIDAE Carter, 1886

Genus Antho Gray (1867)

Plocamilla TOPSENT (1928)
(The differences between *Antho* and *Plocamilla* are here considered to be of minor importance, and certainly not of a generic level, cf. also VAN SOEST & STONE, 1986).

Antho barbadensis (Van Soest, 1984) n.comb.

Plocamilla barbadensis VAN SOEST, 1984: 125, text-fig.50.

Material: ZMA POR. 3832 (holotype), 0.5 mile off Holetown, 100 m.

Diagnosis: Thinly incrusting; surface microtuberculate; consistency soft; skeleton a renieroid reticulation of acanthostyles with ectosomal tufts of larger acanthostyles; ectosomal smooth subtylostyles 220–304 by 2.0–2.5 μm; acanthostyles in three size categories (the largest lightly acanthose on the shafts), viz. 450–500 by 8 μm, 150–300 by 5–8 μm, and 57–73 by 3–4.5 μm; palmate isochelae 6–9 μm; toxa 40–108 μm.
Distribution: Barbados.

Genus Echinochalina Thiele (1899)

Echinochalina melana n.sp.

Echinochalina sp. Hartman in LEWIS, 1965: table.

Material: Holotype, ZMA POR. 5509, Off Paynes Bay, 31-VIII-1978, 108–126 m.

Description (Pl.XII fig.1, text-fig.60):

Irregularly massive; originally 4.5 by 3.5 cm, but now fragmented, surface smooth but heavily incrusted; oscules few in number, with raised rims, 3 mm in diameter; consistency (dried) fragile.
Colour (dry): dark brown to black.
Ectosome: a fibrous detachable skin containing a halichondroid tangential skeleton of megascleres.
Choanosome: filled with debris; skeleton a spongin-enforced ill-defined

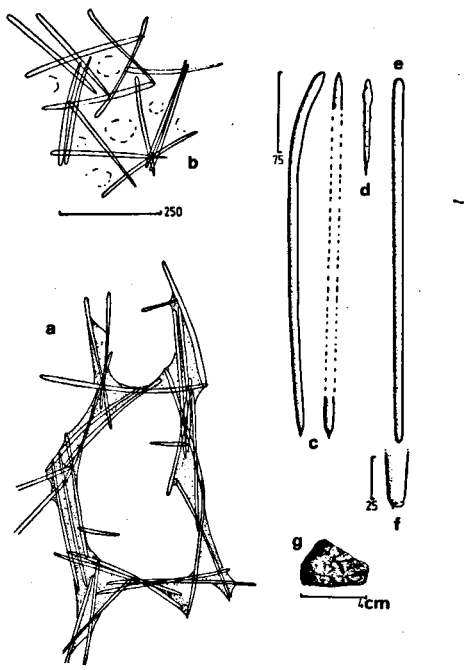

FIGURE 60. *Echinochalina melana* n. sp., a. choanosomal skeleton, b. tangential view of ectosome, c. stylote megascleres, d. echinating acanthostyle, e. inequiended strongylote megasclere, f. acanthose apex of strongylote, g. habit.

reticulation of spicule tracts, with 2–3 spicules in cross section, forming meshes of 200–500 μm; spicules in the tracts strongylotes, long styles or oxea (the latter two are probably modifications of the same spicule type); tracts echinated sparingly by short styles.

Spicules: strongylotes, inequiended, with thinner apex microspined: 270–384 by 2.5–4 μm; long styles and oxeote modifications, the sharp apices normally stair-stepped, with wide axial canal, often strongly curved; 190–305 by 3.5–7.5 μm; small echinating styles of irregular shape, sometimes modified to oxea, or even toxiform, not infrequently with a few scattered spines: 83–104 by 3–5 μm.

Etymology: The name refers to the black colour.

Ecology: Rare, below 60 fms.

Distribution: Known only from Barbados.

Discussion: This species differs from other members of the genus *Echinochalina* in the microspined condition of the inequiended strongylotes and in the oxeote modifications of some of the styles. The spiculation (and the habit) reminds somewhat of *lotrochota birotulata* (Higgin, 1877) or of *Oceanapia bartschi* (De Laubenfels, 1934). The microspined inequiended condition of the strongylotes reminds of *Anisotylacanthaea curvata* Vacelet (1969), and it is likely that both are closely related. The systematic position of *Echinochalina* is uncertain; it is certainly not a typical Clathriid nor a typical Myxillid.

WEST INDIAN POECILOSCLERIDS

38 deep water species (table VIII) have been reported from the West Indian region, one of which is a suspected synonym. Ten remain ill-known.

TABLE VIII

POECILOSCLERIDA FROM DEEP WATER (> 50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS.

Family Desmacellidae	
Desmacella annexa Schmidt, 1870	valid species
Desmacella pumilio Schmidt, 1870	valid species
Desmacella inornata sensu Burton, 1954 (= *D. pumilio*)	junior syn.
Desmacella polysigmata Van Soest, 1984	valid species
Biemna oxeata n. sp.	valid species
Hamacantha johnsoni (Schmidt, 1870) (as *Desmacella*)	valid species
Hamacantha tibicen (Schmidt, 1880) (as *Vomerula*)	?
Hamacantha agassizi Topsent, 1920	valid species
Family Mycalidae	
Mycale? diaphana (Schmidt, 1870) (as *Esperia*)	?
Mycale immitis (Schmidt, 1870) (as *Esperia*)	?
Oxymycale renieroides (Schmidt, 1870) (as *Esperia*)	?
Anomomycale titubans (Schmidt, 1870) (as *Desmacidon*)	valid species
Phlyctaenopora halichondrioides n. sp.	valid species
Family Cladorhizidae	
Crinorhiza amphactis Schmidt, 1880	?
Cladorhiza concrescens Schmidt, 1880	?
Guitarra fimbriata (Carter, 1874)	valid species

Family Desmacididae	
Iotrochota birotulata (Higgin, 1877) (as *Halichondria*)	valid species
Inflatella viridis Schmidt, 1875	valid species
Eucheliplumа congeri De Laubenfels, 1934	valid species
Esperiopsis dianae (Schmidt, 1870) (as *Desmacidon*)	?
Family Myxillidae	
Myxilla distorta Burton, 1954	valid species
Forcepia grandisigmata Van Soest, 1984	valid species
Forcepia trilabis (Boury-Esnault, 1973) (as *Ectoforcepia*)	valid species
Coelosphaera ? infesta (Schmidt, 1870) (as *Desmacidon*)	?
Coelosphaera tunicata (Schmidt, 1870) (as *Desmacidon*)	valid species
Coelosphaera hechteli Van Soest, 1984	valid species
Cornulum johnsoni (De Laubenfels, 1934) (as *Coelosphaerella*)	valid species
Xytopsooecha spec. sensu Hartman in Lewis, 1965	?
Acarnus souriei (Lévi, 1952) (as *Acanthacarnus*)	valid species
Family Crellidae	
Crella chelifera Van Soest, 1984	valid species
Yvesia papillosa (Schmidt, 1870) (as *Cribrella*)	?
Family Hymedesmiidae	
Hymedesmia nummota De Laubenfels, 1936	valid species
Hymedesmia jamaicensis Van Soest, 1984	valid species
Family Microcionidae	
Clathria foliacea Topsent, 1889	valid species
Echinochalina melana n. sp.	valid species
Antho barbadensis (Van Soest, 1984) (as *Plocamilla*)	valid species
Antho penneyi (De Laubenfels, 1936) (as *Holoplocamia*)	valid species
Antho? topsenti Burton, 1954	valid species

Order **HAPLOSCLERIDA** Topsent (1928)

Remark: BERGQUIST's (1980) recent proposal to divide the order Haplosclerida into two separate orders (Haplosclerida and Nepheliospongida) is not followed here, because several synapomorphies unite both (small oxeotes, typical Haplosclerid microsclere morphology, the basic reticulate architecture, a.o.).

Family **PETROSIIDAE** Van Soest (1980)

Genus **Petrosia** Vosmaer (1887)

Petrosia pellasarca (De Laubenfels, 1934)

Haliclona pellasarca DE LAUBENFELS, 1934: 23.
Petrosia pellasarca; ZEA, 1983: 150.

Material: ZMA POR. 5321, Off Paynes Bay, 108–126 m (2 spec.).

Description (text-fig.61):

Broadly erect flattened sponges with small tubiform outcrops, in part traversed by a round central canal; size up to 7.5 cm high, 3.5 cm wide and 2 cm thick; outcrops 1–2 cm in diameter; central canal up to 6 mm in diameter; surface smooth; consistency (dried) corky, crumbly.
Colour (dry): yellow, choanosome yellow-brown.
Ectosome: tangential reticulation of single spicules; 'echinated' at the nodes by single or groups of microxea.

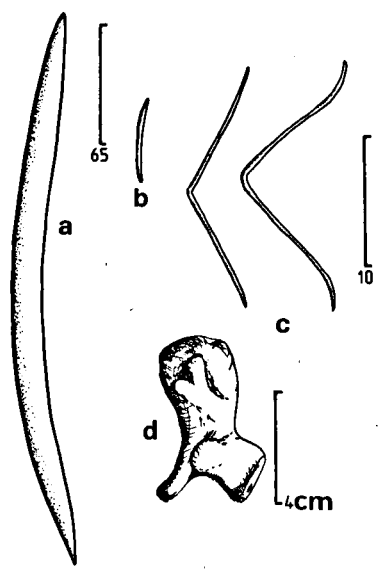

FIGURE 61. *Petrosia pellasarca*, a. oxea, b. microxea, c. toxa, d. habit.

Choanosome: mostly a rather open isotropic reticulation of single spicules, occasionally of short paucispicular bundles.
Spicules: oxea, possibly in three or four, more or less overlapping size categories, varying from thin short sharp-pointed 'microxea' of 25/1.5 μm to blunt ending almost strongylote megascleres of 330 by 17 μm; microscleres abruptly curved toxa (rather uncommon): 15–20 μm.

Ecology: Deep water, elsewhere as shallow as 15 m.

Distribution: Barbados, Puerto Rico, Colombia.

Discussion: The species stands out among *Petrosia* spp. by its lack of stout spicule tracts and by the presence of genuine toxa (which were discovered in the type specimen by ZEA (in litt.), and subsequently in all known specimens). It is another example of the occurrence of microscleres in the family Petrosiidae, which in its turn is a strong indication of the probable primitive nature of Haplosclerid microscleres.

Genus **Strongylophora** Dendy (1922)

Remark: DE WEERDT (1985) synonymized this genus with *Petrosia.* Although both genera are obviously related, and although many *Strongylophora* species are actually true *Petrosia* species, we still think it likely that the group of species with thick, true strongyles, mostly accompanied by smaller kidney-shaped ones, represents a closely related assemblage of species that can be differentiated from proper *Petrosia.*

Strongylophora hartmani Van Soest (1980)

Strongylophora hartmani VAN SOEST, 1980: 76, pl.XIII fig.1, text-fig.28.

Material: ZMA POR. 4442 (holotype), 0.5 mile off Holetown, 100 m.
ZMA POR. 5439, Off Paynes Bay, 153 m, 26-IX-1978.
ZMA POR. 5440, Off Paynes Bay, 153 m, 21-IX-1978.

Diagnosis: (Pl.XII fig.2) Subspherical to globular, with occasional globose outgrowths; larger specimens exhibiting a short stalk; size 5 cm high, 6 cm in diameter with up to four oscules of 3–4 mm in diameter;

surface smooth; consistency stony; colour yellow-brown; large thick strongyles forming the dense, confused choanosomal skeleton, 285–361 by 16–38 µm; kidney-shaped microstrongyles 24–85 by 7–35 µm; long straight oxea 210–306 by 6–7 µm; small often abruptly bent oxea of the ectosomal reticulation, 65–120 by 3–6 µm. Distribution: Barbados.

Strongylophora stoneae n.sp.

Material: Holotype: ZMA POR. 5502, Off Paynes Bay, 8-V-1980, 153 m.
Paratypes: ZMA POR. 5503, Off Paynes Bay, 7-IX-1978, 216 m (2 spec.)
ZMA POR. 5504, Off Paynes Bay, 153 m (2 spec.).

Description (text-fig.62):

Pear- to ball-shaped knolls, up to 6 cm high, 5.5 cm in diameter, mostly on a slightly constricted 'stalk'; oscule apical, up to 6 mm in diameter (with inner reticulated structure, a character shared with *Petrosia* spp.); surface smooth; consistency (dried) stony hard, but easy to cut.
Colour (dry): ochreous brown.

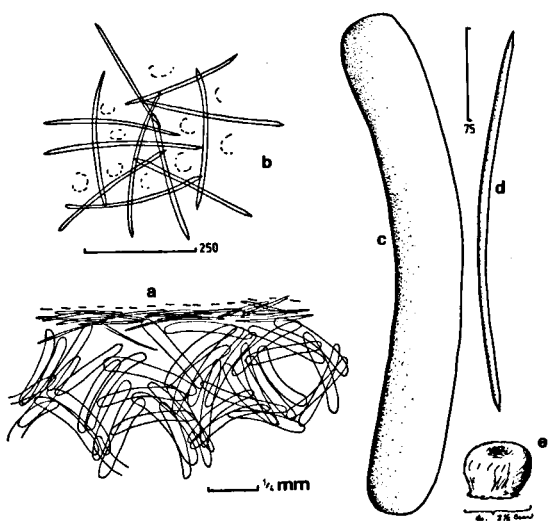

FIGURE 62. *Strongylophora stoneae* n. sp., a perpendicular section through peripheral skeleton, b. tangential view of ectosome, c. strongyle, d. ectosomal oxea, e. habit.

Ectosome: a halichondroid tangential crust of thin oxea.
Choanosome: irregular and confused reticulation of spicule 'tracts' consisting of thick strongyles, forming rounded meshes; many spicules in confusion; the interior is strongly fibrous, but no distinct spongin fibres can be discerned.
Spicules: large thick strongyles, often rather strongly curved: 396–502 by 47–76 μm; thin oxea, often with stair-stepped or abruptly pointed apices: 310–362 by 4–7 μm.

Etymology: The species is named after Miss S.M.STONE (British Museum (Natural History), London) in recognition of her invaluable contributions to sponge taxonomy. Moreover, the name also refers to the stony consistency.

Ecology: Apparently not uncommon below 85 fms.

Distribution: Known only from the type locality.

Discussion: This species bears a strong resemblance in habit to *Strongylophora hartmani* (cf.above). It differs in the absence of the smaller spicule categories and in the much thicker strongyles. These differences seem stable, so conspecificity of the two is unlikely. On the other hand the similarity is so great that the new form was described in *Strongylophora*, which is normally reserved for species with kidney-shaped microstrongyles.

Genus **Xestospongia** De Laubenfels, 1932

Xestospongia cf. rosariensis Zea & Rützler (1983)

Xestospongia rosariensis ZEA & RÜTZLER, 1983: 821, figs. 1–8.

Material: ZMA POR. 5421, Off Paynes Bay, 153 m, 8-IX-1978.
ZMA POR. 5422, Off Paynes Bay, 153 m, 26-IX-1978.
ZMA POR. 5423, Off Paynes Bay, 153 m, 26-X-1978.
ZMA POR. 5424, Off Paynes Bay, 144–126 m, 31-VIII-1978.

Description (Pl.XII fig.3, text-fig.63):

Erect-lobate or globose sponges, in the present material with large apical oscules (up to 8 mm in diameter) (original descriptions concerned predominantly tube-shaped sponges); surface smooth, in places riddled with larger and smaller irregular small holes (1–2 mm); one specimen is densely covered

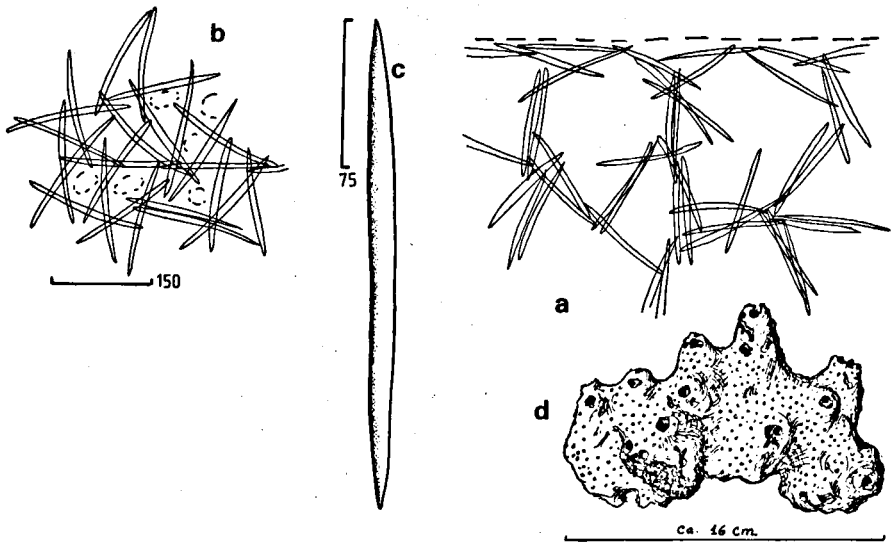

FIGURE 63. *Xestospongia* cf. *rosariensis*, a. perpendicular section through peripheral skeleton, b. tangential view of ectosome, c. oxea, d. habit.

with *Parazoanthus* spec.; size up to 9 cm in cross section, up to 8 cm high; consistency (dry) corky.
Colour (dry): greyish brown to dark brown.
Ectosome: tangential, predominantly unispicular reticulation; meshes tight.
Choanosome: high spicular density; skeleton isotropically meshed, mostly with sides of 2–3 spicules, occasionally unispicular or densely confused.
Spicules: thick, fusiform oxea: 169–208 by 7–9.5 μm.

Ecology: Fairly common at 108–153 m; elsewhere found on reefs and in lagoons.

Distribution: Barbados, Colombia.

Discussion: Although the habit of the present specimens differs quite strongly from typical specimens, ZEA & RÜTZLER (1983: fig.8) also described sprawling forms. Dr. ZEA kindly presented a tube-shaped specimen to the ZMA collection, so it could be compared to the Barbados material. Both the surface characteristics and the skeletal architecture were found to be quite similar.

Xestospongia cf. proxima (Duch & Mich., 1864)

Thalysias proxima DUCHASSAING & MICHELOTTI, 1864: 84, pl.XVIII fig.3.
Densa araminta DE LAUBENFELS, 1934: 14 (fide ZEA, 1983).
Xestospongia proxima; ZEA, 1983: 142, fig.33, pl.15, figs 2–4; VAN SOEST, et al., 1983: 198; VAN SOEST, 1984: 143; ZEA & VAN SOEST, 1986.

Material: ZMA POR. 5438, Off Paynes Bay, 144–153 m, 15-VI-1978.

Description (Pl.XII fig.4, text-fig.64):

Irregular, shallow funnel, 5 cm high, 9 cm across; surface velvety smooth, both inside and outside; no apparent larger oscules; consistency tough, corky.

Colour: whitish grey alive, dark brown in dry condition.

Ectosome: an incomplete tangential reticulation, heavily incrusted by foreign material.

Choanosome: high spicular density with characteristic, very thick spicule tracts; these are very irregular in diameter (50–250 μm, with 5–17 spicules per cross section) and show a marked tendency to anastomose into fascicles; spongin sparingly present, binding the spicules, inconspicuous; meshes irregular in size, but uniformly rounded: 150–500 μm in diameter.

Spicules: thick, abruptly pointed, slightly curved oxea, sometimes with stair-stepped but always sharp apices: 153–187 by 7–11 μm.

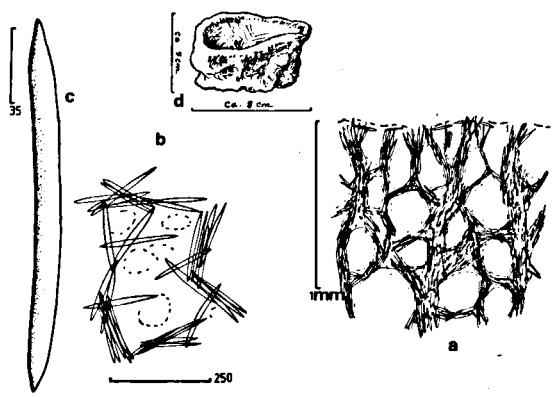

FIGURE 64. *Xestospongia* cf. *proxima*, a. perpendicular section, b. tangential view of ectosome, c. oxea, d. habit.

Ecology: Deep water, elsewhere known from shallow reefs.

Distribution: Tropical western Atlantic.

Discussion: The specific identification is based on comparison with material recently described by ZEA (1983) (cf. also ZEA & VAN SOEST, 1986). Discrepancies between the present specimen and the Colombian material are found in the habit (massively incrusting in ZEA's material) and colour (ZEA's specimens were maroon). From the type, the present specimen also differs, as this was black-brown and showed digitate outgrowths. Skeletal architecture of all specimens is quite similar, and also spicule size and shape agree, so it is likely that this species is polymorphic.

According to ZEA (1983) *Densa araminta* De Laubenfels (1934) from deep water off Puerto Rico, is a synonym of the present species (ZEA examined the type specimen). Since this is the type species of *Densa*, this genus falls into the synonymy of *Xestospongia*.

Family **PHLOEODICTYIDAE** Carter (1882)

Genus **Calyx** Vosmaer, 1887

Calyx cf. podatypa (De Laubenfels, 1934)

Haliclona podatypa DE LAUBENFELS, 1934: 23.
Pachypellina podatypa; VAN SOEST, 1980: 91, pl.XIV fig.3, text-fig.34.

Material: ZMA POR. 5507, 0.5 mile off Holetown, 100 m.

Description (text-fig.65):

Massively incrusting (5–10 mm thick) on *Agelas schmidti*, with a tendency to become lobate (lobes up to 15 mm high); surface flaky, irregular, in places convoluted; oscules indistinct irregular openings; consistency soft, crumbly (material badly preserved).

Colour (spirit): greyish brown.

Ectosome: the detachable crust consists of a felted layer of tangential spicules, 80 μm in thickness.

Choanosome: riddled with fairly large holes, 250–600 μm in diameter,

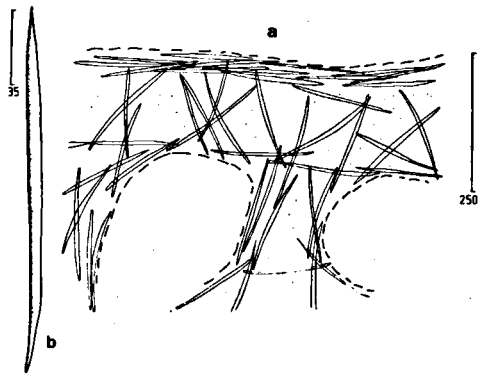

FIGURE 65. *Calyx podatypa*, a. perpendicular section through peripheral region, b. oxea.

specially concentrated subdermally; the skeleton is a confused reticulation of single spicules in high density, with here and there some vague tracts, often associated with the holes.
Spicules: curved thin oxea: 122–193 by 3–6 μm.

Ecology: Deep water; WIEDENMAYER (1977) and ZEA (1983) reported specimens from shallow water.

Distribution: Barbados, Puerto Rico, Bahamas, Belize, Colombia.

Discussion: The present material conforms to Puerto Rican material described by VAN SOEST (1980). DE LAUBENFELS' type differs from this in the possession of an elaborate system of long, discrete tracts; it reminds strongly of Mediterranean *Calyx nicaensis* (Risso, 1826) in this respect. Doubt exists over the conspecificity of the type and specimens assigned to this species by other authors, and this includes the present material. The genus *Pachypellina* Burton (1934) is a synonym of *Xestospongia* because the type species, *Petrosia fistulata* Kirkpatrick (1907) conforms to that genus.

WEST INDIAN HAPLOSCLERIDS:

29 species (table IX) of deep water Haplosclerida have been reported from the West Indian region, three of which are synonyms. Nine remain ill-known.

TABLE IX

HAPLOSCLERIDA FROM DEEP WATER (> 50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS.

Family Chalinidae	
Haliclona calcinea Burton, 1954	valid species
Haliclona ? hebes (Schmidt, 1870) (as *Reniera*)	?
Haliclona spec. 1 (*Sigmadocia* spec. sensu Hartman in Lewis, 1965)	?
Haliclona spec. 2 (*Toxadocia* spec. sensu Hartman in Lewis, 1965)	?
Family Niphatidae	
Amphimedon spec. (*Pachychalina* spec. sensu Hartman in Lewis, 1965)	?
Niphates erecta Duch. & Mich., 1864	valid species
Niphates areolata sensu Hartman in Lewis, 1965 (as *Pachychalina*) (= *N. erecta*)	junior syn.
Niphates amorpha Wiedenmayer, 1977	valid species
Gelliodes leucosolenia De Laubenfels, 1934	valid species
Family Callyspongiidae	
Callyspongia strongylophora Hartman, 1955	valid species
"Siphonochalina" viridescens Schmidt, 1880	?
Family Petrosiidae	
Xestospongia muta (Schmidt, 1870) (as *Schmidtia*)	valid species
Xestospongia rampa (De Laubenfels, 1934) (as *Strongylophora*) (= *X. muta*)	junior syn.
Xestospongia portoricensis Van Soest, 1980	valid species
Xestospongia proxima (Duch. & Mich., 1864) (as *Thalysias*)	valid species
Xestospongia araminta (De Laubenfels, 1934) (as *Densa*) (= *X. proxima*)	junior syn.
Xestospongia rosariensis Zea & Rützler, 1983	valid species
Cribrochalina? infundibulum Schmidt, 1870	?
Petrosia pellasarca (De Laubenfels, 1934) (as *Haliclona*)	valid species
Strongylophora hartmani Van Soest, 1980	valid species
Strongylophora stoneae n. sp.	valid species
Family Oceanapiidae	
Oceanapia oleracea (Schmidt, 1870) (as *Rhizochalina*)	valid species
Oceanapia amphirhiza (Schmidt, 1880) (as *Rhizochalina*)	?
Oceanapia ? ascidia (Schmidt, 1870) (as *Reniera*)	?
Oceanapia bartschi (De Laubenfels, 1934) (as *Inflatella*)	valid species
Oceanapia fibulata (Schmidt, 1880) (as *Rhizochalina*)	?
Oceanapia fistulosa (Bowerbank, 1873) (as *Desmacidon*)	valid species
Calyx podatypa (De Laubenfels, 1934) (as *Haliclona*)	valid species
Foliolina peltata Schmidt, 1870	valid species
Aka ? densa (Schmidt, 1870) (as *Siphonochalina*)	?

Order **DICTYOCERATIDA**

Family **IRCINIIDAE** Gray (1867)

Genus **Ircinia** Nardo (1834)

Ircinia cf. dendroides Schmidt (1862)

Ircinia cf. *dendroides*; VAN SOEST, 1978: 36, pl.VII fig. 1, text-fig. 12.

Material: ZMA POR. 3812, Off Holetown, 100 m.
ZMA POR. 5512, Off Paynes Bay, 153 m, 14-IX-1978 (2 spec.).
ZMA POR. 5513, Off Paynes Bay, 144–153 m, 13-VI-1978 (2 spec.).
ZMA POR. 5514, Off Paynes Bay, 153 m (numerous spec.).

Diagnosis: (text-fig.66a) Massively incrusting base from which issue upright branches, some of them truncated and osculiferous, a few of them quite long: up to 5 cm, diameter 1–1.5 cm, most of them thinner, however (3–6 mm), and tapering into a thin whispy end; surface strongly conulose, conules sharp, 2 mm high, 2 mm apart; oscules on branches and truncate apices, up to 2 mm in diameter; consistency spongy-compressible; pale yellow-brown alive, darker brown in dry condition; choanosome clathrous-cavernous; fibres fasciculated, up to 450 μm in diameter, fairly heavily cored by foreign debris; filaments up to 7 μm in diameter with pronounced 'golden' knobs of up to 12 μm in diameter. Distribution: Barbados, ? Mediterranean-Atlantic.

Ircinia hummelincki Van Soest (1978)

Ircinia hummelincki VAN SOEST, 1978: 37, pl.VII fig.2, text-fig.13.

Material: ZMA POR. 4309 (holotype), 0.5 mile off Holetown, 100 m.

Diagnosis: Upright branch, 6 cm long, 6 mm in diameter; finely conulose; fasciculated fibres 200–250 μm in diameter, sparsely cored; connecting fibres 30–40 μm, devoid of inclusions; filaments relatively few in number, unusually thick: 15–29 μm, without terminal knobs. Distribution: Barbados.

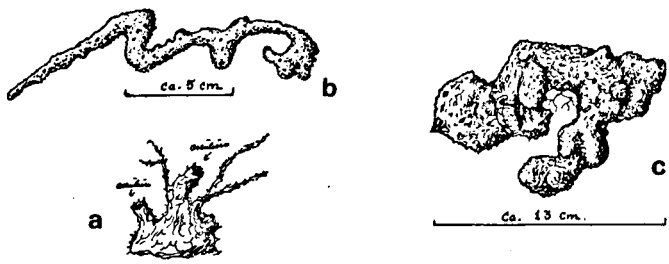

FIGURE 66. Habits of Keratose deep water sponges, a. *Ircinia* cf. *dendroides*, b. *Aplysina ocracea*, c. *Pseudoceratina crassa*.

Order **VERONGIDA**

Family **APLYSINIDAE** Hyatt (1875)

Genus **Aplysina** Nardo (1834)

Aplysina ocracea Alcolado, 1984

Aplysina ocracea ALCOLADO, 1984:2, fig. 1A.

Material: ZMA POR. 3816, 0.5 mile off Holetown, 100 m.
ZMA POR. 5511, Off Paynes Bay, 153 m, 24-X-1978.

Diagnosis: (P.XII fig.5, text-fig.66b) Long slim branches, usually with a few ramifications or branched dichotomously; size up to 20 cm long with a maximum diameter of 2 cm (these size data apply to the present deep water specimens only); surface finely conulose; oscules few, 2–3 mm in diameter; consistency spongy; colour reddish to honey-yellow alive, dark brown when dried; fibres 50–105 μm in diameter, pith about 20%.
Distribution: West Indian region.

Family **DRUINELLIDAE** Lendenfeld (1889)

Genus **Pseudoceratina** Carter 1886

Pseudoceratina crassa (Hyatt, 1875)

Material: ZMA POR. 5510, Off Paynes Bay, 153 m, 27-X-1978.

Description (text-fig.66c):

Massive, irregular body, with blunt side branches and lobes, up to 13 cm long, 4 cm thick; surface irregularly conulose, with a few small oscules (2 mm) and scattered fields of 'pores'; consistency (dried) brittle.
Colour (dry): purple-black.
Ectosome: organic-fibrous.
Choanosome: filled with foreign debris and spongin membranes, which only occasionally form recognizable 'hollow' fibres; mostly the spongin is irregularly anastomosing and sheet-like; colour of the spongin dark amber.

Ecology: Rare at 85 fms.

Distribution: Barbados.

Discussion: The choanosomal structure is difficult to assess, but it approaches that of the genus *Druinella* in the irregularity of the spongin mass, and poor development of regular fibres.

WEST INDIAN KERATOSA

17 deep water Keratosa species (table X) have been reported from the West Indian region, three of which are synonyms. Four species remain ill-known.

TABLE X

KERATOSA FROM DEEP WATER (> 50 M) IN THE WEST INDIAN REGION WITH REMARKS ON THEIR STATUS.

Dictyoceratida	
Family Spongiidae	
Spongia obliqua Duch. & Mich., 1864	valid species
Coscinoderma lanuga De Laubenfels, 1936	valid species
Hyattella intestinalis (Lamarck, 1814)	valid species
Family Irciniidae	
Ircinia dendroides Schmidt, 1862	valid species
Ircinia ramosa sensu De Laubenfels, 1934 (= *I.dendroides*)	junior syn.
Ircinia hummelincki Van Soest, 1978	valid species
Ircinia strobilina (Lamarck, 1814)	valid species
Hyrtios ? psellus (De Laubenfels, 1936) (as *Psammascus*)	?
Smenospongia aurea (Hyatt, 1877) (as *Aplysina*)	valid species
Smenospongia echina (De Laubenfels, 1934) (as *Polyfibrospongia*)	valid species
Dendroceratida	
Family Dysideidae	
Dysidea variabilis (Duch. & Mich., 1864) (as *Amphimedon*)	valid species
Dysidea crawshayi De Laubenfels, 1936 (= *D. variabilis*)	junior syn.
Verongida	
Family Aplysinidae	
Aplysina ocracea Alcolado, 1984	valid species
Aplysina cauliformis (Carter, 1882) (sensu Hartman in Lewis, 1965)	?
Aplysina lacunosa (Pallas, 1766)	valid species
Family Druinellidae	
Pseudoceratina crassa (Hyatt, 1875)	?
Ianthella spec. Hartman in Lewis, 1965	?

REVIEW OF WEST INDIAN DEEP WATER SPONGES

When the tables I–X are combined an overall view is obtained of our knowledge of the composition of the deep water sponge fauna. A total of about 280 nominal records have been found, 27 of which are definite junior synonyms, and 92 have to be considered ill-known (many of which are SCHMIDT records). This leaves a good 160 well-established species known from West Indian deep water (50–2000$^+$ m), which is about the same as the number of species known from deep water (below 90 m) in the Mediterra-

nean (VACELET, 1969). However, this does not mean these faunas are similar: important descrepancies are found in the representations of Hexactinellids (much more numerous in the West Indies), Lithistids (do.), Hadromerids (much more numerous in the Mediterranean), Axinellids (do.), and Halichondrids (much more numerous in the West Indies). Future work will have to establish whether these trends really exist. If so, then some ideas on the origin of the major sponge groups may perhaps be derived from them.

DISTRIBUTION AND ABUNDANCE OF DEEP-WATER SPONGES OFF PAYNES BAY

General description of the bottom characteristics and biota:

Information on bottom characteristics and biota has been obtained solely from the dredged samples; however, a sonar profile running across the collecting area at right angles to the coast line, and the study of some bottom photographs down to a depth of 175 m kindly made available to us by Dr LEWIS have contributed some information. The sea bottom off Paynes Bay is composed of nodular or crusted carbonate sediments of primarily biogenic origin. Individual sediment grains are either animals and plants and the skeletons/fragments of these or cemented aggregates of skeletons and fragments. Both these categories are usually more or less altered by bioerosion and may support encrusting animals and plants (for more details see STENTOFT, 1982).

The main groups of animals in the size fraction of 30 mm or more consist of demosponges, alcyonarians, antipatharians and scleractinians. These larger animals are most common and most diverse in depths from ca. 145 m down to 180 m. Further seaward they constitute only a minor part of the sediments. Scleractinians are dominated by *Madracis myriaster*, *Oxysmilia rotundifolia*, and *Phacelocyathus flos*, but many specimens of the small curled *Agaricia cailleti* were found to grow larger than 30 mm.

At least 13 species of larger octocorals and antipatharians were found between 110 m and 145 m; the most abundant of these were *Placogorgia tenuis*, *Nicella guadelupensis* and *Antipathes spiralis*. Between 145 and

180 m, at least 32 larger species were established, dominated by the same three species and followed by *Caligorgia gracilis* and *Elisella* spp. From greater depths only 6 larger species were taken, with *Elisella funiculina, Scleracis petrosa*, and *Antipathes spiralis* as the most important species.

In the size fraction of 2–30 mm the main animal groups are pelecypods, gastropods, tube worms, crustaceans, echinoderms, bryozoans, foraminiferans and small scleractinians. Gastropods, pelecypods, bryozoans and forams were the most important groups from 110–137 m, gastropods, crustaceans, forams and scleractinians from 155–200 m, gastropods, worm tubes and scleractinians from 219–265 m, gastropods, pelecypods and worm tubes from 265–274 m, and finally pelecypods, echinoderms and scleractinians from 311–324 m.

Grain size distributions of the various organisms have been analyzed statistically (see STENTOFT, 1982); it appears possible to divide the investigated sea floor into two 'lithofacies' having a boundary at a depth of about 137 m, that is at the break in the slope of the sea floor. Thus a proximal sloping fore reef facies (gastropod/benthic foraminifera/bryozoan lithofacies) and a distal fore-reef facies. A further subdivision can be made in the latter on either side of the 200 m depth line: an upper distal fore reef facies (benthic foraminifera/gastropod/crustacean lithofacies), and a lower distal fore-reef facies (mollusk/worm-tube/scleractinian lithofacies).

Distribution and abundance of sponges:

The Poriferan samples have been arranged according to increasing depth in Fig.67. A pattern in the distribution of the species is present to some extent: between 137 and 172 m a particularly rich sponge fauna is found, consisting of relatively many species. Landward of this, from 110–137 m, the fauna is impoverished both with regard to numbers of species and of individuals (with the exception of a single sample). It seems to be possible to recognize in the distribution of sponges the same vertical zonation as described above. The three sponge facies could be characterized by the relatively most important species as follows:

1. *Spongosorites* sp./*Topsentia porrecta*/*Aplysina ocracea* facies (between 110 and 137 m),
2. *Corallistes typus*/*Gastrophanella implexa*/*Amphibleptula madrepora*/*Bubaris rugosa* facies (137–172 m),

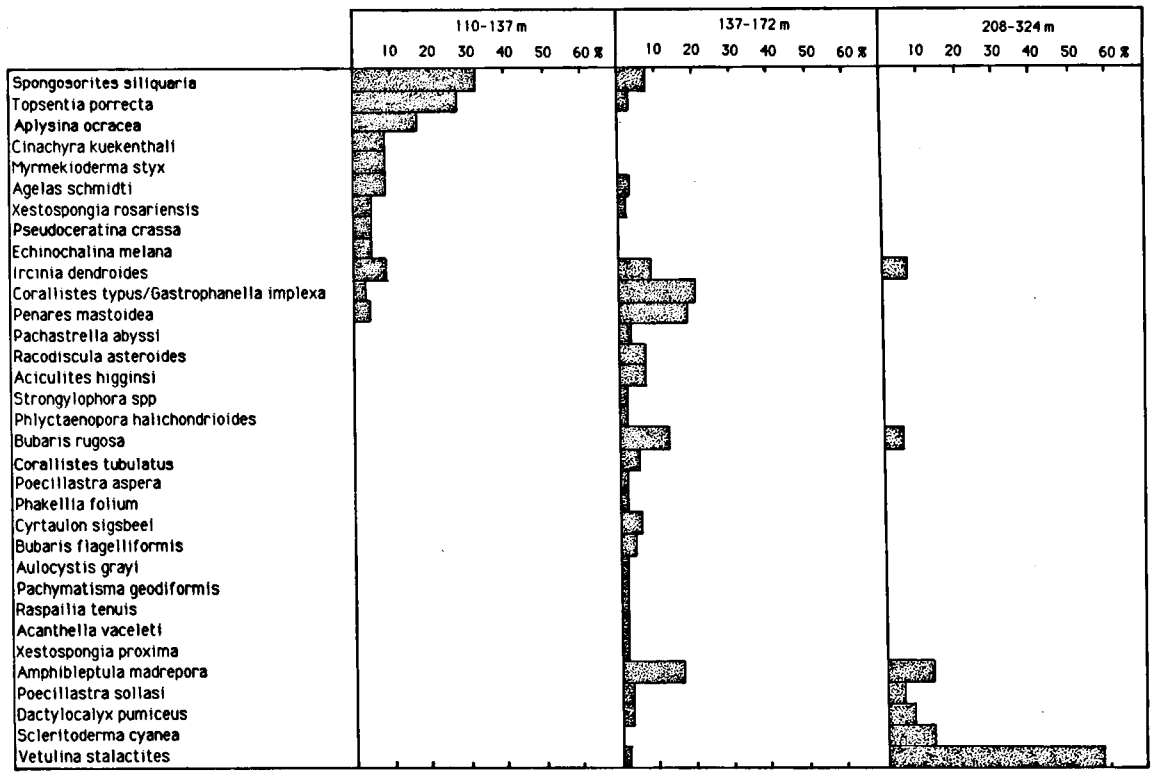

FIGURE 67. Depth distribution of Paynes Bay deep water sponges. The samples are grouped in three sections: 110–137 m, 137–172 m and 208–324 m, in order to show the zonation in the frequency of occurrence.

3. *Vetulina stalactites/Amphibleptula madrepora/Scleritoderma* sp. facies (208–324 m).

LEWIS (1964) described a rich sponge fauna in the 50–100 m depth interval; however, it is likely that at least the upper part of this zone included living coral reefs (see his Plate I figs.2–3), which are of course known to have a rich sponge fauna. The poverty of sponges in our 110–137 m depth interval is not reported by LEWIS: his 100–150 m depth interval apparently also showed a rich and diverse sponge fauna. His 150–250 m observations concur with ours: only a few species, notably *Vetulina stalactites*, remain. Possibly, the discrepancy between LEWIS' and our own results may be due to the fact that LEWIS' quantitative observations on the bottom communities were done by using the Peterson grab, which does not take the larger sponges (as LEWIS himself remarked). His information on the richness of sponges in the different zones is based entirely on qualitative dredge observations.

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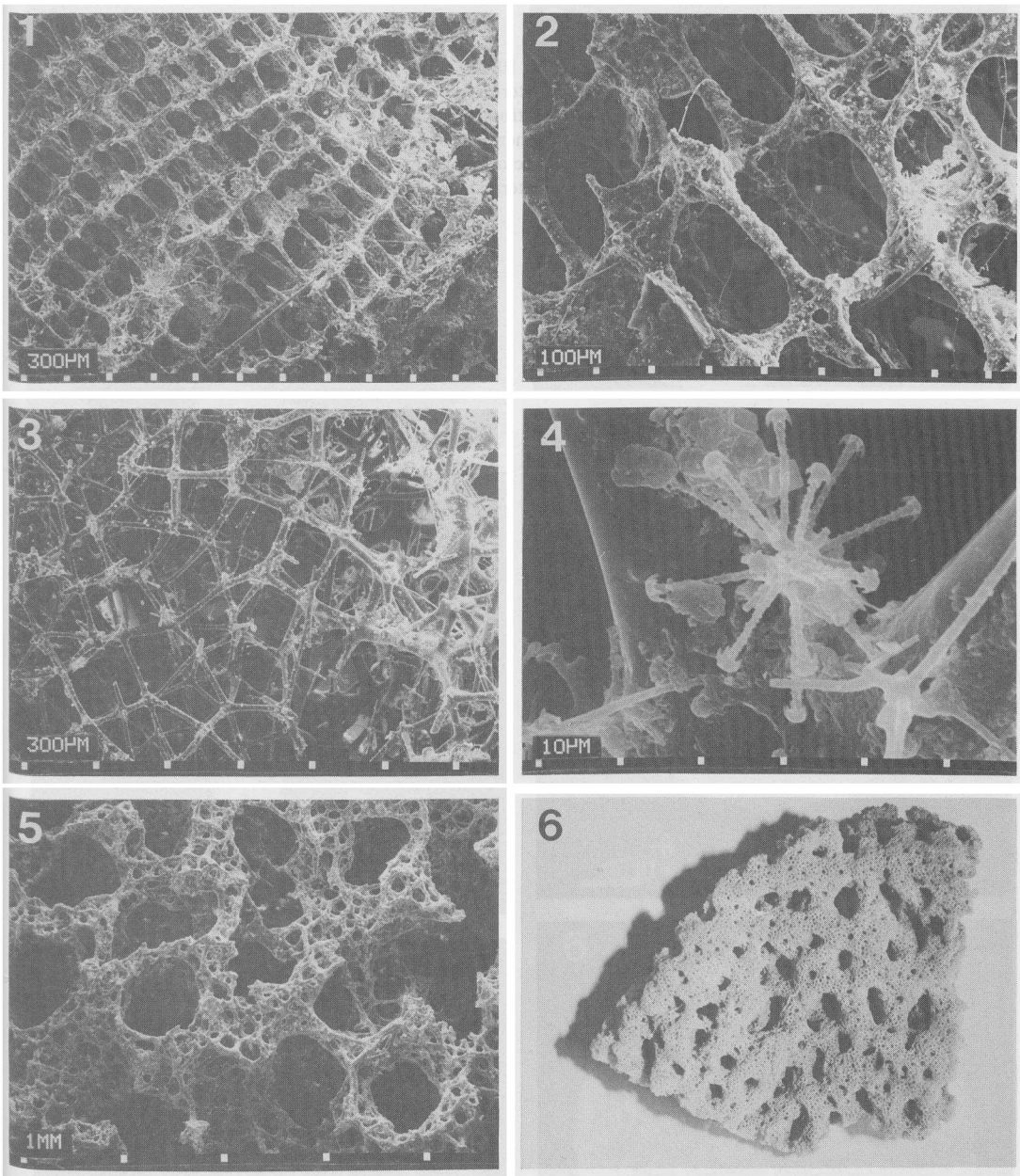
PLATE I

1. *Aulocystis grayi*, SEM photo showing the choanosomal architecture.
2. *Aulocystis grayi*, detail of choanosomal skeleton showing characteristic fusion of hexaradiates.
3. *Cyrtaulon sigsbeei*, SEM photo showing the choanosomal architecture.
4. *Cyrtaulon sigsbeei*, SEM photo of dicohexaster.
5. *Dactylocalyx pumiceus*, SEM photo showing the choanosomal architecture.
6. *Dactylocalyx pumiceus*, habit (size 12 cm across).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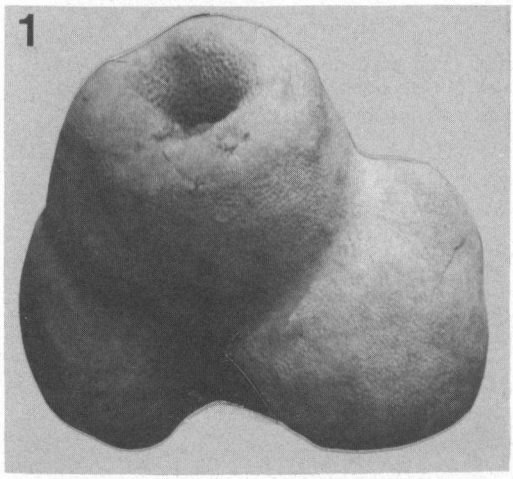
300µM
2
100µM
3
300µM
4
10µM
5
1MM
6

PLATE II

1. *Geodia cf. megastrella*, habit (size 10 × 10 × 7 cm).
2. *Geodia cf. megastrella*, SEM photo of sterraster.
3. *Geodia cf. megastrella*, SEM photo of strongylosphaeraster.
4. *Geodia cf. megastrella*, SEM photo of sphere-like object interpreted as incipient sterraster.
5. *Caminus sphaeroconia*, SEM photo of ectosomal sphere.
6. *Caminus sphaeroconia*, SEM photo of sterraster.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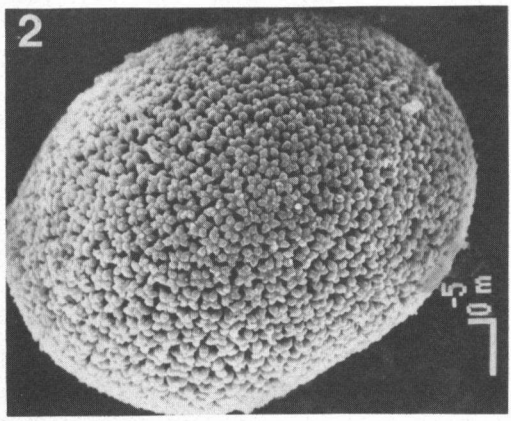
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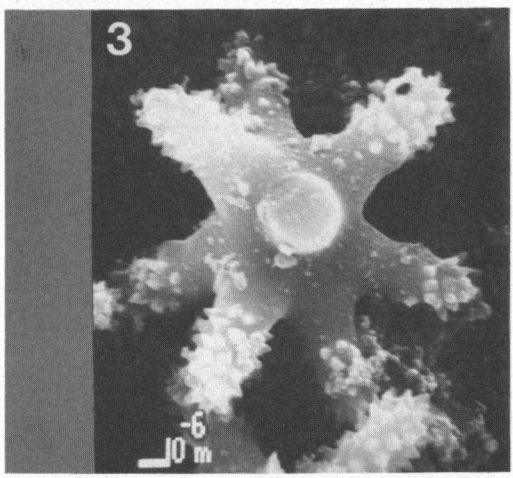
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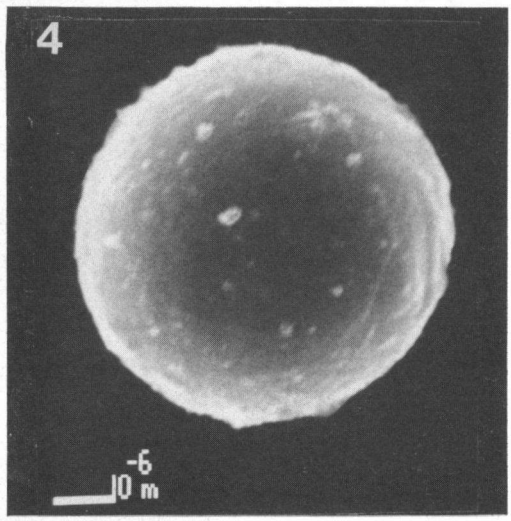
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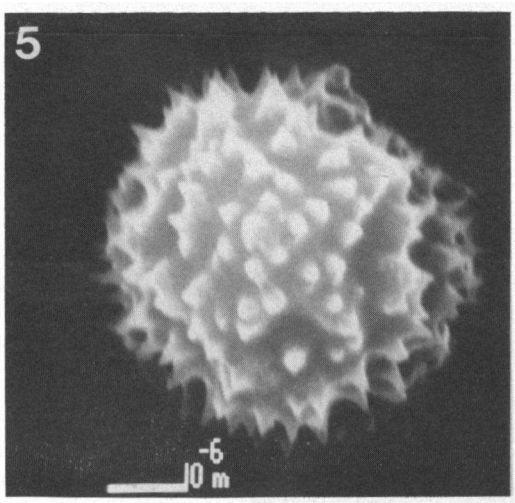
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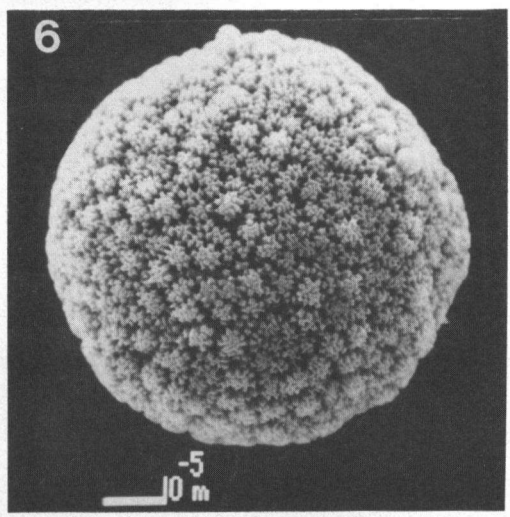
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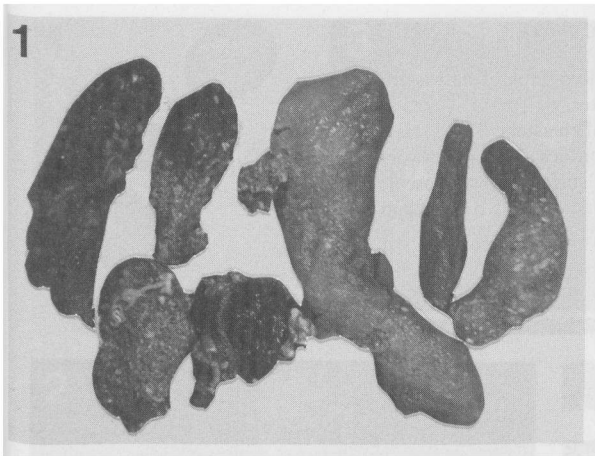
PLATE III

1. *Erylus transiens*, various habits (size of largest specimen: 6 cm).
2–6. *Erylus transiens*, SEM photos of spicules: 2. orthotriaene and aspidasters, 3. full-grown aspidaster, 4. advanced juvenile aspidaster, 5. juvenile aspidaster still showing individual rays, 6. oxyaster.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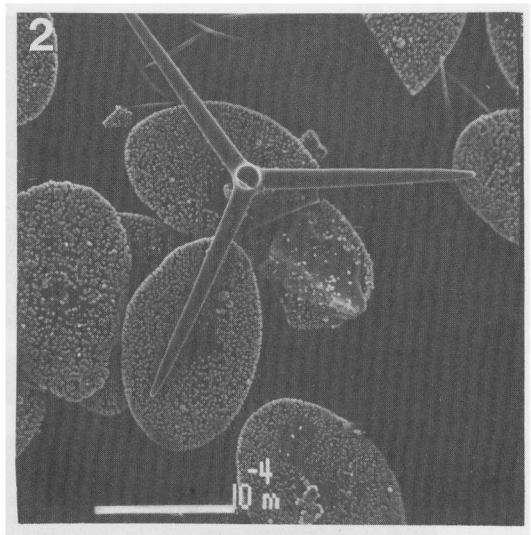
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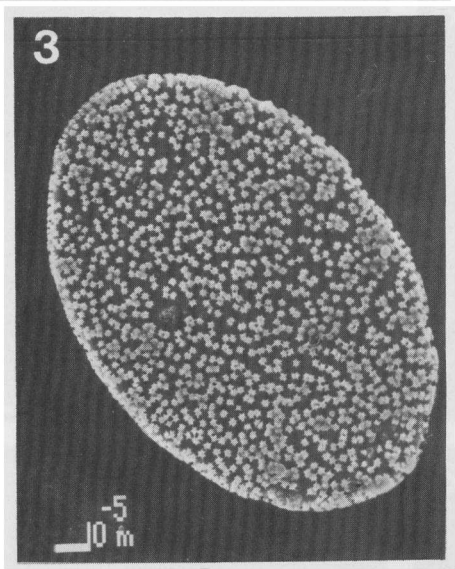
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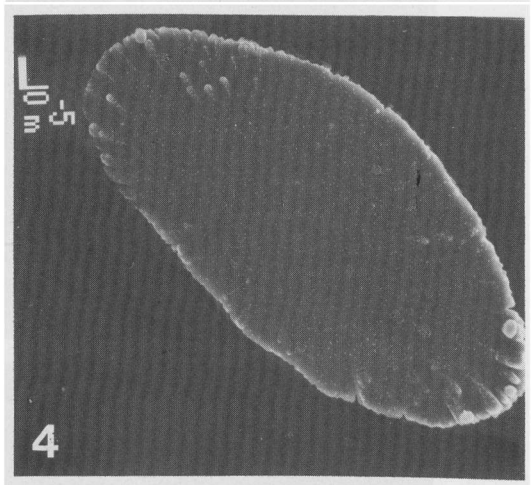
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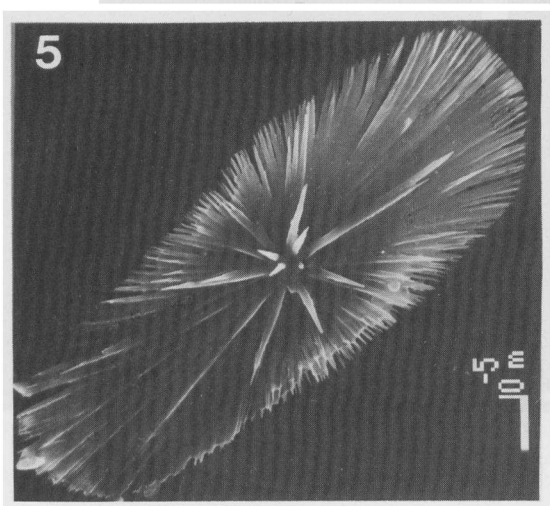
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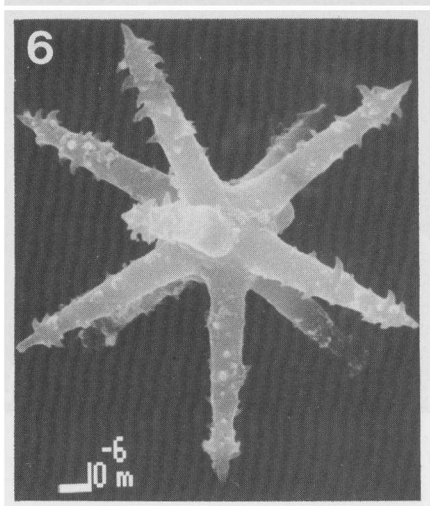
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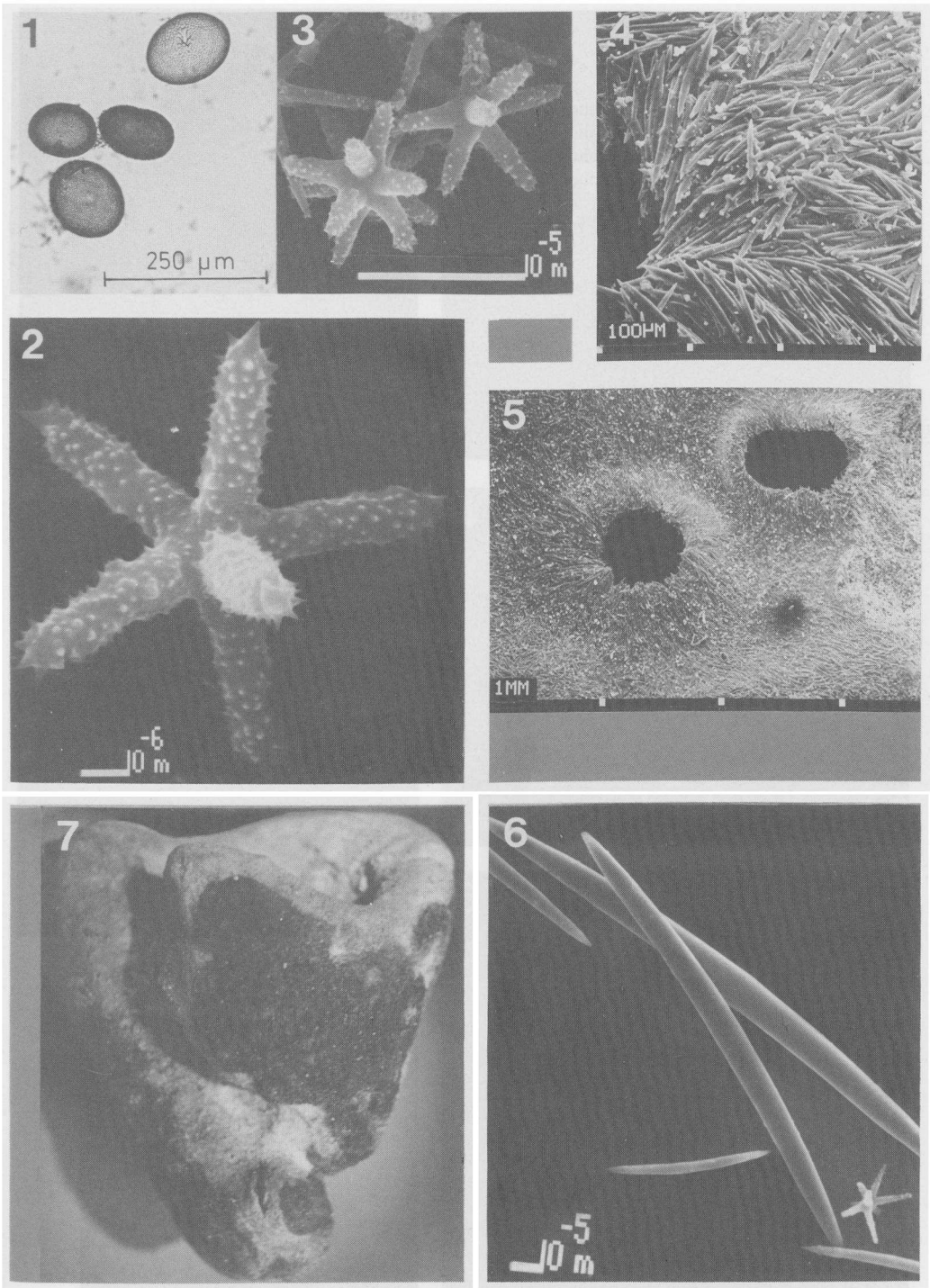
PLATE IV

1. *Pachymatisma geodiformis* n. sp., micrograph of sterrasters.
2. *Stelletta gigas*, SEM photo of chiaster.
3. *Stelletta* cf. *anancora*, SEM photo of chiasters.
4. *Penares mastoidea*, SEM photo of surface showing feltwork of microxea.
5. *Penares mastoidea*, enlarged view of surface showing oscule morphology.
6. *Penares mastoidea*, SEM photo of microxea (two sizes) and oxyaster.
7. *Asteropus simplex*, habit (10 cm high).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0 m
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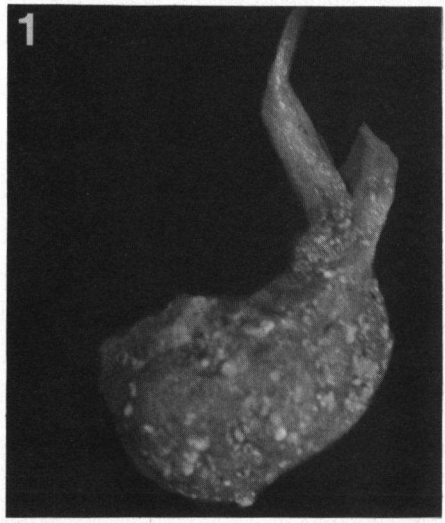
100µM
2
-6
0 m
5
1MM
7
6
-5
0 m

PLATE V

1. *Asteropus syringiferus* n. sp., habit (holotype, 4.5 cm high).
2. *Asteropus syringiferus* n. sp., SEM photo of sanidaster.
3. *Pachastrella abyssi*, SEM photo of amphiaster.
4. *Pachastrella abyssi*, SEM photo of megascleres in situ.
5. *Pachastrella abyssi*, SEM photo of metaster (reduced amphiaster).
6. *Pachastrella abyssi*, SEM photo of microstrongyle.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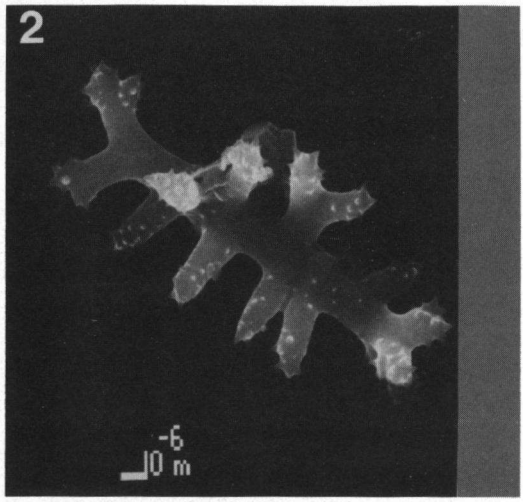
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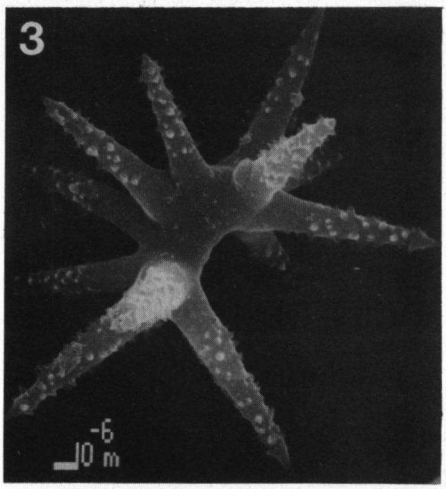
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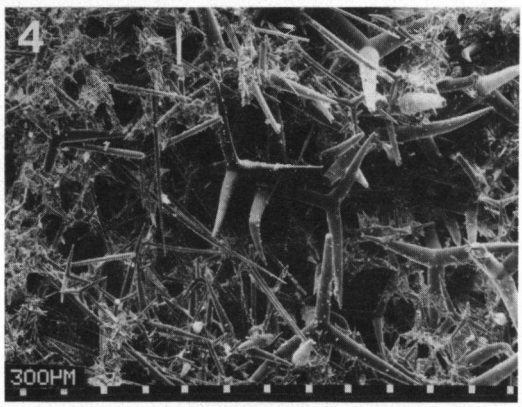
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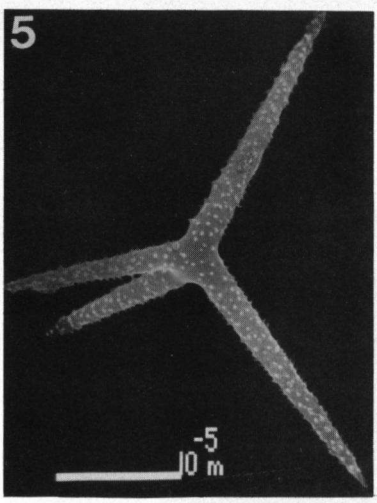
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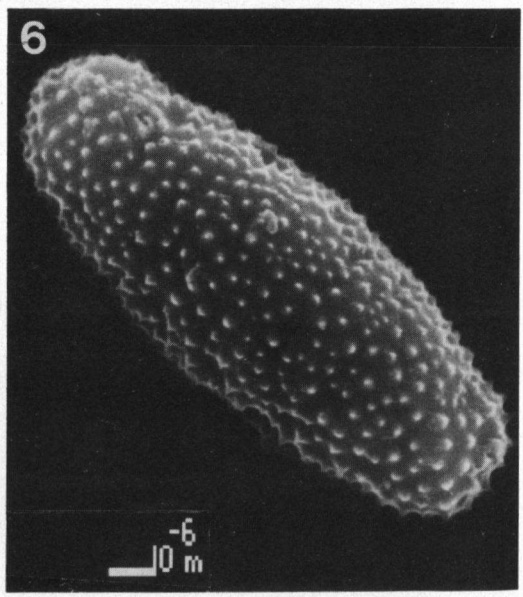
6
-6
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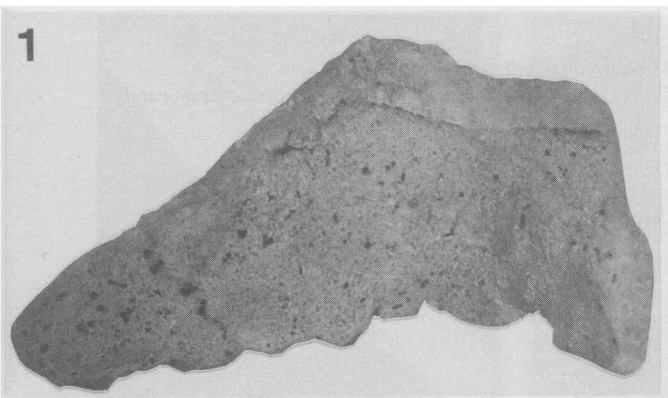
PLATE VI

1. *Poecillastra sollasi*, habit (specimen 10 cm long).
2. *Poecillastra sollasi*, enlarged view of the surface showing pore fields and debris/foreign spicules.
3. *Poecillastra sollasi*, SEM photo of choanosomal skeleton showing megascleres, centrotylote microxea and amphiasters.
4. *Cinachyra arenosa* n. sp., SEM photo of sigmaspire.
5. *Theonella atlantica* n. sp., SEM photo of microrhabd.
5. *Theonella atlantica* n. sp., SEM photo of surface showing phyllotriaenes and crust of microrhabds.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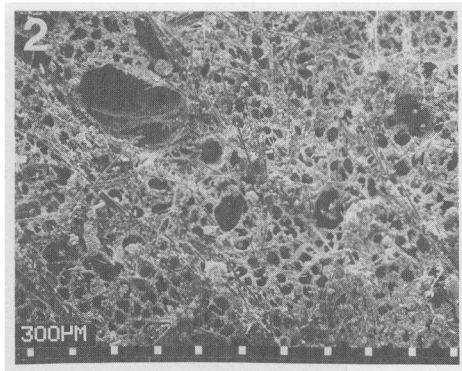
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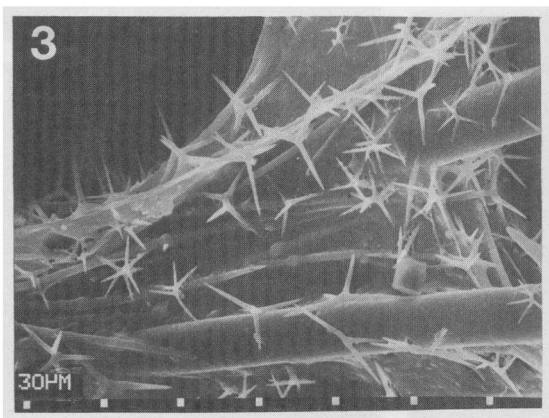
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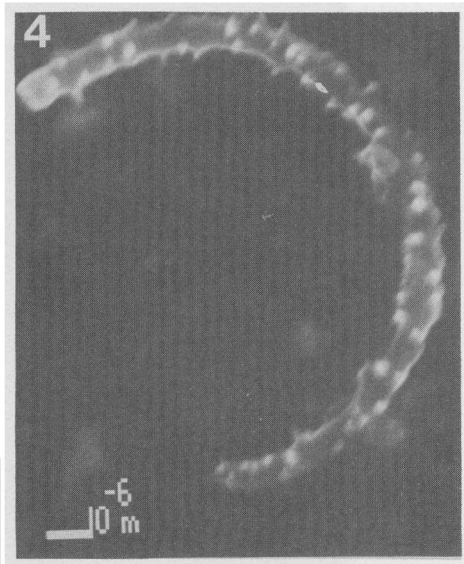
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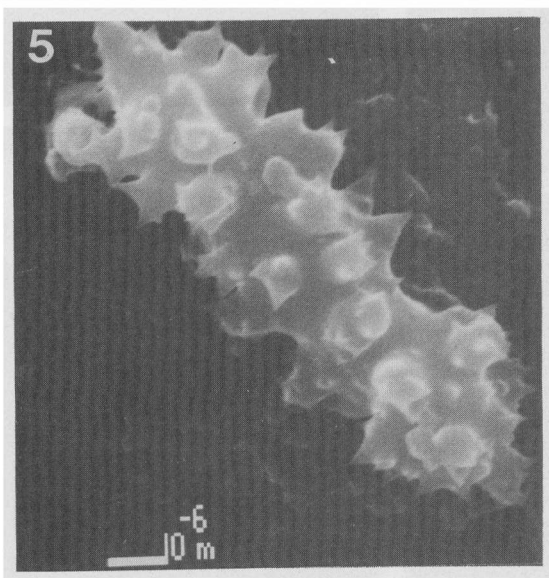
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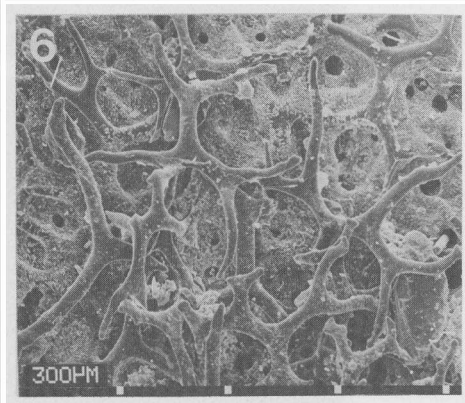
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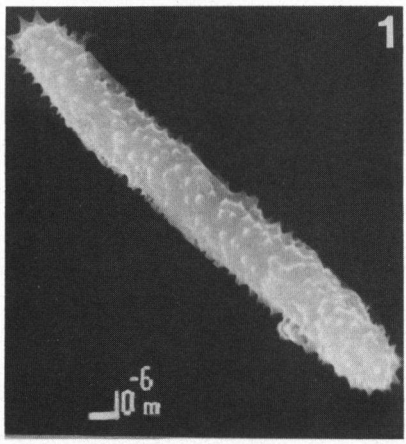
PLATE VII

1. *Discodermia polydiscus*, SEM photo of acanthorhabd.
2. *Corallistes typus*, SEM photo of peripheral skeleton, showing dichotriaenes, desmata and oxeotes.
3. *Corallistes typus*, SEM photo of amphiaster.
4. *Corallistes typus*, SEM photo of dichotriaene and desma.
5. *Corallistes paratypus* n. sp., SEM photo of spiraster.
6. *Corallistes paratypus* n. sp., SEM photo of dichotriaene.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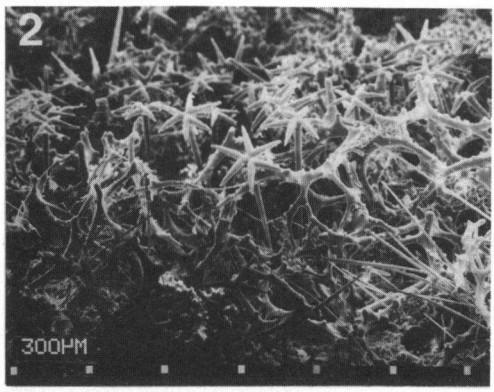
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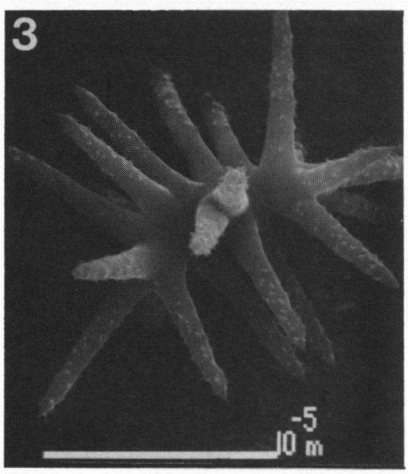
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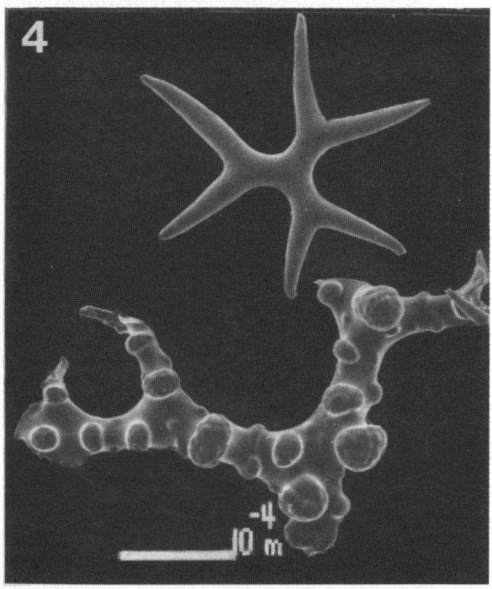
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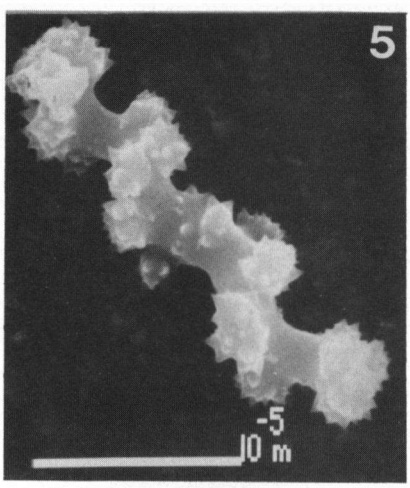
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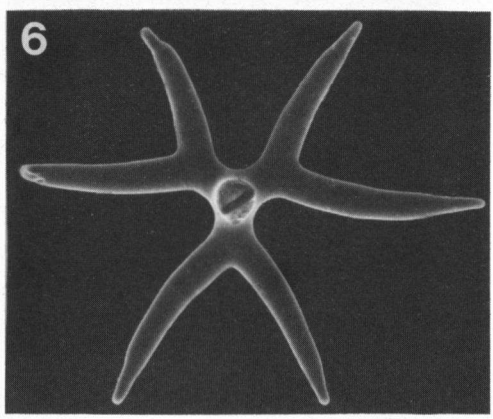
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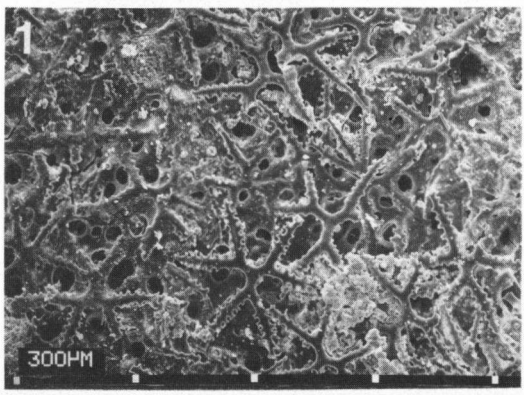
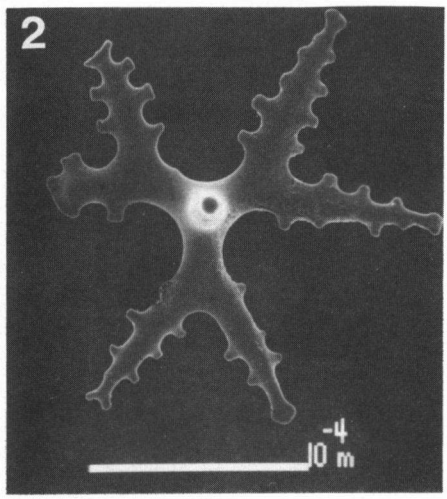
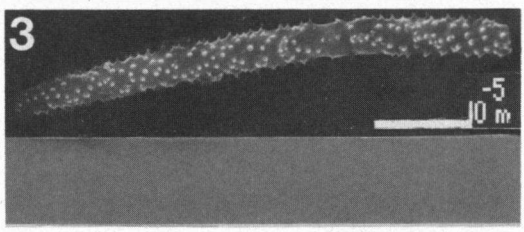
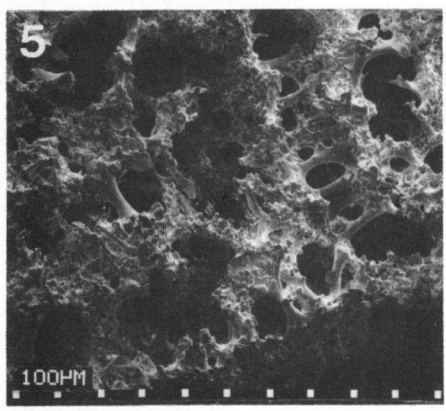
PLATE VIII

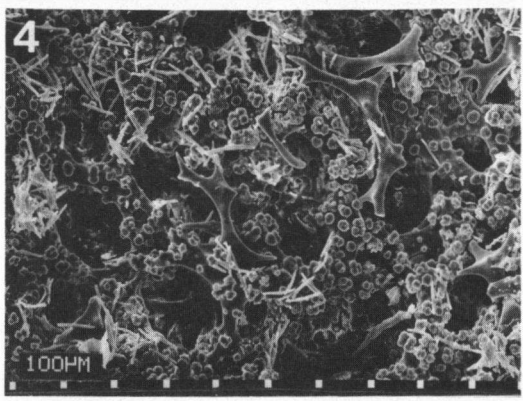
1. *Corallistes tubulatus* n. sp., SEM photo of surface showing the ectosomal skeleton of dichotriaenes and pore fields.
2. *Corallistes tubulatus* n. sp., SEM photo of dichotriaene.
3. *Amphibleptula madrepora*, SEM photo of acanthorhabd.
4. *Amphibleptula madrepora*, SEM photo of peripheral skeleton showing tangential acanthorhabds and desmata.
5. *Amphibleptula madrepora*, SEM photo of choanosomal desma-reticulum.
6. *Aciculites higginsi*, SEM photo of acanthose strongyle.
7. *Aciculites higginsi*, SEM photo of acanthose apex of strongyle.

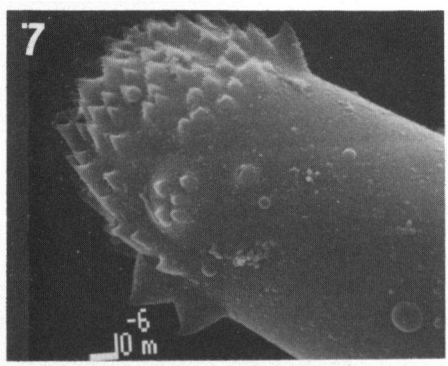

1
300μm


2
-4
0 m


3
-5
0 m


5
100μm


4
100μm


7
-6
0 m

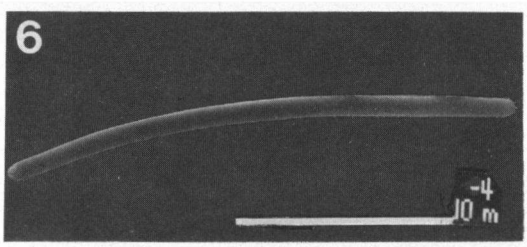
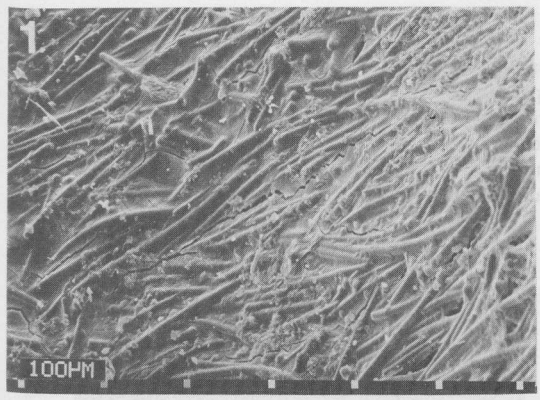
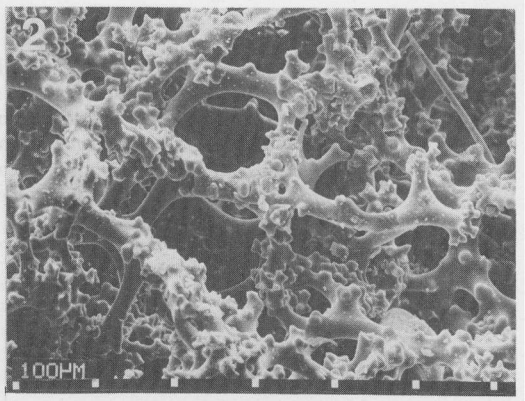
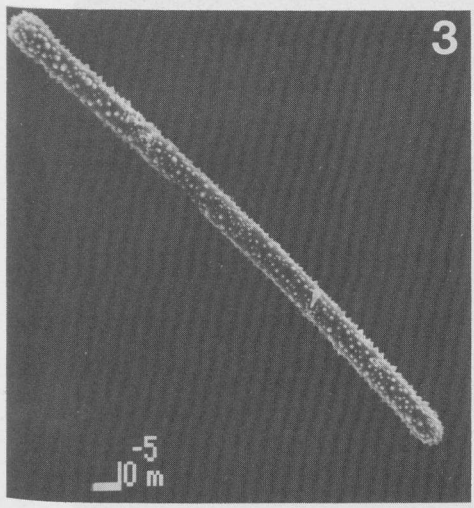

6
-4
0 m

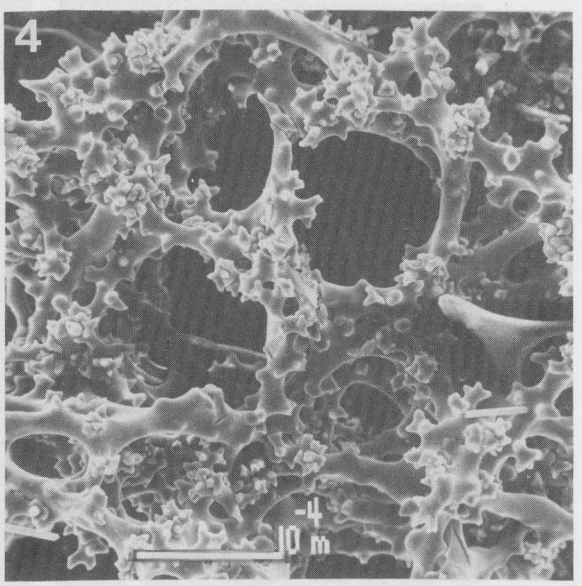
PLATE IX

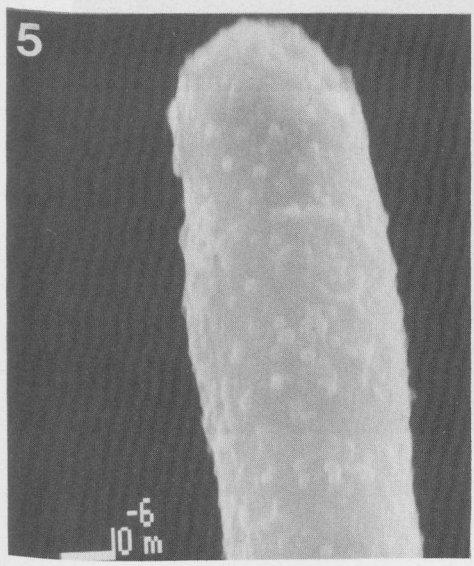
1. *Aciculites higginsi*, SEM photo of surface showing the tangential stongyle skeleton
2. *Aciculites higginsi*, SEM photo of choanosomal desma skeleton.
3. *Aciculites cribrophora*, SEM photo of acanthose strongyle.
4. *Gastrophanella implexa*, SEM photo of choanosomal desma-reticulum.
5. *Gastrophanella implexa*, SEM photo of desma-zygosis.
6. *Gastrophanella implexa*, SEM photo of acanthose apex of oxeote.


1
100μm


2
100μm


3
-5
10 m


4
-4
10 m


5
-6
10 m

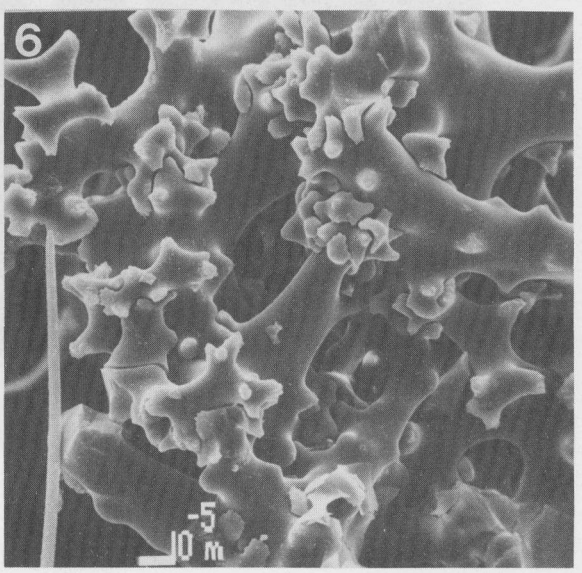
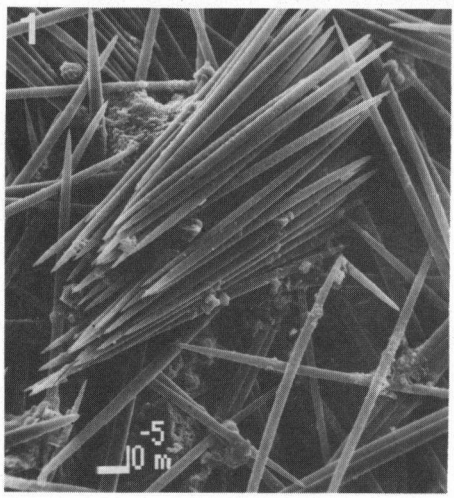
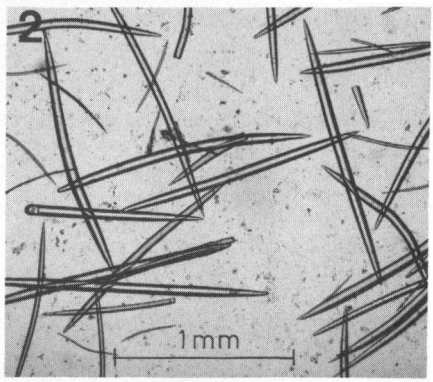
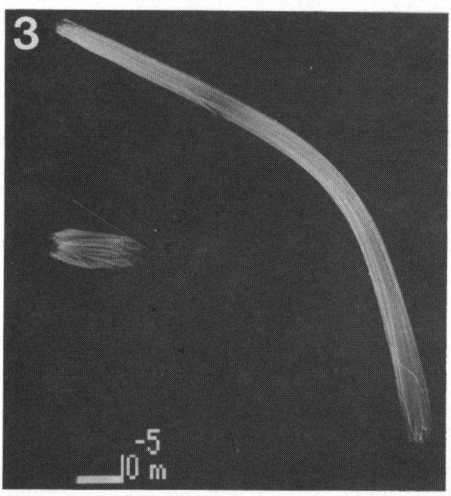

6
-5
10 m

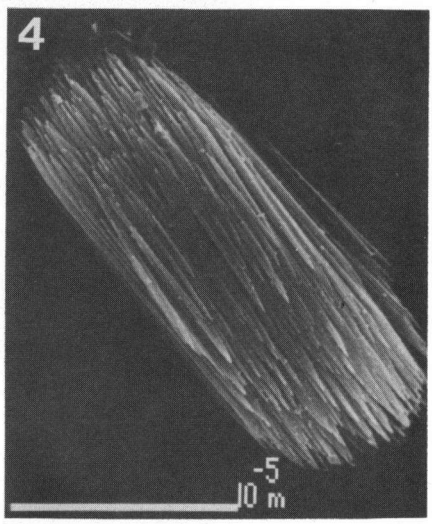
PLATE X

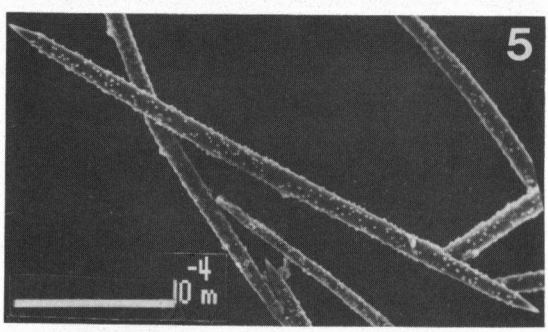
1. *Pseudotrachya hystrix*, SEM photo of microxea.
2. *Topsentia porrecta*, photomicrograph of spicules.
3. *Epipolasis rea*, SEM photo of two categories of trichodragmata.
4. *Epipolasis rea*, SEM photo of smallest category of dragma.
5. *Myrmekioderma styx*, SEM photo of acanthose oxea.
6. *Myrmekioderma styx*, SEM photo of choanosomal skeleton.


1
-5
0 m


2
1mm


3
-5
0 m


4
-5
0 m


5
-4
0 m

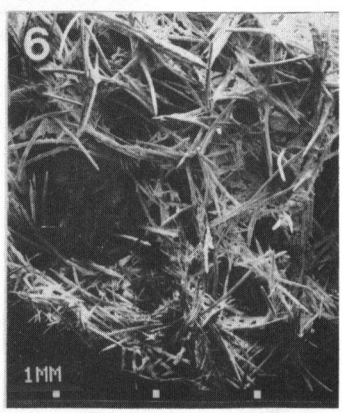
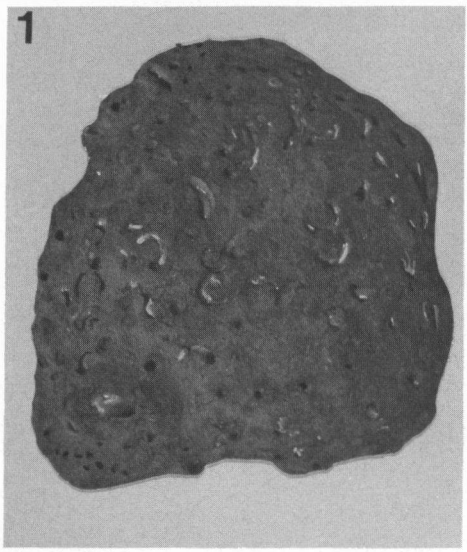
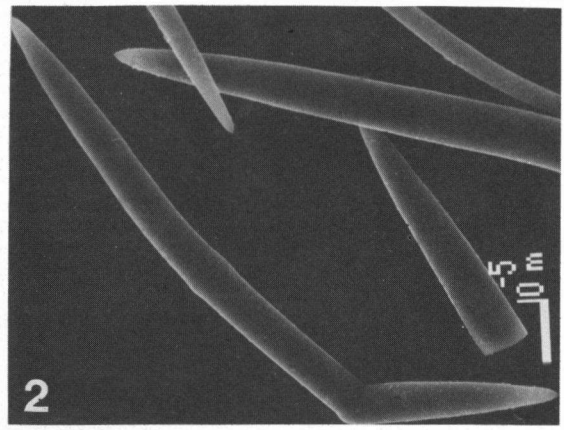
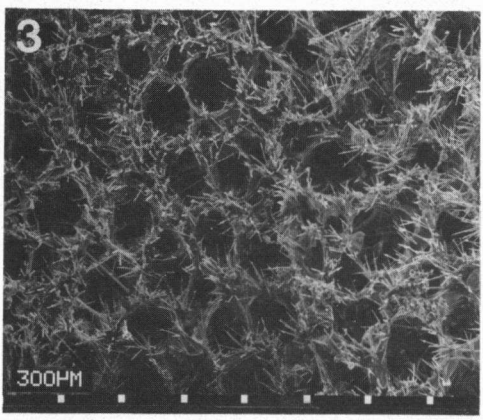

6
1MM

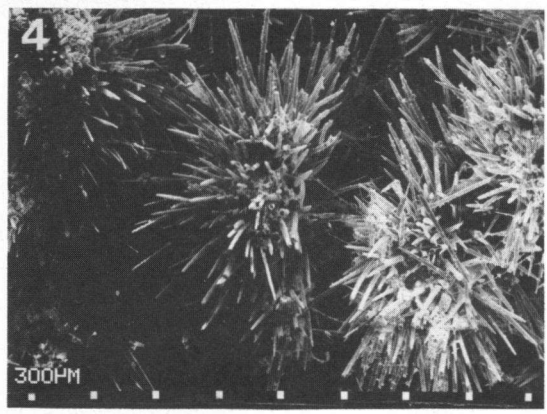
PLATE XI

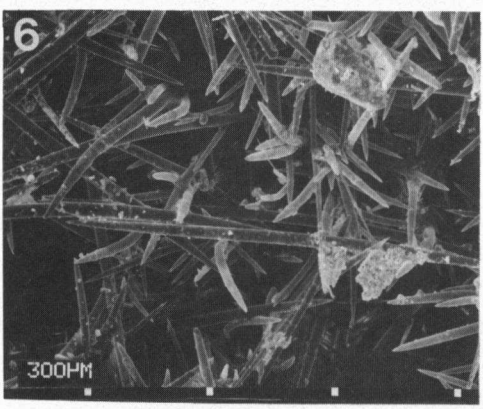
1. *Spongosorites siliquaria*, n. sp., habit (holotype, 9 cm wide).
2. *Spongosorites siliquaria* n. sp., SEM photo of crooked oxea.
3. *Phakellia folium*, enlarged view of surface.
4. *Bubaris rugosa*, enlarged view of surface.
5. *Bubaris rugosa*, SEM photo of sinuous strongyloxea.
6. *Bubaris flagelliformis* n. sp., SEM photo of skeletal architecture showing sinuous and straight oxea.
7. *Raspailia* cf. *tenuis*, SEM photo of surface.

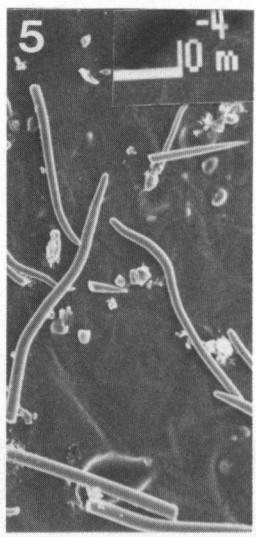

1


2


3
300PM


4
300PM


6
300PM


5
-4
0 m

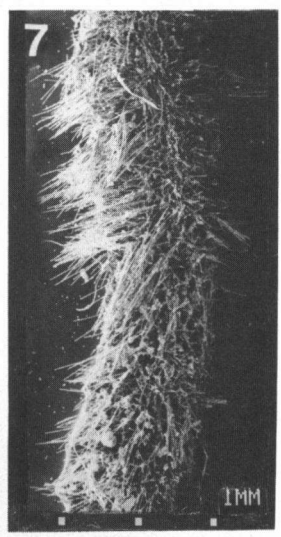
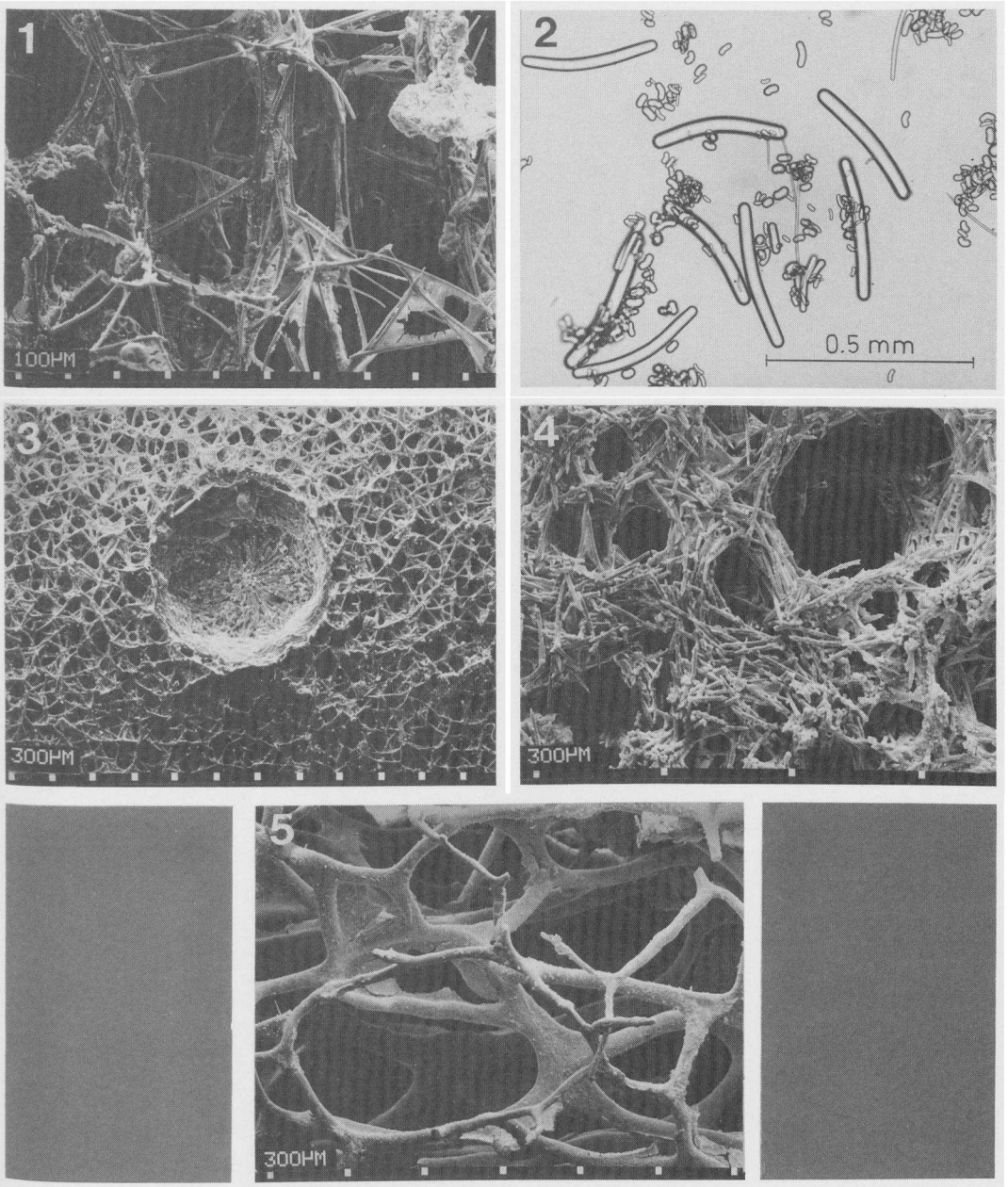

7
1MM

PLATE XII

1. *Echinochalina melana* n. sp., SEM photo of choanosomal skeleton.
2. *Strongylophora hartmani*, photomicrograph of spicules.
3. *Xestospongia* cf. *rosariensis*, SEM photo of surface showing a *Parazoanthus* scar.
4. *Xestospongia proxima*, SEM photo of choanosomal skeleton.
5. *Aplysina ocracea*, SEM photo of fibre reticulation.


1
100μm
2
0.5 mm
3
300μm
4
300μm
5
300μm