BURT 17

SPONGES

BY

MAURICE BURTON, M.Sc.,
Assistant Keeper in the Department of Zoology.

WITH THIRTY-THREE TEXT-FIGURES AND TWO PLATES.

INTRODUCTION.

THE study of the collection of sponges brought home by the Great Barrier Reef Expedition has added few new names to our lists of the Australasian species, but has provided a valuable addition to our knowledge of the fauna of the Australian coasts. Practically nothing was known hitherto of the sponge-fauna of the Great Barrier Reef. But more valuable still is the opportunity afforded to overhaul our knowledge of the sponges of this region, especially with regard to their nomenclature.

The sponges collected by the Expedition belong, for the most part, to species characteristic of the Indo-Pacific. Many of these are common also to the coasts of Australia, and the results of the present investigation suggest that, in the region explored, a mixing of the Australian and Malayan sponge-faunas takes place. This broad generalization, in itself inconclusive and unsatisfactory, is the most that can be said. A more detailed

analysis is impossible until our knowledge of the sponge-fauna of Australia is brought up to date, for, although a formidable list of species has been recorded from various parts of the Australian coast, most of them are either inadequately described or wrongly classified.

There are two further points worthy of mention here. In the first place, the species represented in a collection made by Savile Kent in some unstated part of the Barrier Reef are predominantly Australian, in striking contrast to the collection made by the present Expedition. It is probable, therefore, that the generalization made above regarding the Low Isles area is not true of the whole of the Barrier Reef. The second point concerns the occurrence of species on the Barrier Reef which are also found in the West Indies, Azores and Mediterranean. Although it is not possible here to enter into details, this raises a problem of first-rate importance which would justify close investigation. When we turn to the sponge-faunas of the Indian Ocean and the Malay area we find that there are many species showing this same distribution. So far as can be seen at present, the line of their distribution follows through from the Malay area and Indian Ocean, round the most southerly point of the African continent, up its west coast to the Azores and thence into the West Indies on the one hand and the Mediterranean on the other. Moreover, these same species do not seem to occur outside this area. It is possible that a detailed study of this problem may shed interesting light on the migration of species and the factors limiting distribution.

The ecology of some of the sponges has been dealt with in Vol. III, No. 2, of the Barrier Reef Reports, but since that report was published certain of the names have been altered.

These, with their present equivalents, are given below :

Names used in Vol. III, No. 2.		Names used in present Report.
Chalina clathrata	=	*Haliclona clathrata* (Dendy).
C. camerata	=	*H. camerata* (Ridley).
Gellius toxius	=	*Adocia toxius* (Topsent).
G. sagittarius	=	*A. sagittaria* (Sollas).
G. pumilus	=	*A. pumila* (Lendenfeld).
G. fibulatus	=	*A. fibulatus*, var. *microsigma*, Dendy.
Cladochalina pulvinatus	=	*Callyspongia diffusa* (Ridley).
Polymastia sp.	=	*P. megasclera*, sp. n.
Phyllospongia foliascens	=	*Carterispongia foliascens* (Pallas).
P. ridleyi	=	*Druinella ramosa*, Thiele.
Euspongia irregularis, var. *pertusa*	=	*Spongia officinalis*, Linnaeus.
Spongelia digitata	=	*Dysidea fragilis* (Montagu).

TABLE SHOWING DISTRIBUTION OF SPECIES COLLECTED BY TH EXPEDITION ON THE GREAT BARRIER REEF.

Species.	Australia.				Malay area.	Indian Ocean, including Red Sea.	Further distribution.
	North coast.	East coast.	South coast.	West coast.			
ORDER CALCAREA	..	..	..	..	..	..	..
Family LEUCASCIDAE	..	..	..	..	..	..	..
Pericharax heteroraphis (Polejaeff)	..	..	..	..	×	×	Tristan da Cunha.
Family SYCETTIDAE	..	..	..	..	..	..	..
Sycon gelatinosum (Blainville)	..	×	×	×	×	..	..
Family HETEROPHIDAE	..	..	..	..	..	..	..
Leuconia ramosa, sp. n.	..	..	..	..	..	..	..
ORDER TETRAXONIDA	..	..	..	..	..	..	..
SUB-ORDER HOMOSCLEROPHORA	..	..	..	..	..	..	..
Family PLAKINIDAE	..	..	..	..	..	..	..
Corticium candelabrum, Schmidt	..	..	..	..	×	..	Mediterranean.
Oscarella tenuis, Hentschel	..	..	×	×	..	..	..
SUB-ORDER ASTROSCLEROPHORA	..	..	..	..	..	..	..
Family STELLETTIDAE	..	..	..	..	..	..	..
Stelletta purpurea, Ridley	×	×	..	..	×	×	Antarctic ; New Zeala
S. clavosa, Ridley	×	..	..	×	×	×	..
Ancorina agglutinans (Thiele)	..	..	..	..	×	..	..
Jaspis stellifera (Carter)	×	.	×	..	..	..	..
Family CHONDROSIDAE	..	..	..	..	..	..	..
Chondrilla nucula, Schmidt	×	×	..	..	×	×	New Zealand ; Azo W. Indies ; Medi ranean.
C. australiensis, Carter	..	×	..	..	×	×	..
SUB-ORDER SIGMATOSCLEROPHORA	..	..	..	..	..	..	..
Family TETILLIDAE	..	..	..	..	..	..	..
Cinachyra australiensis (Carter)	..	×	×	..	×	×	Philippines.
Raphidotethya enigmatica, sp. n.	..	..	..	..	..	..	..
Family HAPLOSCLERIDAE	..	..	..	..	..	..	..
Haliclona camerata (Ridley)	..	..	..	..	×	×	..
H. reticulata (Lendenfeld)	..	×	..	..	..	× ?	..
H. clathrata (Dendy)	..	..	×	..	×	..	New Zealand.
H. exigua (Kirkpatrick)	..	..	..	..	×	..	..
H. pigmentifera (Dendy)	..	..	..	..	..	×	..
H. tennispiculata, sp. n.	..	..	..	..	..	..	..
H. flabello-digitatus, sp. n.	..	..	..	..	..	..	..
Adocia toxius (Topsent)	..	..	..	..	×	×	..
A. minor (Dendy)	..	..	..	..	..	×	..
A. obtusa (Hentschel)	..	..	..	..	×	..	..
A. pumila (Lendenfeld)	×	..	..	..	×	×	..
A. sagittaria (Sollas)	..	..	..	..	×	..	..
A. fibulatus, var. *microsigma*, Dendy	..	..	..	..	..	×	..
Petrosia strongylata, Thiele	..	..	..	..	×	..	..
Callyspongia diffusa (Ridley)	..	..	..	..	×	..	..
C. subarmigera (Ridley)	×	×	..	..	×	..	..
C. fibrosa (Ridley and Dendy)	..	..	..	..	×	×	..
C. confoederata (Ridley)	×	×	..	×	×	..	..

Species.	Australia. North coast.	Australia. East coast.	Australia. South coast.	Australia. West coast.	Malay area.	Indian Ocean, including Red Sea.	Further distribution.
ORDER TETRAXONIDA—*cont.*							
SUB-ORDER SIGMATOSCLEROPHORA—*cont.*							
Family HAPLOSCLERIDAE—*cont.*						×	..
C. clathrata (Dendy)	..	..	..	..	..	..	..
C. ridleyi, sp. n.	..	×	..	..	..	..	..
Occanapia fistulosa (Bowerbank)	×	..	..	×	×	×	Azores; Bahia.
O. renieroides, sp. n.	..	..	..	..	..	..	..
O. elastica (Keller)	..	..	..	..	×	×	..
Family DESMACIDONIDAE	..	..	..	..	..	..	..
Section ISODICTYEAE	..	..	..	..	..	..	..
Desmapsamma, gen. n., *anchorata* (Carter)	..	..	..	..	×	..	West Indies; Bahia.
Section MYCALEAE	..	..	..	..	..	..	..
× *Mycale grandis*, Gray	..	..	..	..	×	..	..
M. sulevoidea (Sollas)	..	..	..	..	..	..	..
Section MYXILLEAE	..	..	..	..	..	..	..
Histoderma calcifera, sp. n.	..	..	..	..	..	..	..
Hamigera strongylata, sp. n.	..	..	..	..	..	..	..
Plumocolumella anchorata (Carter)	..	..	×	..	..	..	..
Strongylacidon inaequalis (Hentschel)	..	..	×	×	..	..	..
S. intermedia, sp. n.	..	..	..	..	..	..	..
Psammochela fibrosa (Ridley)	×	..	..	..	..	×	..
Chondropsis chaliniformis (Carter)	×	×	×	..	..	..	Antarctic.
C. carcinophila (Lendenfeld)	..	×	..	..	..	..	..
× *Iotrochota purpurea* (Bowerbank)	..	..	..	..	×	×	..
I. coccinea (Carter)	..	..	×	..	..	..	..
Crella spinulata (Hentschel)	..	..	×	×	..	..	..
Hymedesmia mertoni, Hentschel	..	..	..	..	×	..	..
H. tenuissima (Dendy)	..	..	..	..	..	×	..
Paracornulum dubium (Hentschel)	..	..	..	..	×	..	..
Section CLATHRIEAE	..	..	..	..	..	..	..
Clathria aculeata, Ridley	×	..	..	..	..	..	..
C. rubens (Lendenfeld)	..	×	..	..	..	..	..
C. eccentrica, sp. n.	..	..	..	..	..	..	..
× *Tenacia frondifera* (Bowerbank)	×	..	..	..	×	×	..
× *T. procera* (Ridley)	×	..	..	..	..	×	..
T. paucispina (Lendenfeld)	..	×	..	..	..	..	..
T. coralliophila (Thiele)	..	..	..	..	×	..	..
Ophlitaspongia rimosa (Ridley)	..	..	..	..	..	×	..
O. eccentrica, sp. n.	..	..	..	..	..	..	..
Protophlitaspongia, gen. n., *oxeata*, sp. n.	..	..	..	..	..	..	..
Echinochalina intermedia (Whitelegge)	..	×	..	..	..	×	..
E. anomala, Hallmann	..	×	..	..	..	..	..
Coelocarteria, gen. n., *singaporense* (Carter)	..	..	..	..	×	..	..
Family AXINELLIDAE	..	..	..	..	..	..	..
× *Trachyopsis aplysinoides* (Dendy)	..	..	..	..	..	×	..
T. halichondrioides, Dendy	..	..	..	..	..	×	..
? × *Leucophlœus fenestratus*, Ridley	×	..	..	..	×	..	..

Species.	Australia. North coast.	Australia. East coast.	Australia. South coast.	Australia. West coast.	Malay area.	Indian Ocean, including Red Sea.	Further distribution.
ORDER TETRAXONIDA—*cont.*							
SUB-ORDER SIGMATOSCLEROPHORA—*cont.*							
Family AXINELLIDAE—*cont.*							
Ciocalypta penicillus (Bowerbank)	×	×	×	×	×	×	Eastern Atlantic, from Europe to S. Afric
Collocalypta mertoni (Hentschel)	..	..	..	..	×	..	..
× *Acanthella cavernosa*, Dendy	×	..	..	..	..	×	..
Pararhaphoxya, gen. n., *tenuiramosa*, sp. n.	..	..	..	..	..	..	..
Family CLAVULIDAE	..	..	..	..	..	..	..
× *Pseudosuberites andrewsi*, Kirkpatrick	..	..	..	..	×	..	..
Laxosuberites proteus, Hentschel	..	×	×	..	..	×	..
Polymastia megasclera, sp. n.	..	..	..	..	..	..	..
Tethya robusta (Bowerbank)	×	×	×	×	×	×	..
T. japonica, Sollas	..	..	..	..	×	×	..
Tethyorrhaphis oxyaster, sp.n.	..	..	..	..	..	..	..
Timea stellata (Bowerbank)	..	..	..	..	..	..	Europe.
× *Spirastrella inconstans* (Dendy)	..	..	..	..	..	×	..
S. aurivillii, Lindgren	..	..	..	..	×	..	..
S. semilunaris, Lindgren	..	..	..	..	×	..	..
ORDER KERATOSA	..	..	..	..	..	..	..
Family SPONGIIDAE	..	..	..	..	..	..	..
Phyllospongia dendyi, Lendenfeld	..	..	..	..	×	..	..
Carterispongia foliascens (Pallas)	×	×	×	×	×	×	New Zealand (?); Tropi Pacific (?).
C. vermicularis (Lendenfeld)	..	..	..	×	..	..	..
C. clathrata (Carter)	..	×	×	×	..	×	W. Indies.
Spongia officinalis, Linnæus	?	?	?	?	×	×	W. Indies; Mediterranea
S. nardorus (Lendenfeld)	×	..	×	..	..	..	..
Thorectopsamma, gen. n., *irregularis*, sp. n.	..	..	..	..	..	..	..
Hircinia irregularis (Polé-jaeff)	×	×	..	..	..	..	..
H. echinata, Keller	..	..	..	..	..	×	..
H. ramosa, Keller	..	..	..	..	..	×	..
H. pinna, Hentschel	..	..	..	..	×	..	..
H. ramodigitata, sp. n.	..	..	..	..	..	..	..
H. aruensis, Hentschel	..	..	..	..	×	..	..
H. dendroides (Poléjaeff)	..	..	..	..	×	×	..
Dysidea fragilis (Montagu)	×	×	×	..	×	×	Europe.
D. reticulata (Thiele)	..	..	..	×	×	..	..
D. herbacea (Keller)	..	..	×	..	×	..	..
Family APLYSINIDAE	..	..	..	..	..	..	..
Luffariella variabilis (Poléjaeff)	..	..	..	..	×	..	..
Aplysina mollis, var. *aruensis*, Hentschel	..	..	..	..	×	..	..
Druinella purpurea (Carter)	×	..	..	×	..	×	..
D. ramosa, Thiele	..	..	..	..	×	..	..
Family APLYSILLIDAE	..	..	..	..	..	..	..
Aplysilla rosea (Barrois)	..	×	..	..	..	×	Antarctic: S. America.
Dendrilla membranosa (Pallas)	×	..	..	..	×	×	Philippines.
Basta flabelliformis (Pallas)	×	×	..	×	×	×	

SYSTEMATIC NOTES ON THE COLLECTION OBTAINED BY THE GREAT BARRIER REEF EXPEDITION.

Order CALCAREA.

Family Leucascidae.

Genus *Pericharax*, Poléjaeff.

Pericharax heteroraphis (Poléjaeff).

P. carteri, var. *heteroraphis*, Poléjaeff, 1884, p. 66, pl. ii, fig. 5, pl. vii, fig. 8; *P. heteroraphis*, Dendy, 1913, p. 13; *P. peziza*, *idem*, *l. c.*, p. 15, pl. i, fig. 9; pl. v, figs. 3, 4; Burton, 1930, p. 3.

Occurrence.—Stn. XXIV, 13th March, 1929: ¾ mile N.E. of Pasco Reef, 16½ fath., hard and shelly. Stn. XXV, 17th March, 1929: In Papuan Pass, 20–25 fath., foraminifera and shell fragments.

Remarks.—The holotype of *P. heteroraphis* is a subspherical sponge with a broad rooting attachment. There is an apical oscule, with margins produced into a low collar-like elevation, leading into a spacious gastral cavity with the patent openings of the exhalant canals distributed evenly over the surface. These have an average diameter of 1 mm. and are 1 mm. distant from each other. The outer surface of the sponge is finely porose, in some places smooth to the touch, in others harsh. The harshness is due to the projecting ends of the rays of the large triradiates.

The specimen assigned by Dendy to *P. heteroraphis* is practically globular, with an apical oscule, the margins of which do not extend above the general level of the surface. The surface itself is like that of the type in appearance, but more noticeably glabrous and almost without harshness to the touch. The openings into the cloacal cavity are arranged in irregular groups, situated at varying distances from each other, and have an average diameter of 2 mm.

Of the "Siboga" specimens assigned to this species (Burton, *loc. cit.*) two are like the holotype, but the majority of them have given rise "either by budding or by the coalescence of adjacent individuals . . . to masses of rounded lobes". The surface is entirely glabrous, the oscule without projecting margin and the exhalant openings lining the cloaca arranged as in the type. There is one exception to this, among the "Siboga" sponges, an irregularly lobose sponge, very harsh to the touch, with oscules surrounded by a membranous collar. It differs from all other specimens in that each oscule leads into a shallow cloaca formed by the confluence of several large exhalant canals. The colour in the type is a light greyish-brown; in the "Sealark" specimen, grey; in the typical "Siboga" specimens yellow, strongly tinged with a purplish brown, and in the atypical, lobose specimen referred to, light yellow.

The type of *P. peziza* is a regular cup-shaped sponge, with surface smooth and porose and with the mouth of the cup fringed with the remains of a membranous collar. The inner wall of the cup (*i.e.* the cloacal cavity) is covered with exhalant openings of the same size and distribution as in the type of *P. heteroraphis*. In describing *P. peziza*, Dendy stated that it "is distinguished from *P. heteroraphis* chiefly by its remarkable external form". Actually this external form, regarded by him as of such significance, is merely a simple modification of the typical form, and since the form of the species is now

shown to be variable there is no justification for retaining Dendy's name, especially as it can also be shown that the skeleton contains nothing worthy of specific distinction.

The first of the Barrier Reef specimens is incomplete, but evidently had much the same shape as the type of *P. heteroraphis*. It was probably about 4 cm. in diameter (about three times the size of the type) and the openings lining the cloacal cavity are correspondingly larger. The surface is very harsh to the touch, and the colour is a greyish-yellow. The second specimen consists of three coalescent individuals, the cloacal cavities of which have no connection with each other: the larger of these is damaged, but evidently had a similar form to the type of *P. peziza*; the second is intermediate in form between the largest individual and the type of *P. heteroraphis*; and the third is small, strongly recalling one of the lobes of the atypical "Siboga" specimen. This specimen proves, if any further proof were needed, that *P. peziza*, the type of *P. heteroraphis* and the atypical ("Siboga") specimen of the latter species are conspecific. Other features of this same specimen are its dark greyish-brown colour, smooth surface and the tendency of the surface to be thrown into low folds.

The third Barrier Reef specimen is very like the type of *P. heteroraphis* in external form, but has the same colour as the preceding specimen, while the surface folds are more marked. The fourth specimen is the largest yet recorded for the species. It is subspherical, with apical oscule surrounded by a membranous collar, very dark in colour, with smooth surface thrown into pronounced folds or produced into foliate protuberances. So unlike the typical form is it that, but for the intermediates already discussed, it might be thought to represent a new species.

The variation in external form is accompanied by a variability in the size of the spicules, particularly of the large triradiates. Since this is often considerable, a comparative table is given below showing the extent of the variation in these spicules.

Specimen.	Length and diameter, at base, of typical ray of large triradiate.
P. heteroraphis, Poléjaeff. Holotype	2·0 × ·128.
P. heteroraphis, Poléjaeff. Dendy, 1916	1·55 × ·1.
P. peziza, Dendy. Holotype	1·4 × ·07.
P. heteroraphis, Poléjaeff. Burton, 1930:	
Specimen *a*	1·3 × ·13
,, *b*	·98 × ·075
,, *c*	1·1 × ·11
,, *d*	1·3 × ·13.
,, *e*	·48 × ·035.*
,, *f*	·5 × ·044.*
,, *g*	·96 × ·112.
P. heteroraphis. Barrier Reef:	
Specimen 1	1·44 × ·192.
,, 2	1·28 × ·096.
,, 3	1·28 × ·112.
,, 4	1·44 × ·096.

Distribution.—Malay area; Indian Ocean; Tristan da Cunha.

* Despite differences in the size of the spicules, these specimens are similar to others with more normal spiculation in all other respects.

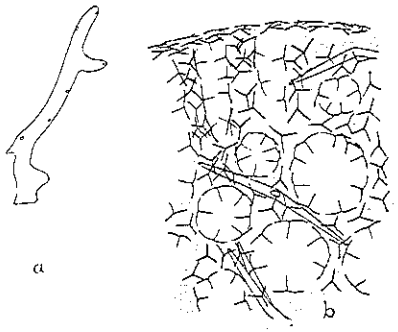
Family SYCETTIDAE.

Genus *Sycon*, Risso.

Sycon gelatinosum (Blainville).

Alcyoncellum gelatinosum, Blainville, 1834, p. 529, pl. xcii, fig. 5; Gray, 1867, p. 557; *Sycidium gelatinosum*, Haeckel, 1869, p. 245; *Grantia gelatinosa*, Bowerbank, 1869, p. 84; *Sycandra arborea* (= *Sycodrendron arboreum*), Haeckel, 1872, p. 331, pl. liii, fig. 1; pl. lviii, fig. 7; *S. alcyoncellum* (= *Sycothamnus alcyoncellum*) et varr. *gelatinosa*, *virgultosa*, Haeckel, *l. c.*, p. 333, pl. liii, fig. 2; pl. lviii, fig. 5; *Sycon gelatinosum*, Dendy, 1892, p. 83; Dendy and Row, 1913, p. 746; Dendy and Frederick, 1924, p. 483.

OCCURRENCE.—Low Isles, 9th March, 1929.
REMARKS.—A particularly robust colony, 3 cm. high.
DISTRIBUTION.—Java; Australia (east, south and west coasts).



TEXT-FIG. 1.—*Leuconia ramosa*, sp. n., showing *a*, external form (× ⅔), and *b*, the skeleton, from a section at right angles to surface.

Family HETEROPIIDAE.

Genus *Leuconia*, Grant.

Leuconia ramosa, sp. n. (Text-fig. 1.)

HOLOTYPE.—B.M. 30.8.13.3.
OCCURRENCE.—Stn. XXIV, 13th March, 1929: ¾ mile N.E. of Pasco Reef, 16½ fath., hard and shelly.
DIAGNOSIS.—Sponge composed of cylindrical branches growing more or less erect, and tunnelled by numerous longitudinal canals; surface smooth, even, minutely reticulate; oscules, leading into shallow cloacae 1–3 mm. in diameter, situated at various points on branches; colour, in spirit, pale greyish-brown; dermal skeleton of regular triradiates, arranged tangentially, variable in size, each ray measuring up to ·22 × ·011 mm.; skeleton of chamber layer confused, formed by small triradiates, slightly sagittal, with basal ray up to ·24 × ·012 mm., and large regular triradiates irregularly but sparsely distributed,

with rays measuring up to ·96 × ·064 mm.; quadriradiates lining large canals of similar dimensions to small triradiates of chamber layer.
REMARKS.—The species is peculiar, among those species of *Leuconia* devoid of oxea, in its ramose form.

ORDER TETRAXONIDA.

Suborder HOMOSCLEROPHORA.

Family PLAKINIDAE.

Genus *Corticium*, Schmidt.

Corticium candelabrum, Schmidt.

C. candelabrum, Schmidt, 1862, p. 42, pl. iii, fig. 25; Lendenfeld, 1903, p. 122; Babić, 1922, p. 292.

OCCURRENCE.—Stn. X, 22nd January, 1929: Satellite Reef, 14–17 fath., coral, shell, gravel, and mud.
DISTRIBUTION.—Malay Area; Mediterranean.

Genus *Oscarella*, Schulze.

Oscarella tenuis, Hentschel.

O. tenuis, Hentschel, 1909, p. 351, pl. xxiii, figs. 9, 12.

OCCURRENCE.—Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., mud and rock.
REMARKS.—Incrustations on the Polyzoa *Microporella mutabilis*, Hastings.
DISTRIBUTION.—S.W. Australia.

Suborder ASTROSCLEROPHORA.

Family STELLETTIDAE.

Genus *Stelletta*, Schmidt.

Stelletta purpurea, Ridley.

S. purpurea, Ridley, 1884, p. 473, pl. xl, fig. E; pl. xliii, fig. j; Burton, 1926, p. 44; *idem*, 1930, p. 415.

OCCURRENCE.—Reef Crest, Yonge Reef, Outer Barrier, 5th June, 1929.
DISTRIBUTION.—Australia (north and east coasts); Malay Area; Indian Ocean; New Zealand; Antarctic.

Stelletta clavosa, Ridley.

S. clavosa, Ridley, 1884, p. 474, pl. xliii, fig. i; Lendenfeld, 1906, p. 287; Hentschel, 1912, p. 310

Occurrence.—Stn. XVI, 9th March, 1929: About ½ mile W. of N. Direction Is., 20 fath., stony. Stn. XIX, 10th March, 1929: ½ mile N. of Eagle Is., 10 fath., shell and gravel.

Distribution.—Australia (north and west coasts); Malay Area; Indian Ocean (from Ceylon eastwards).

Genus *Ancorina*, Schmidt.

Ancorina agglutinans, Thiele.

Ecionema agglutinans, Thiele, 1899, p. 7, pl. iv, fig. 1; pl. v, fig. 2.

Occurrence.—General Survey (no other information available).

Remarks.—The single specimen agrees closely with the holotype except that the microrhabds and asters are slightly larger, the asters being ·014 mm. in diameter as against ·01 mm. in the holotype.

Distribution.—Malay Area.

Genus *Jaspis*, Gray.

Jaspis stellifera (Carter).

(For synonymy and discussion see Shaw, 1927, p. 422.)

Occurrence.—Low Isles; the Thalamita Flat.

Distribution.—Australia (north and south coasts).

Family Chondrosidae.

Genus *Chondrilla*, Schmidt.

Chondrilla nucula, Schmidt.

C. nucula, Schmidt, 1862, p. 39, pl. iii, fig. 22; Annandale, 1915, p. 470; Burton, 1924, p. 206; Dendy, 1924, p. 314.

Occurrence.—Low Isles; the Thalamita Flat, 4th April, 1929.

Distribution.—New Zealand; Australia (east and north coasts); Malay Area; Indian Ocean; West Indies; Azores; Mediterranean.

Chondrilla australiensis, Carter.

C. australiensis, Carter, 1873, p. 23, pl. i, figs. 10–14, 16; Burton, 1924, p. 207.

Occurrence.—Stn. XXIII, 12th March, 1929: In lee of Turtle Is., 8 fath., mud and shell.

Distribution.—Australia (east coast); Malay Area; Indian Ocean.

Suborder SIGMATOSCLEROPHORA.

Family Tetillidae.

Genus *Cinachyra*, Sollas.

Cinachyra, Sollas, 1886, p. 183; *Cinachyrella*, Wilson, 1925, p. 356.

Wilson (*loc. cit.*) proposed to subdivide those Tetillidae with porocalices into two subgenera, *Cinachyra* and *Cinachyrella*, having the same relation to each other as *Craniella* to *Tetilla*, the one having a stout cortical palisade of oxea, the other an ill-defined palisade or none at all; but just as it is not possible, or necessary, to separate *Tetilla* and *Craniella*, so I believe it to be unnecessary and, probably, impossible to separate *Cinachyra* and *Cinachyrella*.

Cinachyra australiensis (Carter).*

Tethya cranium, var. *australiensis*, Carter, 1886, p. 127; *Tetilla? australiensis*, Sollas, 1888, p. 43; *Spiretta raphidiophora*, Lendenfeld, 1888, p. 43; *S. porosa*, *idem*, *l. c.*, *p.* 43; *Cinachyra schulzei*, Keller, 1891, p. 337, pl. xix, figs. 41–43; *C. trochiformis*, *idem*, *l. c.*, p. 340, pl. xix, figs. 44, 45; *Tetilla ternatensis*, Kieschnick, 1896, p. 527; *T. schulzei*, *idem*, *l. c.*, p. 21; *idem*, 1900, p. 562, pl. xlv, figs. 16–22; *T. ternatensis*, Lindgren, 1898, p. 329, pl. xvii, fig. 14, pl. xix, fig. 25; *T. australiensis*, Thiele, 1899, p. 6, pl. i, fig. 1; pl. v, fig. 5; *T. ternatensis*, Kirkpatrick, 1900, p. 132; *Cinachyra malaccensis*, Sollas (Miss), 1902, p. 219, pl. xiv, fig. 2, pl. xv, fig. 5; *Tetilla lindgreni*, Lendenfeld, 1903, p. 18; *T. australiensis*, *idem*, *l. c.*, p. 20; *T. porosa*, *idem*, *l. c.*, p. 22; *T. poculifera*, Dendy, 1905, p. 90, pl. i, fig. 3, pl. vi, fig. 4; *Tethya hebes*, Lendenfeld, 1906, p. 98, pl. xvi, figs. 19–38; *Cinachyra isis*, *idem*, *l. c.*, p. 143, pl. xv, figs. 54–58; pl. xvi, figs. 1–4; *C. alba-tridens*, *idem*, *l. c.*, p. 149; pl. xv, figs. 7–9; *C. alba-obtusa*, *idem*, *l. c.*, p. 154, pl. xvi figs. 45–52; *C. alba-bidens*, *idem*, *l. c.*, p. 151, pl. xvi, figs. 39–44; *Tetilla cinachyroides*, Hentschel, 1911, p. 281, fig. 1; *T. poculifera*, Row, 1911, p. 306; *Chrotella ibis*, Row, 1911, p. 311, pl. xxxv, fig. 2, pl. xxxvi, fig. 7; *Tethya clavigera*, Hentschel, 1912, p. 327, pl. xvi, fig. 1; pl. xviii, fig. 10; *Cinachyra merloni*, *idem*, *l. c.* p. 332, pl. xiii, fig. 1; pl. xviii, fig. 12; *C. nuda*, *idem*, *l. c.*, p. 333, pl. xiii, fig. 2; pl. xviii, fig. 13; *C. vaccinata*, Dendy, 1921, p. 14; pl. i, fig. 4; pl. ii, fig. 1; *C. isis*, *idem*, *l. c.*, p. 16, pl. x, fig. 3; *C. providentiæ*, *idem*, *l. c.*, p. 18, pl. i, fig. 5, pl. x, fig. 2; *Tetilla* (*Cinachyrella*) *clavigera*, Wilson, 1925, p. 365, pl. xxxix, fig. 4; *T.* (*Cinachyrella*) *puterifera*, *idem*, *l. c.*, p. 375, pl. xxxix, figs. 6, 8; pl. xlviii, fig. 4.

Occurrence.—Low Isles; the Thalamita Flat; east of Sand Flat: the Middle Moat; the Mangrove Park; Batt Reef.

Diagnosis.—Sponge more or less spherical, the outer surface usually coated with a layer of sand; oscules small and inconspicuous, porocalices usually small and scattered over the surface; skeleton composed of radial bundles of oxea which tend to spread out in divergent brushes at the surface; anatriaenes or protriaenes may be present in small quantities. Microscleres, microxea, which may be sometimes absent, and sigmaspirae.

Remarks.—A large number of specimens of *Cinachyra* have been recorded from the Indo-Pacific under a variety of generic and specific names, but the majority of these are so much alike that a doubt arises as to the validity of these distinctions.

* Uliczka (1929, pp. 38–46) has recently described a group of species of *Cinachyra*, *C. rhizophyta*, *C. allocladu*, *C. apion*, *C. kükenthali*, *C. schistospiculosa*, from the West Indies which appear to be indistinguishable from *C. australiensis*. These have the same characters and range of variation as *C. australiensis*, as here understood, and there can be little doubt that they are synonyms of Carter's species.

The majority of the known individuals of *Cinachyra* from the Indo-Pacific may be divided into three groups, which may be called provisionally the *australiensis*-, *schulzei*- and *porosa*-groups respectively. The members of each of these are very similar in general characters and, after due allowance is made for the normal fluctuating variations in both the external form and in the details of spiculation, it is found that they may be distinguished in the following way only: the *australiensis*-group is characterized by the possession of roughened microxea; the *schulzei*-group has smooth microxea; and the *porosa*-group is without microxea. Before proceeding with the discussion of the taxonomic value of these particular characters, it will be necessary to consider in turn each of the three groups and the members of which it is composed.

The type of *Tethya cranium*, var. *australiensis*, Carter, from which the first group takes its name, is preserved in the dried state and is therefore in an unsatisfactory condition for examination. That it is a true *Cinachyra* is certain, but the porocalices, having collapsed on drying, have been mistaken for oscules. The skeleton consists of oxea, 5·0 by ·038 mm., anatriaenes, with cladi ·135 mm. long, roughened microxea, ·12 mm. long, and sigmaspirae, ·017 mm. chord. Complete protriaenes cannot be found in the preparations so far made, but there can be little doubt that they are, or were, present. The many slender rhabds terminating in a broken end a little beyond the surface almost certainly represent the shafts of the protriaenes, the cladi probably having been broken off by abrasion of the surface. The microxea, which are very abundant, were described by Sollas as "minutely-spined", but in effect their surfaces are only roughened, and to so slight a degree as to be barely perceptible.

Spiretta raphidiophora, Lendenfeld, is described as spherical and the dimensions of the spicules are practically identical with those of *Tethya cranium*, var. *australiensis*. The protriaenes cannot be found, and the microxea are faintly roughened and very abundant. Porocalices are present in the small fragment of the type preserved in the British Museum, but, as in the preceding specimen, their walls have collapsed so that the openings are inconspicuous. There can be no doubt therefore of the identity of this species with *Tethya cranium*, var. *australiensis*.

Tetilla australiensis (Carter), Thiele, bears clear indications of the presence of porocalices (see Thiele, 1899, pl. i, fig. 1) and the spiculation differs little from that of the holotype. The oxea are shorter, only 4·0 mm. long and antriaenes are absent. Protriaenes are present, with cladi ·15 mm. long. No doubt, as in the case of the protriaenes of the holotype, anatriaenes would be found if more careful search were made.

Tetilla schulzei, Kieschnick, an obvious *Cinachyra*, has a spiculation identical in all respects with that of *Tethya cranium*, var. *australiensis*, except that protriaenes, identical with those of *Tetilla australiensis* (Carter), Thiele, are present.

Tetilla ternatensis, Kieschnick, was inadequately described, but, even so, there is justification for regarding it as identical with *Tethya cranium*, var. *australiensis*, but the specimens described under the same name by Lindgren and Kirkpatrick, and re-named *Tetilla lindgreni* by Lendenfeld, are identical with *T. schulzei*, Kieschnick.

The type of *T. poculifera*, also an undoubted *Cinachyra*, differs slightly from the specimens already discussed in that the megascleres are all slightly smaller. There are present also some curious plagiotriaenes, but as these are absent in the co-types, which agree with the holotype in all other respects, they can only be regarded as teratological modifications of the normal protriaenes. The fact that the megascleres are slightly smaller does not

constitute a specific distinction and *T. poculifera* must take its place with the other specimens already discussed.

Tethya hebes, Lendenfeld, agrees almost exactly with *T. cranium*, var. *australiensis*, in external features, structure of skeleton and dimensions of spicules. It has, on the other hand, a few plagiotriaenes, such as are found in *Tetilla poculifera*.

Tetilla cinachyroides, Hentschel, was described from a fragment of sponge, but the original description shows that that piece had all the characters of *T. poculifera*, Dendy, except the porocalices, but these must almost certainly have been present on the missing portion of the sponge.

The great similarity between the specimens discussed above makes it impossible to regard them as representative of more than one species. Indeed, it is difficult to imagine why their identity with a single species should have escaped notice for so long a time.

The next group begins with *Cinachyra schulzei*, Keller. This appears to differ from the holotype of *Tetilla poculifera*, included in the *australiensis*-group, in the more conspicuous porocalices, in the presence of smooth microxea and microspheres, the latter being comparable with the silica-pearls of *Cinachyra barbata*, Sollas, enigmatic bodies having no taxonomic value. *C. trochiformis*, Keller, is very like *C. schulzei*, but differs in the absence of microspheres and in the distribution of the porocalices, which, instead of being generally distributed over the surface as in *C. schulzei*, are confined to a belt running round the lower part of the sponge.

C. isis, Lendenfeld, has the same form as *C. schulzei*, but its spicules are slightly larger, agreeing therein with those of *Tethya cranium*, var. *australiensis*. The plagiotriaenes are present, but not the microspheres. In fact, the only real difference between this species and *Tethya hebes* of the *australiensis*-group, rests in its having smooth, instead of roughened, microxea.

C. alba-tridens, Lendenfeld, agrees with the co-types of *T. poculifera*, except that the microxea are so rare that they readily escape detection. Lendenfeld makes no mention of the microxea, but in his preparations from the type they may be found in very small quantities.

Chrotella ibis, Row, is like *Cinachyra isis*, Lendenfeld, but differs in the presence of abnormal triaenes, and in having a comparatively smooth instead of a hirsute surface, which, as I have shown (Burton, 1931), is not unusual in such sponges and is probably due to a periodic extrusion of spicules.

Cinachyra mertoni, Hentschel, is almost identical with *C. alba-tridens*, Lendenfeld, while *C. nuda*, Hentschel, differs from both only in the absence of anatriaenes and in having a smooth surface as in *Chrotella ibis*, Row.

Of the two species of *Cinachyra* described by Dendy from the Indian Ocean, the first, *C. vaccinata*, is remarkable for its large porocalices,* and the second, *C. providentiae*, is practically indistinguishable from *C. alba-tridens*, Lendenfeld. Finally, *Tetilla paterifera*, Wilson, is obviously identical with *Cinachyra vaccinata*, Dendy, while the peculiar distribution of the porocalices in *C. trochiformis*, Keller, though interesting from other points of view, can have no taxonomic significance.

To summarize, the *schulzei*-group consists of a number of so-called species showing the same general characteristics and the same variations as the members of the

* At least, in the holotype, though in the paratypes the porocalices are more like those found in members of the *australiensis*-group.

australiensis-group. The only possible distinction that can be made between the *australiensis*-group and the *schulzei*-group lies therefore in the character of the microxea, whether they be rough or smooth, and to maintain a distinction on such grounds is out of the question. In the most roughened microxea of the *australiensis*-group, the roughening is only perceptible by careful examination with a high power of the microscope, and there can be no doubt at all that examination with sufficiently high magnification of a number of specimens would show all transitions from the rough to the smooth. Indeed, had not previous authors tended to stress this character, it would not have been considered worthy of more than passing mention here. There can be, then, no real distinction between the two groups, and their constituent species must all be considered synonymous with *Cinachyra australiensis* (Carter).

The identity with a single species of the many forms discussed above is more strikingly evident when the specimens are examined side by side than can be demonstrated by words and figures. The position of the *porosa*-group is, however, a matter of opinion. This group includes *Spiretta porosa*, Lendenfeld, *Cinachyra malaccensis*, Sollas, *C. alba-bidens*, Lendenfeld, *C. alba-obtusa*, Lendenfeld, and *Tethya clavigera*, Hentschel. Disregarding the minute details on which these various species were founded, we have here a group of sponges having the same essential characters as *C. australiensis* (Carter), as now understood; the same globular or subglobular form, radial bundles of oxea diverging just below the surface to form dermal brushes of projecting oxea; anatriaenes and protriaenes associated with radial bundles; and the same sigmaspirae. But in no case have microxea been found. At the same time, mention has been made already of a specimen of *C. alba-tridens* in which, though present, these spicules were extremely rare, and there is no reason to suppose that other intermediates may not be found. There is, therefore, considerable justification for regarding the *porosa*-group as a collection of specimens of *C. australiensis* (Carter) which have lost their microxea.

Distribution.—Australia; Malay Area; Indian Ocean.

Genus *Raphidotethya*, gen. n.

Genotype.—*R. enigmatica*, sp. n.

Diagnosis.—Tetillidae with skeleton composed of well-defined fasciated systems of loose bundles of oxea radiating from a central nucleus; distal ends of radial systems spreading out slightly near surface, with outermost spicules projecting beyond; associated with distal ends of radial systems are smaller oxea set also at right angles to surface; small oxea, similar to those found at surface, scattered sparsely in inner tissues; triaenes absent; cortex not recognizable; microscleres sigmaspirae and raphides, each divided into two categories.

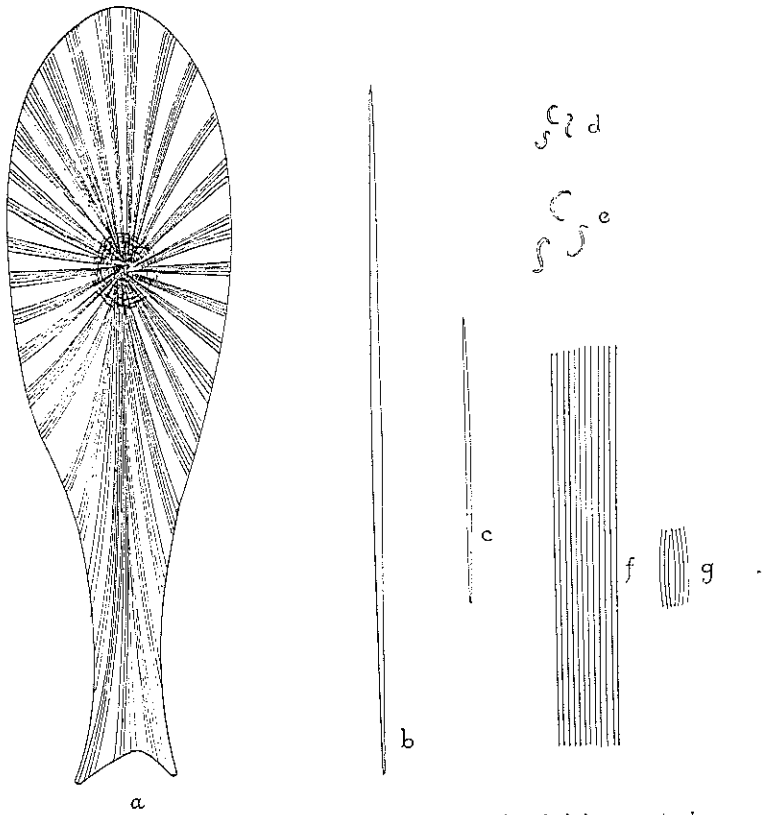
Remarks.—The genus is closely allied to *Amphitethya*, from which it differs mainly in the absence of triaenes.

Raphidotethya enigmatica, sp. n. (Text-fig. 2.)

Holotype.—B.M. 30.8.13.27.

Occurrence.—Stn. XVI, 9th March, 1929: ¼ mile N. of N. Direction Is., 19 fath., sand.

Diagnosis.—Sponge ficiform, stipitate; surface even, slightly hispid; texture firm and fleshy; oscules and pores not apparent; oxea of main skeleton straight, smooth, measuring 1·4 by ·024 mm.; smaller oxea, associated with distal ends of radial systems of main skeleton, straight and smooth, measuring ·73 by ·012 mm.; sigmaspirae of two



Text-fig. 2.—*Raphidotethya enigmatica*, sp. n. *a*, Longitudinal section of whole sponge to show arrangement of main skeleton. × 2; *b* and *c*, large and small oxea, × 100; *d* and *e*, sigmaspirae of two sizes. *f* and *g*, raphides of two sizes, × 300.

sizes, ·024 and ·009 mm. long respectively; raphides, in bundles, of two sizes, ·03 and ·15 mm. long, respecitvely.

Remarks.—The holotype is 4½ cm. high and 2 cm. in diameter at the widest point, just below the apex. Its shape recalls that of the species of *Amphitethya*, a closely-allied genus, in which the main skeleton has essentially the same structure, but which possesses amphitriaenes in addition to oxea. The sigmaspirae are of typical form.

Family Haplosclerida.

In dealing with the Haplosclerida of this report, special emphasis is laid on the utility of dermal skeleton as a guide to identification. In my experience the characters of the dermal skeleton, when present, and the presence or absence of a special dermal skeleton are features which have not been accorded their due significance. It is probable, judging from the preparations in the British Museum collections, that the common practice in identifying specimens is to cut two sections, one at right angles and the other tangentially to the surface, but it is quite certain that too little significance has been attached to the characters of the dermis as seen in tangential section. In the case of the Chalininae, we have two well-marked groups; the first characterized by a soft texture and a pale-coloured spongin, and the second by a coarse, firm texture and dark-coloured spongin. Both the texture and the colour of the spongin are relative properties, transitions between the two groups in respect of these characters are often found, and well-marked exceptions to this generalization could be cited. Speaking generally the members of the first group are cosmopolitan, but more commonly found perhaps in temperate waters, the members of the second being almost exclusively confined to tropical or sub-tropical seas. But none of these features, texture, colour or distribution, is sufficiently constant to be used as a taxonomic guide. On the other hand, the first group is characterized by the complete absence of a special dermal skeleton (as in *Haliclona*) or by the presence of a tangential unispicular skeleton (as in *Adocia*). The second group is characterized by a stout dermal reticulation of spiculo-fibre (as in *Callyspongia*). In the character of the dermis we have then the only certain indication of a generic distinction.

In my preliminary examination of specimens of Haplosclerida I have often been misled by the appearance of tangential sections. For example, in a specimen of *Haliclona*, if the secondary fibres of the main skeleton lie just beneath the dermis, as they sometimes do, a tangential section will appear to contain a special dermal reticulation of the *Callyspongia*-type. In other cases, such as a specimen of *Callyspongia* with a feebly-developed dermal skeleton, the radial section gives the impression that a special dermal skeleton is absent. I have, therefore, found it necessary, in some cases, to examine the surface of a specimen first with a hand-lens, then with a low-power binocular microscope, and finally by means of a mounted tangential section. By using these three magnifications it is practically impossible to go wrong. Another very good criterion, but one which comes of experience, is the feel of the knife-edge as the section is cut, and the appearance of the surface after the cut is made. In fact, with a little experience, it is possible to forecast correctly in about 95 per cent. of the specimens examined from the mere act of cutting the tangential section.

I believe that the only hope of classifying the Haplosclerida satisfactorily is to pay as much, if not more, attention to the dermal skeleton as to the main skeleton. And I believe further that similar treatment applied to other groups will prove a great help. For example, the genus *Topsentia* contains a number of species the spiculation of which is made up of oxea of various sizes; to that extent they all appear congeneric and to form a natural group. But it is certain that they represent several genera, since the disposition of these spicules differs considerably particularly in the dermis, and I have found from experience that it is practically impossible to recognize or to distinguish between these species without first finding out the characters of the dermal skeleton.

Genus *Haliclona*, Grant.

Haliclona, Grant, 1841, p. 5; *Chalina*, Grant, 1861, p. 76; *Diplodemia*, Bowerbank, 1864, p. 201; *Prianos*, Gray, 1867, p. 520; *Philotia*, *idem*, *l. c.*, p. 522; *Gellius*, *idem*, *l. c.*, p. 538; *Orina*, *idem*, *l. c.*, p. 539; *Chalinula*, Keller, 1879, p. 318; *Acervochalina*, Ridley, 1884, p. 398; *Phylosiphonia*, Lendenfeld, 1887, p. 796; *Euchalinopsis*, *idem*, *l. c.*, p. 815; *Chalinodendron*, *idem*, *l. c.*, p. 819; *Chalinorhaphis*, *idem*, *l. c.*, p. 821; *Polysiphonia*, Levinsen, 1887, p. 512.

Genotype.—*Spongia oculata*, Pallas, 1766, p. 390.

Diagnosis.—Haplosclerida with skeleton composed of short oxea arranged typically in an isodictyal network of ascending primary fibres and short connecting secondary fibres; fibres may be unispicular or multispicular, with spongin at ends of spicules only or forming a thick investment to whole spicular skeleton; special dermal skeleton absent; surface of sponge rendered hispid from projecting ends of primary fibres; microscleres when present, sigmata, toxa or trichodragmata.

Remarks.—The genus *Haliclona* was first mentioned by Grant (1841, p. 5, fig. 2) in describing the anatomy and physiology of a species he called *Haliclona occulata* (*sic*). From his figure this sponge is clearly the *Spongia oculata* of Pallas, known since the days of Bowerbank as *Chalina oculata* (Pallas). *Haliclona* must therefore replace *Chalina*, a name first used by Grant (1861, p. 76), without diagnosis or genotype, and later adopted by Bowerbank (1864, p. 208) with *Halichondria oculata* (Pallas) Johnston as type. Of *Diplodemia*, Bowerbank (1864, p. 201), with genotype *D. vesicula*, Bowerbank (*loc. cit.* p. 202, figs. 234, 273, 377), it is impossible to say anything with certainty, but the probability is that the type comprises the remains of a *Haliclona* sp., possibly *H. oculata* (Pallas), left on a shell after the main mass of the sponge had been torn away. The genus *Philotia*, Gray (1867, p. 522), has for genotype *Isodictya varians*, Bowerbank (1864, p. 278, fig. 309), the holotype of which is an obvious example of *Haliclona oculata* (Pallas). Finally, *Euchalinopsis*, Lendenfeld (1887, p. 815) must also be regarded as a synonym of *Haliclona*. Lendenfeld named no genotype and the first species mentioned by him is *Chalina oculata* (Pallas). This species is accordingly accepted here as the genolectotype of the genus.

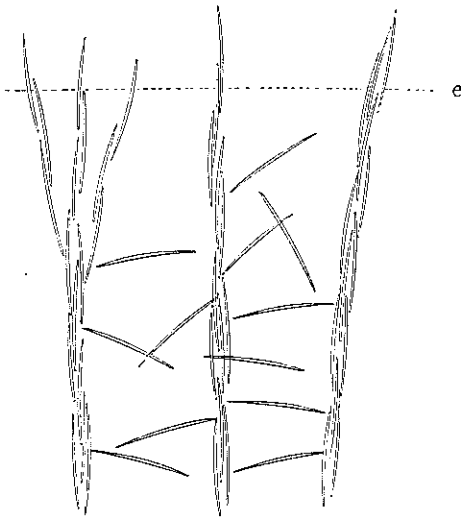
In addition to the genera so far discussed it is necessary to consider the relation of *Acervochalina* to *Haliclona*. *Acervochalina* was established by Ridley (1884, p. 398), for *Chalina limbata*, Bowerbank, with the following diagnosis:

"Massive, sessile Chalinidae. Fibre strongly ceratinous, containing axially or diffusely arranged slender acerate spicules, which do not exceed in bulk the horny material of the fibre which contains them. Vents distinct, ranged along upper surface."

According to this diagnosis the only essential difference between *Haliclona* and *Acervochalina* concerns the external form, which is wholly insufficient for a generic distinction, and since the structure of the skeleton differs hardly at all in the two cases, there is no reason for maintaining the distinction between the two genera. There is one other point that need be considered, if only because it offers a possible explanation of the reluctance on the part of some authors to abandon the use of the name *Acervochalina*. *Chalina limbata* is known to secrete quantities of mucilage in life and, as a consequence, presents a different appearance to *Haliclona oculata* and other typical species of *Haliclona*. The same may, however, be said of *Myxilla incrustans* as compared with other species of *Myxilla*, or *Tedania mucosa* and other species of *Tedania*. In fact, examples of this kind may be found in many genera. If we are to regard such secretion as a basis for generic distinction, then it will be necessary to subdivide very many other genera too on the same

grounds. To do so would, however, be little less than ludicrous. *Acervochalina* must, therefore, be regarded as a synonym of *Haliclona*, and with it *Chalinodendron*, Lendenfeld (*loc. cit.*, p. 819), with genolectotype *Chalina gracilenta*, Bowerbank (1866, p. 372), (= *C. limbata*, Bowerbank).

So far *Haliclona* (= *Chalina*, Auctt.) has been used to include only those species without microscleres, but there is no reason why species, with sigmata, toxa or trichodragmata, provided they agree in other respects, should not be included. The liability on the part of sponges to undergo reduction in the matter of microscleres is sufficiently well-known to call for much comment here, except to point out that greater convenience will result by extending the diagnosis of *Haliclona* to include all species with a chalinoid



TEXT-FIG. 3.—*Gellius jugosus* (Bowerbank). Section at right angles to surface, to show arrangement of skeleton. From holotype. *e* = ectosome.

skeleton irrespective of the presence or absence of sigmata, toxa or trichodragmata. In this case, it will be necessary to include the genus *Gellius*, Gray (1867, p. 538), since the genotype, *Isodictya jugosa*, Bowerbank (1866, p. 296), has a typically chalinoid skeleton but, in addition, microscleres in the form of sigmata (see Text-fig. 3).*

* Genus *Gellius*, Gray, 1867, p. 538.

GENOTYPE.—*Isodictya jugosa*, Bowerbank.

GENOHOLOTYPE.—B.M. 10.1.1.294 (for description and illustration see Bowerbank, 1866, p. 296, 1874, pl. i, figs. 11–14).

DIAGNOSIS.—Haplosclerida with sub-isodictyal skeleton of oxea, with multispicular ascending fibres joined at intervals by irregularly scattered single spicules; distal ends of ascending fibres projecting slightly beyond ectosome; no special dermal skeleton; microscleres, when present, sigmata.

DISCUSSION.—The holotype is a small incrustation on a calcareous nodule, and is preserved in the dried state, which makes the determination of its spicular characters difficult. It seems certain, however,

The genus *Phylosiphonia*, Lendenfeld (1887, p. 796), was established for *Chalinula fertilis*, Keller (1879, p. 318), and this species is here accepted as the genotype. According to Keller's description and figures, this is a typical *Haliclona*, but without examination of the type-specimen this cannot be stated definitely. The fact remains, however, that a specimen in the British Museum collection, obtained by Norman from the type-locality and agreeing closely with Keller's description of *Chalinula fertilis*, is quite definitely a *Haliclona*.

From a specimen of *Polysiphonia mucronata*, Levinsen, in the British Museum, presumably one of the co-types, it is clear that the species is a typical *Haliclona*.

Haliclona camerata (Ridley).

Reniera camerata, Ridley, 1884, p. 605, pl. liii, fig. H; pl. liv, fig. n; Topsent, 1897, p. 474; Dendy, 1921, p. 31.

OCCURRENCE.—Low Isles, the Thalamita Flat, 20th April, 1929.

REMARKS.—The first specimen, though possessing the external form typical of the species, differs slightly from the specimens hitherto recorded in the structure of its skeleton. This is a unispicular reticulation of triangular mesh, in which the component oxea measure ·16 by ·005 mm. In the holotype the oxea are ·2 mm. long and the skeleton an irregularly polygonal network of loosely-knit, multispicular fibres. The specimen described by Dendy (*loc. cit.*) has oxea measuring ·22 mm. long arranged in an irregular reticulation of unispicular and triangular mesh. There is yet another specimen in the British Museum, B.M. 27.2.14.8, with skeleton similar to that of Dendy's specimen, but having oxea measuring ·32 by ·02 mm., and this corresponds closely in spiculation with the second Barrier Reef specimen in which the oxea are ·28 by ·008 mm.

The series of specimens discussed above has a special significance. The external form is so characteristic that there can be no possibility of mistaken identity and we can be sure, therefore, as is so seldom the case in the genus *Haliclona*, that all the specimens so far assigned to the species are conspecific. Yet in these specimens the oxea vary from ·16 to ·32 mm. long and ·005 to ·02 mm. thick, and the skeleton itself varies from unispicular to multispicular with triangular or polygonal meshes. The data thus afforded are of great importance in the biometrical study of the spicules of the Chalininae.

DISTRIBUTION.—Malay Area; Indian Ocean.

Haliclona reticulata (Lendenfeld). (Plate I, fig. 14.)

Euchalinopsis reticulata, Lendenfeld, 1887, p. 815.

OCCURRENCE.—Stn. XIX, 10th March, 1929: ½ mile N. of Eagle Is., 10 fath., shell gravel.

REMARKS.—The single specimen, which seems to resemble the holotype, is a roughly spherical mass, 6 cm. in diameter, of anastomosing trabeculae which bear on their outer margins occasional aculeate processes (Plate I, fig. 14). The surface is finely hispid, and almost conulose in parts. The colour, in spirit, is a greyish yellow. The skeleton is

as the result of exhaustive examination, that the main skeleton is a sub-isodictyal reticulation such as is shown in Text-fig. 3, although this condition is not realized at every point of the surface. From this it is clear that *Gellius* embodies the characteristics of what has hitherto been regarded as the "*Reniera*"-type of skeleton, and is, apart from the presence of sigmata, identical with *Haliclona*.

an irregular reticulation of spongin fibres cored by spicules measuring ·12 by ·003 mm. The spicules are not markedly strongylote, and occasionally stylote or even oxeote. The dimensions of the fibres are very much the same as those given for the holotype.

The original description of this species is somewhat inadequate and the holotype appears to be lost, or, at least, not immediately available, but the external form is so peculiar for a species of Chalininae that there would appear to be little doubt as to the identification of this specimen with that described by Lendenfeld. So far as the skeleton is concerned there is little to choose between the present specimen of *Haliclona reticulata* and the holotype of *Chalina obtusispiculifera*, Dendy, from Ceylon, while *C. cymaeformis* (Lamarck), also from Ceylon, differs only in slight details of external form. Possibly these three species may eventually be regarded as synonymous.

Distribution.—Australia (Port Jackson); Ceylon (?).

Haliclona clathrata (Dendy).

Reniera clathrata, Dendy, 1895, p. 237; *R.* spec. 6 Sollas (Miss), 1902, p. 211; *R.* spec. 4 Hentschel, 1912 p. 410; *R. clathrata*, Brøndsted, 1923, p. 125.

Occurrence.—Low Isles, Luana Creek, Luana Harbour.

Remarks.—The single specimen is very fragmentary and macerated, but appears at one time to have comprised a sponge of similar form to the holotype of *Reniera clathrata*, Dendy. In places it is massively encrusting, with oscules 3 to 4 mm. in diameter. In other places long slender processes, cylindrical in form, are given off, which may anastomose and bear, at intervals, curious tubular outgrowths, probably corresponding to similar processes in *Reniera* spec. 4 of Hentschel and referred to by that author as resembling "Schneckenfühler". The skeleton is a unispicular mesh, mainly triangular, through which short polyspicular fibres run at intervals. These fibres appear to be quite independent of the rest of the skeleton. The spicules are oxea measuring ·12 by ·005 mm.

The present specimen appears to be, so far as may be judged by the written descriptions, identical with Hentschel's *Reniera* spec. 4, and Sollas' *R.* spec. 6. It agrees, on the other hand, with the holotype of *Reniera clathrata*, Dendy, with which a direct comparison has been possible, in all respects but the size of the spicules and the unispicular character of the main skeleton. In that specimen the meshes of the main skeleton are mainly polygonal and bispicular, while the independent polyspicular bundles, though present, are feebly developed. In Brøndsted's specimen of *R. clathrata*, Dendy, from Campbell Is., which I have been able to compare with the holotype, the polyspicular bundles are wholly absent. For the rest there is very close agreement between the two in all respects. From such evidence as this it appears to be a debatable question how far the presence of independent polyspicular bundles may constitute an acceptable basis for specific distinction.

Distribution.—Australia (south coast); New Zealand; Malay Area.

Haliclona exigua (Kirkpatrick).

Petrosia exigua, Kirkpatrick, 1900, p. 139, pl. xii, fig. 7; pl. xiii, fig. 4.

Occurrence.—Batt Reef (or Low Isles ?); Three Isles.

Remarks.—The two specimens are typical except that the oxea measure ·16 by ·008 mm. in the first, and ·14 by ·007 mm. in the second, while those of the holotype measure ·114 by ·006 mm. A fourth specimen in the British Museum, B.M. 27.2.14.136, collected by Kirkpatrick from the reef off Christmas Island at low tide, has spicules measuring ·093 by 0·003 mm. In all but the holotype, which is a pale yellowish-white, the colour of the sponge is dark brown in spirit.

The characteristic features of the species are: (*a*) The surface is thrown into folds, producing irregular ridges and lobose processes; (*b*) the colour, in spirit, is usually dark brown; (*c*) the surface, though appearing smooth to the naked eye, is minutely hispid; (*d*) the ectosome appears detachable to the naked eye, but is actually non-detachable; (*e*) the oxea range from ·093 to ·16 by ·003 to ·008 mm.

Distribution.—Malay Area.

Haliclona pigmentifera (Dendy).

Reniera pigmentifera Dendy, 1905, p. 143, pl. ix, fig. 10.

Occurrence.—Low Isles, the Thalamita Flat.

Remarks.—The single specimen forms an incrustation on a piece of coral rock. The colour, in spirit, is a dark purple-brown, but in life it was black. The surface is porose and the oscules 2 to 3 mm. in diameter with slightly raised margins. The skeleton does not appear to differ perceptibly from that of the holotype.

Distribution.—Ceylon.

Haliclona tenuispiculata, sp. n.

Reniera semitubulosa, Dendy, 1921, p. 30; *Reniera* spec. 1, Hentschel, 1912, p. 409; nec *Spongia semitubulosa*, Lamarck.

Holotype.—B.M. 30.8.13.59.

Occurrence.—Stn. XXII, 11th March, 1929: East of Snake Reef, 13½ fath., mud with foraminifera and shells; Low Isles, the Thalamita Flat.

Diagnosis.—Sponge a mass of cylindrical branches, repent or erect (?); surface minutely hispid, porose; texture soft, friable; oscules 1–3 mm. in diameter, with tendency to linear arrangement along branches; skeleton irregularly sub-isodictyal, generally unispicular but becoming feebly multispicular in parts, with meshes triangular to quadratic; spicules oxea, slightly curved, ·144–·176 by ·004–·007 mm.

Remarks.—The holotype, a fragment only, consists of three branches which, presumably, had grown in a recumbent position. In general it agrees very closely with the specimen identified by Dendy as *Reniera semitubulosa* (Lamarck), and more particularly with his R.N. LXVIII, 6. Hentschel's *Reniera* spec. 1, appears to be also a representative of the same species.

The characteristic features of the species are: The branching habit, the irregularity of the skeleton and the slender form of the spicules.

A small incrustation, in association with *Iotrochota purpurea* (Carter) and *Jaspis stellifera* (Carter) on a piece of coral rock, shows the typical anatomical details of the species.

Distribution.—Malay Area; Indian Ocean.

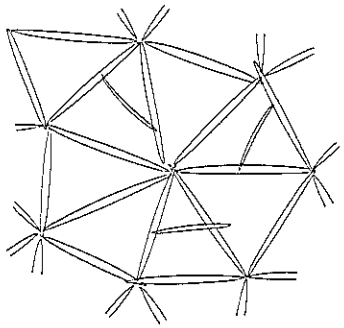
Haliclona flabello-digitatus, sp. n. (Plate I, fig. 10).

HOLOTYPE.—B.M. 30.18.13.167.

OCCURRENCE.—Stn. XIII, 7th March, 1929: ½ mile W. of Two Is., 16½ fath.

DIAGNOSIS.—Sponge erect, irregularly flabello-digitate; surface even, minutely-hispid, porose; oscules numerous, 3–6 mm. diameter, margins usually level with surface; texture soft, compressible; colour, in spirit, ash-grey; skeleton an isodictyal reticulation of spiculo-fibre, becoming irregular in places, with primary fibres usually ·05 mm. and secondary fibres ·03 mm. thick, meshes of reticulation variable in size, ·2 to ·4 mm. across, and ranging from quadratic to irregularly polygonal; spicules oxea, straight or only slightly curved, ·15 by ·004 mm.; primary fibres cored by oxea arranged in bi- or uniserial lines; secondary fibres aspiculous or containing only uniserial lines of spicules; surface hispid owing to feebly-developed tufts of spicules at distal ends of primary fibres; microscleres absent.

REMARKS.—This species bears a superficial resemblance to *Chalina montagui*, Bowerbank, but differs from it in the absence of a special dermal skeleton. It is probable that the specimen identified by Topsent as *C. montagui*, Bowerbank, from Amboina, may belong to this species.



TEXT-FIG. 4.—*Adocia simulans* (Bowerbank). Portion of dermal skeleton. From holotype. × 200.

Genus *Adocia*, Gray. (Text-fig. 4.)

Adocia, Gray, 1867, p. 522; *Orina*, *idem*, *l. c.*, p. 539; *Siphonochalina*, Schmidt, 1868, p. 7; *Amorphina*, *idem*, 1870, p. 40; *Pellina*, *idem*, *l. c.*, p. 41; *Tubulodigitus*, Carter, 1881, p. 367; *Chalinopora*, Lendenfeld, 1887, p. 764; *Pellinella*, Thiele, 1905, p. 471.

GENOTYPE.—*Chalina simulans*, Bowerbank, 1864, p. 101, pl. xix, fig. 299.

GENOHOLOTYPE.—B.M. 32.1.5.2 (for description and illustration see Bowerbank, 1866, p. 308, 1874, pl. li, figs. 5–6).

DIAGNOSIS.—Haploscleridae with a sub-isodictyal skeleton of oxea, with multispicular ascending fibres joined by irregularly-disposed isolated spicules; special dermal skeleton, a tangential unispicular reticulation of triangular mesh with which small oxea may be associated; microscleres, when present, sigmata and toxa.

REMARKS.—The true characters of *Adocia simulans* have long been obscured and it becomes obvious, now that the nature of the dermal skeleton is determined, that *Pellina*, with genotype *Halichondria semitubulosa*, Lieberkühn (= *Reniera** *semitubulosa*, Schmidt = *Pellina semitubulosa*, Topsent (1925, p. 709)), is a synonym of *Adocia*. *Halichondria angulata*, Bowerbank, the genotype of *Orina*, Gray (*loc. cit.*), has a similar skeleton to that of *Adocia*, but is without microxea in the dermal skeleton and has sigmata and toxa for microscleres. The absence of microxea from the dermal skeleton has little significance, since in undoubted specimens of *Pellina semitubulosa* these spicules vary considerably in number and are often so rare as to be virtually absent.

If we accept the absence of microxea from the dermal skeleton as a point without taxonomic significance, it will be necessary to include two other genera, *Siphonochalina* and *Pellinella*, as synonyms of *Adocia*. *Siphonochalina*, Schmidt, with genotype *S. coriacea*, Schmidt (1868, p. 7, pl. ii, fig. 4), was inadequately described and has been used to include all tubular Haploscleridae without microscleres. This practice, though convenient, is unscientific and has made the genus a heterogeneous collection of species. All that remains of the original specimen described by Schmidt is, so far as is known, a hand section (B.M. 68.3.2.13) in the British Museum collection labelled in Schmidt's handwriting. This is, therefore, accepted here as the holotype. According to this, the spicular characters of *S. coriacea* are precisely those of *Adocia simulans*, except that the microxea are absent.

Acervochalina claviformis, Carter, here chosen as genotype of *Chalinopora*, Lendenfeld, being the first species assigned to that genus, is a typical *Adocia*.

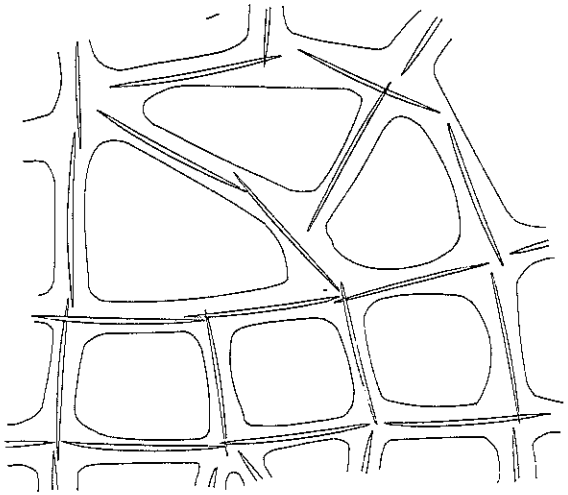
* The Genus *Reniera*, Nardo. Nardo (1833, p. 519) established the genus *Rayneria*, giving a brief and inadequate diagnosis, and referring to it a number of species (without diagnosis) of which the first-named was *R. typus*. Later (1847, p. 3), the same author referred to a genus *Reniera*, which, we may infer, was the same thing as *Rayneria*, the difference between the two names being due, presumably, to some question of correctness of spelling. At all events, Nardo, in speaking of *Reniera*, refers to *R. typica* (=*Rayneria typus ?*) as "Il tipo del genere". Since no information is given in Nardo's works, or from those of Schmidt (who often redescribed Nardo's species, we have reason to believe, from the original specimens), both *Rayneria typus* and *Reniera typica* are *nomina nuda*. Vosmaer (1887, p. 339), stated, after referring to the genus *Rayneria*, that "Oscar Schmidt hat dann das Genus in *Reniera* umgeändert und sagt dass die Gattung ungefähr in dem Umfange und mit den Attributen, welche Nardo ihr beilegt, beibehalten werden müsse". To attribute the name *Reniera* to Schmidt is wrong, and this has probably caused many to accept Schmidt's diagnosis of it. And to attempt to retain the genus on the characters "welche Nardo ihr beilegt" is hopeless! The generic name *Reniera* must therefore be abandoned.

In the absence of any exact knowledge of the genus *Reniera*, but clinging to the use of the name with a quite inexplicable tenacity, authors from Schmidt's time to the present day have attributed to it certain characteristics which, as far as may be judged from their writings, are found in *Reniera cinerea* (Grant). This species was first mentioned by Grant (1826, p. 204), without description, under the name *Spongia cinerea*, was again mentioned by Fleming (1828, p. 521) without adequate description, and was first described with anything like completeness by Johnston (1842, p. 111), under *Halichondria cinerea*. Later Bowerbank, (1874, p. 121) redescribed the species, under *Isodictya cinerea*. The specimens used for these descriptions are lost, with the exception of those of Bowerbank, so that it is impossible to say what Grant understood by *Spongia cinerea*, especially in view of the fact that the types of *Chalina montagui*, Bowerbank, and *Isodictya cinerea*, Bowerbank, which are now known to be generically distinct, are practically undistinguishable externally.* I therefore accept Bowerbank's specimen (1874, pl. xlviii, fig. 1) of *Isodictya cinerea* as the neotype of *Spongia cinerea*, Grant, and since this is identical with his specimen of *Isodictya simulans* which I propose to make the neotype of *Halichondria simulans*, Johnston (nominated by Gray (1867, p. 522) the type of the genus *Adocia*), the species must be known henceforth as *Adocia cinerea* (Grant).

* When writing my paper of 1926, I used Bowerbank's original preparations. Since then, I have found that these are somewhat mixed, a slide not always belonging to the specimen from which it is alleged to have been made. In that paper, therefore, although the fundamental principles still hold good, some of the details have to be revised.

Pellinella, Thiele, with genotype *P. conica*, Thiele (1905, p. 471, figs. 90, 103), has exactly the same spiculation as *Siphonochalina*. The holotype is in the Berlin Museum, but a fragment of it is in the British Museum. According to Thiele (*loc. cit.*) the dermal skeleton in *Pellinella conica* is an irregular reticulation of loose oxea, but in the preparations made from the piece in the British Museum this is not the case, the dermal skeleton being here a regular reticulation of triangular mesh, exactly as in *Adocia simulans*.

Amorphina also appears to be a synonym of *Adocia*. This genus, established by Schmidt (1870, p. 40), was originally intended to include *Halichondria panicea* (Pallas) and a number of new species, and *H. panicea* should, strictly speaking, by its inclusion, have been chosen as genotype. Topsent (1925, p. 711) has, however, declared *Reniera grossa*, Schmidt, to be the type and this is accepted here. According to that author's



TEXT-FIG. 5.—*Tubulodigitus communis*, Carter, showing dermal skeleton. From neotype. × 200.

description of *R. grossa* the dermal skeleton appears to be the same as that found in *Adocia*, and *Amorphina* is therefore here regarded as synonymous with Gray's genus.

The genus *Tubulodigitus* was established by Carter (1881, p. 367) for a sponge collected in the Gulf of Manaar, which he called *T. communis*. This specimen cannot be found in the collections of the Liverpool Free Museum or the British Museum. I therefore take Dendy's specimen (B.M. 89.1.21.1), also collected in the Gulf of Manaar, as the neotype of the species. This is a tubular sponge with a regularly isodictyal main skeleton, in which the ascending fibres are bi- or trispicular and the conjunctive fibres unispicular, and a dermal skeleton composed of an irregular reticulation, with meshes varying from triangular to polygonal, but in no way divisible into primary or secondary meshes. The spicules are oxea measuring ·14 by ·004 mm.

The characters of *Tubulodigitus* are, therefore, essentially those of *Adocia* except that the spicules are completely enclosed in spongin (*cf.* Text-figs. 4 and 5). I have been

able to show, however, and hope to publish the observations soon, that within the species *Adocia simulans* all transitions occur between the skeletons described and figured here for *Adocia* on the one hand, and *Tubulodigitus* on the other. It will be necessary, therefore, to enlarge our conception of *Adocia* to include also those sponges of which *Tubulodigitus communis*, Carter, is representative.

Adocia toxius (Topsent).

Gellius toxius, Topsent, 1897, p. 470; Hentschel, 1912, p. 391; Dendy, 1921, p. 28.

OCCURRENCE.—Low Isles, Crab Spit, 5th April, 1929; R.P. 2, south-eastern end of Mangrove Swamp; black sponge growing on Mangrove roots, 22nd March, 1929.

REMARKS.—The numerous specimens are all of one type. They are erect, tubular sponges, dark brown in colour when preserved in spirit, black in life, with spiculation identical with that of the holotype.

DISTRIBUTION.—Malay Area; Indian Ocean.

Adocia minor (Dendy).

Siphonochalina minor, Dendy, 1916, p. 115, pl. ii, fig. 15.

OCCURRENCE.—Low Isles, Mangrove Park.

REMARKS.—The structure of the skeleton in this species agrees with that of *Adocia simulans* (Bowerbank) in all respects but the absence of sigmata.

DISTRIBUTION.—West coast of India.

Adocia obtusa (Hentschel).

Gelliodes obtusa, Hentschel, 1912, p. 394, pl. xiv, fig. 6; pl. xvi, fig. 2; pl. xxi, fig. 48.

OCCURRENCE.—Stn. XIX, 10th March, 1929: ½ mile N. of Eagle Is., 10 fath., shell gravel. Stn. XXII, 11th March, 1929: ½ mile N.W. of Howick Is., 10 fath., mud and shell.

REMARKS.—Five specimens were obtained, all identical in external form and spiculation and agreeing in these respects with the holotype of the species, except that the oxea measure ·26 by ·006 mm. and the sigmata are absent.

DISTRIBUTION.—Malay Area.

Adocia pumila (Lendenfeld). (Plate I, figs. 1–7.)

Gellius fibulatus (pars), Ridley, 1884, p. 425; *Siphonochalina pumila*, Lendenfeld, 1887, p. 806; *Gelliodes spinosella*, Thiele, 1899, p. 22, pl. ii, fig. 10; pl. v, fig. 17; *G. porosa*, Thiele, 1903, p. 943; *Gellius ridleyi*, Hentschel, 1912, p. 389 (nec *Gellius fibulatus*, Schmidt, *G. fibulatus*, Dendy, 1905, or *G. ridleyi*, Dendy, 1921).

OCCURRENCE.—Low Isles; between Madrepore Moat and Mangrove Park; Mangrove Park.

REMARKS.—The holotype of *Siphonochalina pumila*, Lendenfeld, now in the British Museum, has for main skeleton an isodictyal reticulation of spiculo-fibre, a tangential unispicular skeleton of triangular mesh, with oxea, measuring ·18 by ·008 mm., for megascleres and sigmata, measuring ·024 mm., for microscleres. It is, therefore, a typical *Adocia*.

The main skeleton is chiefly composed of spongin fibres cored by oxea, the primary fibres being multispicular and the secondaries usually uni- or bispicular, but immediately beneath the surface, to a depth of ·2 mm., the skeleton is devoid of spongin. This outer, non-fibrous zone of the main skeleton is probably the most distinctive feature of the whole skeleton. The sponge consists of a system of stout anastomosing branches with large oscules set in series on the upper surfaces and with conulose surface (Plate I. fig. 5).

All the Barrier Reef specimens have the typical skeleton structure and differ but slightly from the holotype in external form (Plate I, figs. 1–4, 6–7).

Both *Gelliodes spinosella*, Thiele, and *G. porosa*, Thiele, judging from the original descriptions, are identical with some of the examples of this species and must be considered synonymous with it, and *Gellius ridleyi* which I have examined, through the kindness of Dr. Max Thiel of the Zoologisch Museum at Hamburg, is certainly the same thing as *Siphonochalina pumila*.

A specimen from Kurrachee described by Ridley (*loc. cit.*) as *Gellius fibulatus* (Schmidt) also belongs to the species.

Distribution.—Australia (north coast); Malay Area; Indian Ocean.

Adocia sagittaria (Sollas).

Gellius sagittarius, Sollas, 1902, p. 212, pl. xv, fig. 7; *G. angulatus*, var. *canaliculata*, Dendy, 1905, p. 136, pl. ix, fig. 7.

Occurrence.—Low Isles, east of the Sand Flat and the Thalamita Flat.

Remarks.—In no single case has a complete specimen of this species been collected, but from the numerous fragments at my disposal it is possible to show that the external form consists of an irregular basal mass bearing a number of fistulae, some of which end in a crown of short filaments, while others end blindly. In all cases the spicules are oxea, sigmata and toxa. The fistulae are very fragile and readily broken off, so that in preserved specimens only in exceptional cases do we find any considerable length of a fistule attached to the body.

The types of this species were described as "consisting of a more dense basal part and of numerous slender tubes arising from this. In one specimen these tubes anastomose; in the second they are broken off and show no indication of how they were arranged". The measurements of the spicules given were: Oxea, ·3–·35 by ·01–·013 mm.; sigmata, ·012–·016 mm. chord; and toxa, ·049 mm long. The outward form of the sponges was not figured. A few years later, Dendy (*loc. cit.*) described a sponge from Ceylon under the name *Gellius angulatus* (Bowerbank), var. *canaliculata*. This, too, was not figured, but the sub-spherical specimen, now in the British Museum collection, clearly bore in life a number of fistulae which were subsequently broken off and lost. The remains of these were described by Dendy as "a group of vents". The spicules are: Oxea, ·25 by ·008 mm.; sigmata, up to ·028 mm. chord; and toxa, ·044 mm. long. A conspicuous feature of the specimen, to which Dendy calls attention, is the presence of ramifying exhalant canals lying "just beneath the surface and covered over only by a thin translucent membrane, which is easily rubbed off, leaving the canals as open grooves".

The Barrier Reef specimens are extremely fragmentary and can only be recognized by their spicules, and by comparison with a number of specimens from the "Siboga" collection, at present in the British Museum.

The colour, in life, of the Barrier Reef specimens is given as magenta and ultramarine.

Distribution.—Malay Area; Indian Ocean.

Adocia fibulatus, var. *microsigma*, Dendy.

Gellius fibulatus, var. *microsigma*, Dendy, 1916, p. 107; 1921, p. 26.

Occurrence.—Mangrove Park: the Thalamita Flat; Batt Reef and Low Isles.

Remarks.—There are several specimens growing in association with algae as yet unidentified.

Distribution.—Indian Ocean.

Genus *Petrosia*, Vosmaer.

Petrosia strongylata, Thiele.

P. strongylata, Thiele, 1903, p. 938, fig. 2.

Occurrence.—Stn. XXIV, 13th March, 1929: ¾ mile N.E. of Pasco Reef, 16½ fath., foraminifera and coral fragments.

Remarks.—The first specimen is irregularly massive, approximately 7 cm. long by 3 cm. broad and 3 cm. high, and dark brown in colour. There is a definite tangential dermal skeleton, and the spicules are strongyla of two sizes, ·2 by ·008 and ·06 by ·004 mm., occasionally modified to oxea. In the second specimen the dermal skeleton is often ill-defined in places, but otherwise it agrees with the first, and both differ from the holotype only in the smaller size of the spicules.

Distribution.—Malay Area.

Genus *Callyspongia*, Duchassaing and Michelotti.

Genolectotype.—*C. fallax*, Duchassaing and Michelotti.

Tuba, Duchassaing and Michelotti, 1864, p. 44 (*nec* Fabricius); *Callyspongia*, *eidem*, *l. c.*, p. 57; *Cladochalina*, Schmidt, 1870, p. 35; *Patuloscula*, Carter, 1882, p. 365; *Toxochalina*, Ridley, 1884, p. 402; *Dactylochalina*, Lendenfeld, 1886, p. 570 (1 : sep. pag.); *Spinosella*, Vosmaer, 1887, p. 342; *Ceraochalina*, Lendenfeld, 1887, p. 778; *Siphonella*, Lendenfeld (*nec* Macquart, *nec* Hagenow), 1887, p. 808; *Euchalina*, *idem*, *l. c.*, p. 817.

Diagnosis.—Haploscleridae with main skeleton a reticulation of spongin fibres cored with oxea; special dermal skeleton a network of similar fibres subdivided by secondary or even tertiary fibres; microscleres toxa (and possibly sigmata).

Remarks.—It has been possible, through the kindness of Dr. M. W. de Laubenfels, to re-examine the type of *Callyspongia fallax*, here accepted as the genolectotype of *Callyspongia*, and to determine that this species is conspecific with *C. eschrittii*, Duchassaing and Michelotti, *Tuba scrobiculata*, Duchassaing and Michelotti, *Patuloscula procumbens*, Carter, and *Ceraochalina vanderhorsti*, Arndt. Although the types of these supposed species vary in shape from massive to ramose or even tubular, the similarity in the skeleton, and the fact that many intermediate forms occur, leave no doubt as to their identity. Another important point is that the three co-types of *Callyspongia eschrittii* all contain abundant toxa. The type of *Patuloscula procumbens* also contains a few, but none could be found in *Callyspongia fallax* or *Tuba scrobiculata*. It seems therefore that,

in regard to the variable occurrence of microscleres, *Callyspongia fallax*, in its wider sense, is comparable with *C. ramosa* (see p. 603). As regards the variation in external form the species is likewise comparable with *C. diffusa* (see p. 541).

The genus *Tuba*, Duchassaing and Michelotti, with lectotype *T. sororia*, is preoccupied for a Mollusc (Fabricius, 1823), but the lectotype is a *Callyspongia* closely related to *Tuba armigera*, Duchassaing and Michelotti, which was made the type of the genus *Cladochalina* by Schmidt (1870, p. 35). *C. armigera* differs from *Callyspongia fallax* mainly in the characters of the dermal skeleton; in the former the primary meshes are subdivided into numerous small secondary and tertiary meshes; in the latter there is no differentiation into secondary and tertiary meshes and the network is altogether more open than in *Cladochalina armigera*. The difference, which can be best appreciated by comparing Arndt, 1927, p. 155, fig. 16, and Dendy, 1890, pl. lviii. fig. 6, although fairly great, does not prove in practice to be one of generic importance. *Cladochalina* must therefore be regarded as a synonym of *Callyspongia*.

The genus *Patuloscula* must also be considered a synonym of *Callyspongia* since *Patuloscula procumbens* (= *Callyspongia fallax*, see above) is the genotype, and it is worth recording that the dermal skeleton in this species is often echinated, as in *Callyspongia diffusa* (see p. 542, Text-fig. 6).

Desmacidon folioides, Bowerbank, the genotype of *Toxochalina*, has a skeleton like that of *Cladochalina armigera* and has, in addition, toxa for microscleres; but, as we have seen, these spicules may also be present in *Callyspongia fallax* (the genotype) and *C. ramosa* (a typical species of the genus *Callyspongia*). The only supposedly distinctive feature of *Toxochalina* is therefore lost and this genus also becomes a synonym of *Callyspongia*.

The genus *Spinosella*, Vosmaer (1887, p. 342), for *Tuba sororia*, Duchassaing and Michelotti, also becomes a synonym of *Callyspongia* since, as we have seen above, the genotype cannot be separated generically from *C. fallax*.

Finally, of the many generic names created by Lendenfeld in 1887, *Ceraochalina*, genolectotype *Cladochalina nuda*, Ridley, *Siphonella* (preoccupied Diptera, Macquart, 1835; Polyzoa, Hagenow, 1850), genolectotype *Siphonochalina fortis*, Ridley, and *Euchalina*, genolectotype *E. rigida*, must all be considered synonyms of *Callyspongia*, and to these must be added *Dactylochalina*, Lendenfeld, with genotype *D. australis*.

Callyspongia subarmigera (Ridley).

Cladochalina subarmigera, Ridley, 1884, p. 397, pl. xxxix, fig. H; pl. xli, fig. L; *Chalinopora subarmigera*, Lendenfeld, 1887, p. 767; *Chalina subarmigera*, Lindgren, 1897, p. 481; *idem*, 1898, p. 13.

Occurrence.—Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., rock and shell gravel.

Distribution.—Australia (north and east coasts); Malay Area.

Callyspongia fibrosa (Ridley and Dendy).

Dasychalina fibrosa, Ridley and Dendy, 1886, p. 330; *Pachychalina fibrosa*, Ridley and Dendy, 1887, p. 21, pl. iv, figs. 3–4; *Chalina spinifera*, Carter, 1889, p. 66, pl. v, figs. 1–2; *Pachychalina spinilamella*, Dendy, 1889, p. 80; *P. fibrosa*, Lindgren, 1897, p. 481; 1898, p. 11, pl. xix, fig. 6; Kirkpatrick, 1900, p. 356; *Pachychalina spinilamella*, Dendy, 1905, p. 149, pl. vii, fig. 8; *Pachychalina fibrosa*, Dragnewitsch, 1905, p. 26; Hentschel, 1912, p. 400; *Cladochalina spinilamella*, Burton, 1927, p. 511.

Occurrence.—Stn. XXIV, 13th March, 1929: ¾ mile N.E. of Pasco Reef, 16½ fath., hard and shell bottom.

Remarks.—The specimen closely resembles that described by Carter under *Chalina spinifera*.

Pachychalina spinosissima, Dendy, is not, as Lindgren (1898) suggests, a synonym of this species. Although having a similar external form, the structure of its dermal skeleton suggests an affinity with *Dasychalina*.

Distribution.—Malay Area; Indian Ocean.

Callyspongia confoederata (Ridley).

Tuba confoederata, Ridley, 1884, p. 400; *Siphonella laxa* Lendenfeld, 1887, p. 803, pl. xxiv, fig. 55; *Siphonochalina confoederata*, *idem*, *l. c.*, p. 803, pl. xxv, fig. 60; *S. typica*, *idem*, *l. c.*, p. 804, pl. xxiv, fig. 54; *S. paucispina*, *idem*, *l. c.*, p. 805; *S. axialis*, *idem*, pl. xxvii, figs. 2, 19; *S. elastica*, *idem*, *l. c.*, p. 805; *S. extensa*, var. *dura*, *cleyans*, *idem*, *l. c.*, p. 806; *Siphonella tuberculata*, *l. c.*, p. 805, pl. xxiv, fig. 53; *S. extensa*, var. *dura*, *cleyans*, *idem*, *l. c.*, p. 806; *Siphonella tuberculata*, *idem*, *l. c.*, p. 808; *Spinosella confoederata*, Topsent, 1897, p. 479, pl. xix, fig. 20.

Occurrence.—Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., rock and shell gravel. Stn. XVI, 9th March, 1929: ½ mile W. of N. Direction Is., 20 fath., stony.

Remarks.—The numerous species included above as synonyms of *Callyspongia confoederata* (Ridley) are so obviously members of a single species that it is necessary to say little on this point. The British Museum collection contains the types of all Lendenfeld's species included above and from these it is clear that the structure of the main and dermal skeletons is identical in every case. Moreover, in external form they show no greater variety than those specimens recorded below under *C. diffusa*.

Here, again, is shown the inadequacy of any attempt to differentiate between tubular and non-tubular forms. One specimen, from the present collection, agreeing in structure with the rest, is irregularly massive and gives no sign of even an incipient tubular growth.

Distribution.—Australia (north, east and west coasts); Malay Area.

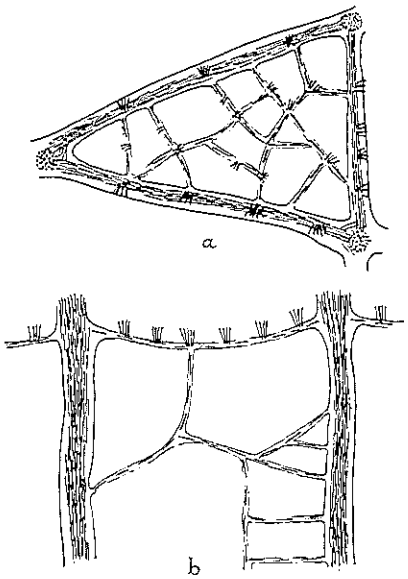
Callyspongia diffusa (Ridley). (Text-fig. 6.)

Acervochalina finitima (*pars*) Ridley, 1884, p. 399*; *Cladochalina diffusa*, Ridley, 1884, p. 672, pl. xli, fig. D; *idem*, 1884, p. 183; *Cladochalina elegans*, Lendenfeld, 1887, p. 770; *Chalinissa ramosa*, *idem*, *l. c.*, p. 774, pl. xx, fig. 31; *Ceraochalina multiformis*, var. *digitata* (pars: specimen from Port Jackson), *idem*, *l. c.*, p. 784, pl. xix, fig. 20; *Pachychalina multiformis*, var. *manaarensis*, Dendy, 1889, p. 79; *Siphonochalina crassifibra*, *idem*, *l. c.*, p. 82; *Chalina pulvinatus*, Lindgren, 1897, p. 481; *idem*, 1898, p. 13, pl. xviii, figs. 2, 16; pl. xix, fig. 7; *Ceraochalina reticulata*, *idem*, 1905, p. 152, pl. x, fig. 4; *C. multiformis*, var. *manaarensis*, *idem*, *l. c.*, p. 154, pl. vii, fig. 3; pl. x, fig. 6; *Chalina pulmata*, Dendy and Frederick, 1924, p. 499.

Occurrence.—Low Isles, Crab Spit and Mangrove Park. Stn. XIX, 10th March, 1929: About ½ mile N. of Eagle Is., 10 fath., shell, gravel, rich *Halimeda*.

* Ridley (1884) identified 3 specimens with *Acervochalina finitima* (Schmidt). The correct systematic position of these is: Specimen 1 (B.M. 81.10.21.249–250) from Port Jackson = *Callyspongia diffusa*; specimen 2 (B.M. 87.10.21.367) from Percy Island, Queensland = *Haliclona* (*Chalina*) *minor* (Row); specimen 3 (B.M. 82.2.23.267–8) from Alert Island, Torres Straits = *Haliclona* sp. In addition, 2 specimens from the Seychelles were identified as *Acervochalina finitima* (Schmidt) var., and of these the first (B.M. 82.10.17.80–81) is identical with *Haliclona minor* (Row), and the second (B.M. 82.10.17.82) is a *Tubulodigitus* sp. (see Text-fig. 5).

Remarks.—The type of *Cladochalina diffusa*, Ridley, is sub-ramose with flattened branches, sparingly spinose, with small oscules (2–3 mm. diameter), scattered over the surface. The main skeleton consists of an irregular network of stout polyspicular fibres, and the dermal skeleton consists of a network of stout fibres forming a mainly triangular mesh, subdivided by more slender fibres, the whole echinated at intervals by sparse tufts of spicules set out at right angles to the surface (Text-fig. 6*a*). The spicules are oxea measuring ·135 by ·006 mm. The dermal skeleton is particularly striking and serves better than anything else to characterize the species.



Text-fig. 6.—*Callyspongia diffusa* (Ridley), showing *a*, dermal and *b*, main skeletons. × 50. [Although taken from the type of *Chalina pulvinatus*, Lindgren, this drawing represents the typical condition in *Callyspongia diffusa*.]

A precisely similar skeleton is found in the following species: *Ceroachalina multiformis*, varr. *digitata* et *manaarensis*, *C. retiarmata*, Dendy, *C. ceylonica*, Dendy, *Chalina palmata* (Lamarck), Dendy and Frederick, *C. pulvinatus*, Lindgren, *Chalinissa ramosa*, Lendenfeld, *Cladochalina elegans*, Lendenfeld, and *Siphonochalina crassifibra*, Dendy, and it remains to be seen how far these species may be considered identical.

The type of *Ceraochalina ceylonica*, Dendy, differs from that of *Cladochalina diffusa* in having a more markedly spinose surface, and in having fewer spicules in some of the fibres, particularly in the main skeleton. Apart from these differences there is nothing to distinguish the two. *Chalinissa ramosa*, Lendenfeld, from Port Jackson, and *Chalina palmata*, Dendy and Frederick, from Abrolhos Island, have the same branched form as *Cladochalina diffusa*, but are entirely without spines. In addition, there are fewer

spicules in the fibres, the fibres of the dermal skeleton usually containing only a uniserial line of spicules. *Chalinissa ramosa* and *Chalina palmata* are undoubtedly identical, and there is no good reason for separating them from *Cladochalina diffusa*.

The Port Jackson specimen of *Ceraochalina multiformis*, var. *digitata*, Lendenfeld, has slightly more spicules than *Chalinissa ramosa*, has a palmo-digitate external form and, apart from the absence of spines, cannot be distinguished from *Cladochalina diffusa*. *Ceraochalina multiformis*, var. *manaarensis*, Dendy (and this applies equally to the specimens from the Gulf of Manaar and from Abrolhos Is.), *C. retiarmata*, Dendy, and *Cladochalina elegans*, Lendenfeld, all have the same type of skeleton as *Chalinissa ramosa* and vary in form from the flabello-digitate, as in *Ceraochalina multiformis*, var. *digitata*, to flabellate.

The next group of species, including *Chalina elegans*, Lindgren, and *Siphonochalina crassifibra*, Dendy, comprises tubular specimens, having the same skeleton as *Cladochalina diffusa*.

The radical step of identifying this group of supposed species of markedly differing external form under one name needs good justification, for it is contrary to all ideas previously held on the classification of the Haplosclerida. But in the Barrier Reef collections we have a batch of specimens which show the following shapes: massive to massive with low tubular oscules; tubular and repent, the tubes anastomosing; erect and tubular; flabellate, with oscules arranged serially around the margin or scattered over one face; cylindrical and repent, with long slender branches. Further, the usually smooth surface may bear a varying number of spines; and their skeletons show the same variations as are met with in that group of "species" now combined under *Callyspongia diffusa*. A most important point is that all the Barrier Reef specimens, with one exception, were collected in the same locality and have the same texture and colour, and may be regarded with a fair degree of certainty as conspecific.

Distribution.—Australia (east and west coasts); Malay Area; Indian Ocean.

Callyspongia clathrata (Dendy).

Chalina clathrata, Dendy, 1905, p. 151, pl. x, fig. 3.

Occurrence.—Stn. XXV, 17th March, 1929: in Papuan Pass, 20–25 fath., foraminifera and coral fragments.

Remarks.—A small encrusting specimen, with a single vent, on *Thorectopsamma irregularis*, sp. n.

Distribution.—Ceylon.

Callyspongia ridleyi, sp. n. (Text-fig. 7.)

Tuba bullata, Ridley, 1884, p. 399; *nec Spongia bullata*, Lamarck, and *Siphonochalina bullata*, Schmidt.

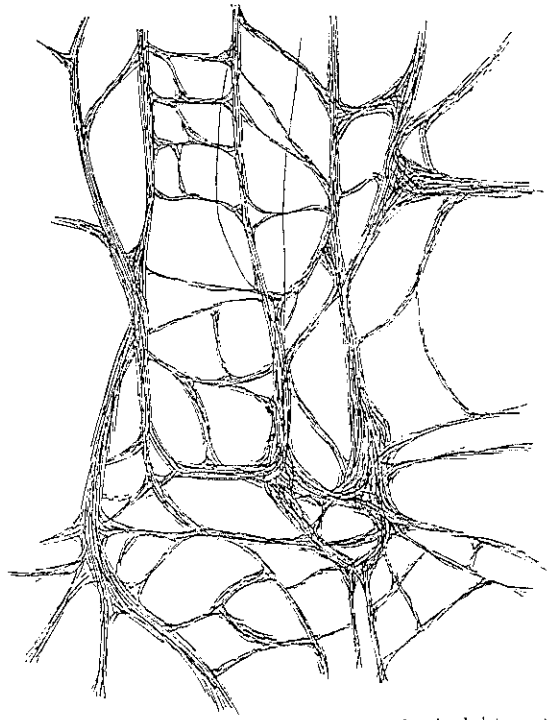
Holotype.—B.M. 81.10.21.249.

Occurrence.—Low Isles, 8 fath.

Remarks.—The single specimen consists of a large irregularly infundibuliform sponge with smaller lateral outgrowths. The latter are mostly tubular, but occasionally infundibuliform also. The whole colony measures 20 cm. in height and 30 cm. in extent either way. The outer surface is conulose throughout, and in places marked by irregular and

inconspicuous ridges. The colour, in the dried state, is brown, and the texture firm and incompressible.

The skeleton of both the present specimen and the holotype are closely similar. The main skeleton (Text-fig. 7*a*) consists of an irregular system of branching and anastomosing fibres, subdivided by more slender fibres. The thicker fibres run generally towards the surface. The dermal skeleton (Text-fig. 7*b*), though very similar, is quite distinct from it, and may readily be separated from its outermost fibres. It consists of an irregular



TEXT-FIG. 7*a*.—*Callyspongia ridleyi*, sp. n. Portion of main skeleton. × 26.

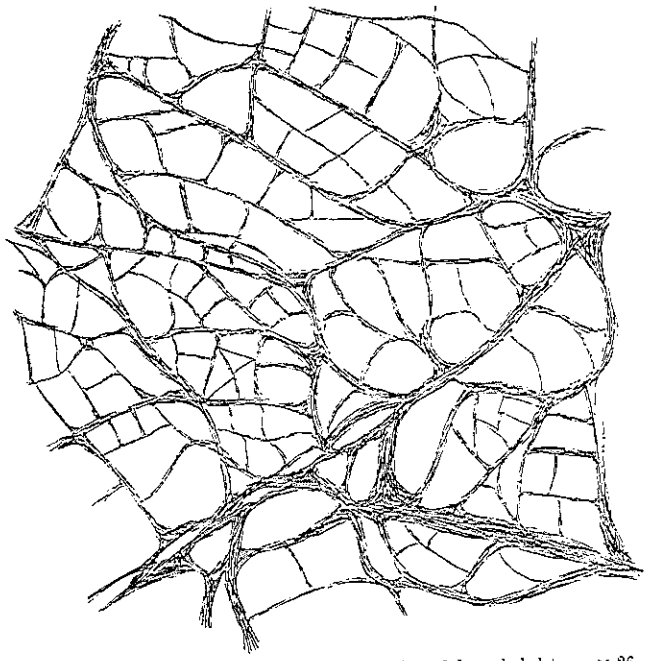
system of stout fibres which branch and anastomose without order, and the meshes formed by this system are subdivided by more slender fibres. In both main and dermal skeletons it is not possible to differentiate clearly between primary and secondary fibres, as is usually the case in the Chalininæ, since both are of varying thickness, and grade one into the other. Some of the slender (secondary ?) fibres, for example, are unispicular, others multispicular and as thick as the more slender of the (primary ?) fibres forming the main system.

The fibres almost invariably contain a fair quantity of spongin, and this is true even of the unispicular fibres, but the number of spicules contained is so numerous and arranged

so irregularly that the spongin itself is more or less masked by the spicules. The spicules are oxea measuring ·2 by ·008 mm. There is no sign of the " acuates " recorded by Ridley, and we may reasonably regard such as occur in the holotype as abnormal oxea.

Spongia bullata, Lamarck, with which Ridley believed his specimen to be identical, is an *Adocia* with a totally different arrangement of the skeleton.

DISTRIBUTION.—Port Molle and Port Curtis, Queensland.



TEXT-FIG. 7*b*.—*Callyspongia ridleyi*, sp. n. Portion of dermal skeleton. × 26.

Genus *Oceanapia*, Norman.

Oceanapia, Norman, 1869, p. 334; *Rhizochalina*, Schmidt, 1870, p. 35; *Phloeodictyon*, Carter, 1882, p. 122.

REMARKS.—There has been much uncertainty about the use of the three names, *Oceanapia*, *Rhizochalina* and *Phloeodictyon*, but it is fairly certain that we must regard them as synonyms. The external form and the structure of the skeleton is identical in each of these genera, but whereas *Oceanapia* possesses sigmata, the other two do not. *Rhizochalina* and *Phloeodictyon* must therefore be considered as synonyms without hesitation, and it merely remains to be determined whether the presence or absence of sigmata can be regarded as a basis for generic distinction, as has been done by most authors. Experience shows that the ease with which microscleres may be lost is far greater than is

ordinarily recognized. In the present instance we have examples of this, but the significance has usually been overlooked or wrongly interpreted. The holotype of *Rhizochalina, R. oleracea*, for example, has no sigmata, but *R. carotta* from the same locality, and clearly congeneric if not conspecific, has. Topsent (1920, pp. 5–6) recognizes from this that *Rhizochalina* may or may not possess sigmata, and this, in my opinion, is the only view possible, in which case there can be no distinction between that genus and *Oceanapia* and *Phloeodictyon*.

In this connection Dendy (1905, p. 166) found "that at one of the "Challenger" stations, specimens of *Phloeodictyon fistulosum* with and without sigmata appear to occur together, and are so closely similar in external appearance that they cannot be distinguished otherwise than microscopically". And on the strength of this Dendy united *Rhizochalina*, without sigmata, and *Oceanapia*, with sigmata, in one genus.

He seems then to have changed his mind and asserted that: "It seems equally reasonable, however, to suppose that the two genera (*i. e. Rhizochalina* and *Oceanapia*) actually occur together in this locality, or that there has been some confusion in the sorting out of the specimens". This seems to be clearly a case of taking a difficult detour to avoid an obvious truth.

Oceanapia fistulosa (Bowerbank).

(For synonymy see Dendy, 1905, p. 165.)

Occurrence.—Low Isles, S.E. of Mangrove Park. Stns. II and III, 24th November, 1928: Linden Bank, 28 fath., shell and sand.

Distribution.—Australia (west and north coasts); Malay Area; Indian Ocean; Azores (?); Bahia (?).

Oceanapia renieroides, sp. n.

Holotype.—B.M. 30.8.13.49.

Occurrence.—Low Isles, 28th March, 1929.

Diagnosis.—Sponge massive (or sub-spherical ?) with blind fistulæ; surface smooth; texture friable; colour, in spirit, white, main and tangential dermal skeletons of body a unispicular and triangular mesh; dermis of fistulae supported by tangential skeleton like that of body, with a sub-dermal multispicular reticulation of polygonal mesh; spicules oxea, measuring ·14 × ·005 mm.

Remarks.—Only a few fragments of the body and a fistule remain. The texture of the sponge is very unlike that of the usual *Oceanapia* species. This is because the skeleton is unispicular throughout. The species is most nearly related to *Phloeodictyon polysiphonia*, Dendy, from the Indian Ocean, but in that species the spicules of the main skeleton tend to be arranged in multispicular fibres.

Oceanapia elastica (Keller).

Reniera elastica, Keller, 1891, p. 306, pl. xvi, figs. 3, 7; *Petrosia elastica*, Lindgren, 1897, p. 480; *idem*, 1898, p. 5, pl. xviii, fig. 13; pl. xix, fig. 5.

Occurrence.—Stn. XVII, 9th March, 1929: ¼ mile N. of N. Direction Is., 19 fath., sand; Stn. XXXV, 17th March, 1929: in Papuan Pass, 20–25 fath., foraminifera and coral fragments.

Remarks.—The holotype of *Reniera elastica*, Keller, appears to be nothing more than the fistule of a specimen of *Oceanapia*, and Lindgren's specimens, which I have been able to examine, certainly are. The first of the present specimens, consisting of a fistule 11 cm. long and encrusted with a species of Gorgonid, is identical with Lindgren's specimens and, there is little reason for doubt, with the holotype.

The second specimen consists of a sub-spherical body bearing on its upper surface the bases of a few small fistulae. That this belongs also to Keller's species, there can be no doubt, but since the general form of the sponge is similar to that of *Oceanapia fragilis*, Topsent, and the skeleton much the same except for the absence of sigmata, it is probable that Keller's species is identical with Topsent's *O. fragilis*.

Distribution.—Malay Area; Red Sea.

Family Desmacidonidae.

Section Isodictyeae.

Genus *Desmapsamma*, gen. n.

Genotype.—*Fibularia anchorata*, Carter, 1882, p. 283.

Diagnosis.—*Isodictyeae* with a special dermal skeleton of multispicular fibres forming an irregular reticulation of polygonal mesh; much sand incorporated in skeleton; spicules oxea, tridentate isochelae and sigmata.

Remarks.—*Fibularia anchorata*, Carter, was originally described from a specimen from Antigua, West Indies, and is identical with that described later by Ridley and Dendy from Bahia, as *Desmacidon reptans*. Lindgren, later still, recorded *D. reptans* from the Indo-Pacific. I have compared the types of *Fibularia anchorata* and *Desmacidon reptans* with Lindgren's specimen of *D. reptans*, those of the present collection, and several from the "Siboga" collection, which I had provisionally identified as *D. reptans*. As the result of this comparison, there can be no doubt that these specimens represent a single species distributed alike in the West Indian and the Indo-Australian regions.

Arndt (1927, p. 147) realizing the affinity of *Fibularia anchorata* Carter to the genus *Desmacidon*, referred it to that genus, and changed the specific name to *D. carterianum*. This he did under the impression that *Axos anchorata*, Carter, an earlier species, also belonged to *Desmacidon*. *Axos anchorata*, however, belongs to the genus *Plumocolumella*.

Desmapsamma anchorata (Carter).

Fibularia anchorata, Carter, 1882, p. 283; *Desmacidon reptans*, Ridley and Dendy, 1886, p. 345; *idem*, 1887, p. 105, pl. xxiii, fig. 7; Lindgren, 1897, p. 482; *idem*, 1898, p. 21; *D. carterianum*, Arndt, 1927, p. 147.

Occurrence.—Low Isles: the Thalamita Flat.

Distribution.—Malay Area; West Indies; Bahia.

Section Mycaleae.

Genus *Mycale*, Gray.

Mycale grandis, Gray.

Mycale grandis, Gray, 1867, p. 533; *M. armata*, Thiele, 1903, p. 950, fig. 16; *M. grandis*, Hentschel, 1912, p. 337, pl. xviii, fig. 15.

OCCURRENCE.—Stn. XVII, 9th March, 1929 : ½ mile N. of N. Direction Is., 19 fath., sand and thick *Halimeda*.

REMARKS.—The species is represented by two small massive specimens.

DISTRIBUTION.—Malay Area.

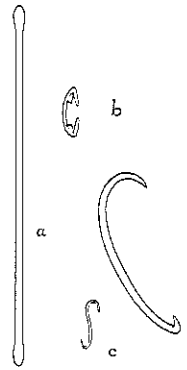
Mycale sulevoidea (Sollas).

Esperella sulevoidea, Sollas (Miss), 1902, p. 213, pl. xiv, figs. 8–9 ; pl. xv, fig. 10 ; *Mycale sulevoidea*, Hentschel, 1912, p. 335, pl. xii, fig. 6 ; pl. xviii, fig. 14.

OCCURRENCE.—Stn. XVII, 9th March. 1929 : ½ mile N. of N. Direction Is., 19 fath., sand and thick *Halimeda*.

REMARKS.—There are three flagelliform sponges, of which the largest measures 35 cm. long and 1·5 cm. in diameter at the thickest point. The shape is unusual for the species, the only other specimens recorded being encrusting, but the spiculation leaves no doubt as to the identity of these specimens.

DISTRIBUTION.—Malay Area.



TEXT-FIG. 8.—*Histoderma calcifera*, sp. n. *a*, Tornote, × 190 ; *b*, chela, and *c*, sigmata, showing the range in size, × 500.

Section MYXILLEAE.

Genus *Histoderma*, Carter.

Histoderma calcifera, sp. n. (Text-fig. 8).

HOLOTYPE.—B.M. 30.8.13.228.

OCCURRENCE.—Stns. II and III, 24th November, 1928 : Linden Bank, 28 fath., shell sand.

DIAGNOSIS.—Body massive, entirely hidden by a covering of calcareous *débris*, with blind fistulae projecting upwards ; texture of body firm but compressible ; skeleton composed of amphitylota, tylostrongyla or strongyla, ·35 by ·007 mm., scattered without order in inner tissues ; microscleres chelae arcuatae, between ·02 and ·026 mm. chord and sigmata, varying from ·028 to ·07 mm. or more.

REMARKS.—The skeleton in this species contains nothing remarkable or characteristic, and differs from that of other species of *Histoderma* largely in the dimensions of the spicules. The external form, and particularly the coat of calcareous matter is, however, peculiar.

Genus *Hamigera*, Gray.

Hamigera strongylata, sp. n.

HOLOTYPE.—B.M. 30.8.13.79.

OCCURRENCE.—Stn. IX, 2nd February, 1929 : Penguin Channel, 12–14 fath. ; Stn. XII, 24th February, 1929 : Penguin Channel, 10–15½ fath., rock and shell gravel.

DIAGNOSIS.—Sponge irregularly massive ; surface uneven, glabrous ; pore areas well-defined, numerous ; oscules not apparent ; colour, in spirit, yellowish grey ; choanosome supported by an irregular reticulation of triangular, quadratic or polygonal mesh ; dermis for most part aspiculous, except around pore-areas, where megascleres are radiately arranged ; megascleres strongyla, with ends occasionally slightly swollen, ·28 by ·004 to ·008 mm. ; microscleres isochelae of usual form ·03 mm.

REMARKS.—The species is unique in having only one form of megasclere. The chelae have almost the same form as those of *H. papillata*, Dendy and *H. dendyi*, Shaw, and it is possible that the present species may be a reduced form of one of these species or some allied species. Had it not been for the presence of characteristic pore-areas and chelae, which indicates the affinities to *Hamigera*, it would have been necessary to include this species among the reduced Myxilleae of uncertain affinity (see p. 554).

Genus *Plumocolumella*, Burton.

Plumocolumella anchorata (Carter).

*Axos** *anchorata*, Carter, 1881, p. 382, pl. xviii, fig. 3.

* *Axos*, Gray.

The genus *Axos*, established by Gray (1867, p. 545) for a spicule-drawing by Bowerbank (1862, p. 260, fig. 197), contains at present five species. In the British Museum collection there is a small portion of a sponge which may be accepted as the holotype of *A. cliftoni*, the genotype. This specimen is labelled, probably in Gray's handwriting, "*Axos cliftoni* Gray, West Australia, G. Clifton, Esq.," and its skeleton includes spicules of the form recorded by Bowerbank (*l. c.*, fig. 197). The complete spiculation consists of radial bundles of styli and an uninterrupted mass of asters filling both cortex and choanosome. The asters have six cylindrical rays, truncated and ornamented at the ends with four or more stout spines. Bowerbank's figure is badly drawn, and misleading, but it does illustrate the appearance of the spicule when seen from a certain angle. The typical appearance of the aster is, however, very like that of the microasters of such species of *Tethya* as *T. robusta*, Bowerbank, and for this reason the genus *Axos* is here assigned to the family Tethyadae.

Of the remaining species *A. flabelliformis*, Carter (1879, p. 285, pl. xxvi, figs. 1–4), is congeneric with *A. cliftoni*, Gray ; *A. spinipoculum* Carter (*l. c.*, p. 286, pl. xxv, figs. 1–9), belongs to the Acarneae ; *A. fibulata*, Carter (1881, p. 383, pl. xviii, fig. 4), of which the holotype is lost, is probably identical with *Gelliodes fibulatus*, Ridley ; and *A. anchorata*, Carter (*l. c.*, p. 382, pl. xviii, fig. 3), belongs to the Myxilleae and may be placed provisionally in the genus *Plumocolumella*, Burton (1929, p. 424). Further, *Axos spinipoculum*, Carter, must be assigned to a new genus for which the name *Diacarnus*, gen. n., is proposed, in recognition of its characteristic spicules, consisting of a straight shaft bearing a whorl of four recurved teeth just below the point at each end and two irregular whorls of spines near the centre. This spicule seems to be directly comparable with the cladotyla of *Acarnus*.

Occurrence.—Stn. XXIII: Turtle Is., 8 fath., mud and shell.
Distribution.—Bass Strait, Australia.

Genus *Strongylacidon*, Lendenfeld.

Strongylacidon inaequalis, Hentschel.

Batzella inaequalis, Hentschel, 1911, p. 325, fig. 20.

Occurrence.—Stn. XIX: ½ mile N. of Eagle Is., 10 fath., shell, gravel and rich *Halimeda*.

Remarks.—The first three specimens are in the form of extensive blue incrustations on a *Hircinia*. The fourth is small and massive, dark brown in colour, and consists of an irregular basal plate, from which spring small vertical lamellae, or digitate processes, with conulose surface. The fifth specimen, 9 cm. high, consists of a single lamella bearing lateral and terminal digitate processes. The surface is coarsely conulose and the colour, in spirit, dark brown. The skeleton in this specimen consists of a stout reticulation of horny fibres cored by irregularly plumose bundles of typical strongyla. In places the fibre disappears and the skeleton consists of feeble, plumose bundles of strongyla running towards the surface and ending there in feebly-marked surface brushes.
Distribution.—S.W. Australia.

Strongylacidon intermedia, sp. n. (Text-fig. 9.)

Holotype.—B.M. 30.8.13.87.
Occurrence.—Stn. XIX: ½ mile N. of Eagle Is., 10 fath., shell, gravel and rich *Halimeda*.

Diagnosis.—Sponge massive, sub-clathrous, with short digitate processes given off at various points; surface uneven, coarsely hispid, aculeate; texture compressible; oscules not seen; colour, in spirit, pale greyish-brown; skeleton composed of irregular fibres, branching and anastomosing, running generally towards the surface and cored by plumose bundles of slender strongyla, occasionally modified to styli, measuring ·14 by ·003 mm.

Remarks.—The species differs from *S. inaequalis* (Hentschel), in that the spicules are collected into fibres and surrounded by spongin. On the other hand, it has considerable resemblance to *Echinochalina anomala*, Hallmann, and might almost be regarded as an *Echinochalina* which has lost its echinating styli.

Genus *Psammochela*, Dendy.

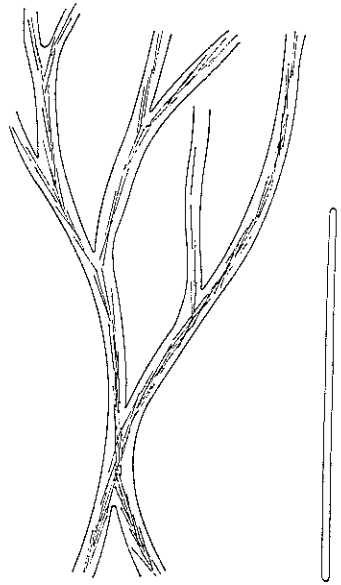
Psammochela fibrosa (Ridley).

Phoriospongia fibrosa, Ridley, 1884, p. 439, pl. xlii, fig. g; *Psammochela elegans*, Dendy, 1916, p. 128, pl. i, fig. 6; pl. iii, fig. 22.

Occurrence.—Stn. XXII, 11th March, 1929: E. of Snake Reef, 13½ fath., mud with foraminifera and shells, dredged.

Remarks.—There can be little doubt that *Phoriospongia fibrosa*, Ridley, and *Psammochela elegans*, Dendy, represent a single species. The resemblance between them in external

form and in the types of spicules present is too great for it to be otherwise. Ridley (*loc. cit.*, p. 440) speaks of the megascleres as "acerates . . . with very slightly enlarged, subpyriform basal ends". In other words, the megascleres are "acuates" (= styli) not "acerates". The main difference between Dendy's and Ridley's specimens is in the composition of the skeleton fibres. Dendy describes them as "composed of sand-grains and megascleres in varying proportions with no visible spongin", but this description does not lay sufficient emphasis on the important details. In the majority of his specimens, for example, the fibres are filled almost entirely with styli, with little foreign



Text-fig. 9.—*Strongylacidon intermedia*, sp. n. *a*, Portion of the skeleton showing the arrangement of the fibres. × 70; *b*, strongyle. × 500.

matter, but in R.N. IV.12, X and XXXIV.11, they are composed exclusively of sand and foraminiferal *débris*, with the styli sparingly associated. The condition found in these last three specimens is thus practically the same as that found in Ridley's sponges.

The present specimen is much macerated, and its identification is therefore doubtful. The external form is much the same as that of the irregularly massive forms described by Dendy, and the surface is irregularly conulose, but the dermal membrane which should span the intervals between the conuli is entirely absent. The skeleton is an irregular reticulation of horny fibres cored by bundles of slender styli, the styli measuring ·16 by ·001 to ·002 mm. Microscleres are entirely absent but in view of the macerated condition of the sponge this is not surprising. Assuming that this is truly a representative of *Psammochela fibrosa*, as seems probable, we have an interesting series of forms in which

the fibres of the skeleton show a wide range of variation. On the one hand, they may be composed of styli only, "with no visible spongin" (*fide* Dendy, *loc. cit.*, p. 126), or they may be composed entirely of sand-grains and calcareous *débris*, with only a small amount of spongin, or in extreme cases, foreign inclusions may be entirely absent and the skeleton consist of stout spongin fibres cored by proper megascleres. This is precisely the same as the sequence of variations found in *Spongelia fragilis* (see p. 583), and is comparable with the condition found in *Chondropsis chaliniformis* (see below). It is a striking illustration of the way in which the amount of spongin fluctuates in different individuals of a single species (*cf.* Burton, 1926).

Distribution.—Indian Ocean; Northern Australia (Torres Straits).

Genus *Chondropsis*, Carter.

Chondropsis chaliniformis (Carter).

Dysidea chaliniformis, Carter, 1885, p. 217: *Phoriospongia chaliniformis*, Lendenfeld, 1889, p. 600, pl. xxxvii, fig. 8; pl. xl, figs. 1, 3; pl. xli, fig. 2; *Chondropsis chaliniformis*, Burton, 1929, p. 433.

Occurrence.—Stns. II and III, 24th November, 1928: Linden Bank, 28 fath., shell and sand.

Remarks.—The specimen consists of a mass of branches growing erect from a single stoloniform branch. The latter is angulate and irregular, but the erect branches are smooth and rounded, with a maximum diameter of 5 mm. In appearance the sponge approximates most nearly to the one recorded by me from the Antarctic, although differing in the composition of the skeleton. In the type the skeleton consists of stout fibres of spongin filled with large sand-grains. In the "Terra Nova" specimen, it is composed of foreign spicules exclusively, and in the present specimen of small sand-grains. The species shows, therefore, the same wide selection of extraneous matter for constructing a skeleton, as is seen in *Spongelia fragilis*.

There are also two small specimens of the dimensions and shape of those figured by Lendenfeld (*loc. cit.*, pl. xxxvii, fig. 8, and pl. xl, fig. 3). The fibres of the skeleton are filled with sand-grains of the same size as those found in the type of the species, but there are, in addition, so many foreign spicules present that it is practically impossible to determine whether proper megascleres are present or not.

The embryo of this species has been figured by Lendenfeld and it is noteworthy that an incipient tangential dermal skeleton is present (*cf.* Burton, 1931, p. 523).

Distribution.—Australia (north, east and south coasts) (*fide* Lendenfeld, *loc. cit.*); McMurdo Sound, Antarctic.

Chondropsis carcinophila, Lendenfeld.

Sigmatella carcinophila, Lendenfeld, 1889, p. 615, pl. xli, fig. 8.

Occurrence.—Stn. XIX, 10th March, 1929: about ½ mile N. of Eagle Is., 10 fath.

Remarks.—The specimen has been dissected for the removal of a number of parasitic (?) Amphipoda, but appears to have been massive and low-growing. Its dimensions were approximately 2½ by 2 cm. across by ·5 cm. high. The surface is tolerably smooth, but

thrown into a number of low tubercles or rounded ridges. The choanosome is densely crowded with foreign matter, chiefly sand, arranged as in *Sigmatella australis*, var. *tuberia*, Lendenfeld (*loc. cit.*, pl. xlii, fig. 5), but more abundantly present. Associated with this sandy skeleton are a number of slender spicules, probably strongyla, so much mixed up with sand-grains that it is not possible to be quite certain of the shape of their ends. They measure ·2 by ·001 mm., and are usually flexuous.

This specimen seems to agree with *S. carcinophila*, Lendenfeld, in all essential features except that the surface is not conulose but tuberculate or ridged.

Distribution.—Australia (east coast).

Genus *Iotrochota*, Ridley.

Iotrochota purpurea (Bowerbank).

Halichondra purpurea, Bowerbank, 1875, p. 293; *Iotrochota purpurea*, Ridley, 1884, p. 434, pl. xxxix, fig. L; pl. xlii, fig. c; Topsent, 1897, p. 455; Dendy, 1905, p. 164; Hentschel, 1912, p. 348; Dendy, 1921, p. 97.

Occurrence.—Low Isles, the Thalamita Flat.

Remarks.—The first three specimens are thinly encrusting, with here and there an incipient branch growing upwards. A fourth specimen is branched and closely resembles that figured by Ridley (*loc. cit.*, pl. xxxix, fig. L).

The colour in life has been variously recorded as velvet-black and indigo.

Distribution.—Malay Area; Indian Ocean.

Iotrochota coccinea (Carter).

Halichondria birotula, Carter, 1886, p. 52 (*nec Halichondria birotula*, Higgin): *Axinella coccinea*, Carter, 1886, p. 378; *Iotrochota coccinea*, Dendy, 1896, p. 23.

Occurrence.—Stn. X, 22nd February, 1929: Satellite Reef, 14–17 fath., coral, shell, gravel and mud.

Remarks.—The specimen agrees closely with the type in general features, but differs in the megascleres, which though of typical dimensions are exclusively strongylote.

Distribution.—Australia (south coast).

Genus *Crella*, Gray.

Crella spinulata (Hentschel).

Grayella spinulata, Hentschel, 1911, p. 340, fig. 29.

Occurrence.—Stn. IX, 22nd February, 1929: Penguin Channel, 12–14 fath., mud. Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., rock and shell gravel, mud on edges of pit. Stn. XXII, 11th March, 1929: E. of Snake Reef, 13½ fath., mud with foraminifera and shells.

Remarks.—The sponge is branching, with branches cylindrical and 3–5 mm. in diameter, and agrees with the holotype in external features. The spicules have the same form and dimensions as those of the holotype, but differ slightly in arrangement. The

dermal skeleton is typical, but the main skeleton consists of a regular reticulation of triangular mesh, formed by the acanthoxea with occasional bundles of tornota running towards the surface.

DISTRIBUTION.—S.W. Australia.

APPENDIX TO THE MYXILLEAE.

There are many species of doubtful affinity in which the spiculation consists of smooth monactinal or diactinal megascleres, with some form of chela for microscleres, and the practice has been hitherto to refer these to either the genus *Batzella*, or the genus *Desmacidon*, in the sub-family Isodictyeae, so that these two genera have tended, in practice, to serve for the reception of all Desmacidonidae of doubtful affinity. The Isodictyeae was intended to include, in the first place, the genus *Isodictya*, with genotype *I. palmata*, Johnston, which has oxeote megascleres and chelae and sigmata for microscleres, and differs from the genus *Chalina* almost entirely in the possession of microscleres. In the genus *Batzella* and such species as *Desmacidon plicatum*, Hentschel, *D. psammodes*, Hentschel, *D. arenosa*, Whitelegge, *D. chaliniformis* (Carter), Dendy, *D. stelliderma* (Carter) Dendy, and *D. dendyi*, Whitelegge, the megascleres, where present, are tornota and this alone justifies their removal from the Isodictyeae to the Myxilleae, the characteristic feature of which is the possession of tornota of various forms as auxiliary spicules, either forming a dermal skeleton exclusively, or, as in *Anchinoë*, entering also into the main skeleton.

The type of the genus *Batzella*, *B. inops*, Topsent, has, according to the original description, strongyla (? tornota) scattered loosely in the tissues, but the description of the skeleton is not sufficient to settle beyond doubt the affinities of the species. *Desmacidon columella*, Bowerbank, also referred to *Batzella*, has unequally ended strongyla and styli for megascleres, but no microscleres, and is evidently a reduced *Mycale*. A new genus must, therefore, be made for its reception, and for this I propose the name, *Hemimycale*, gen. n. *Batzella corticata*, Thiele, is closely related to *Rhaphoxya*, Hallmann, but differs in having a tangential dermal layer of short strongyla, not recorded by Thiele, about half the length of the principal megascleres. For this species I propose the name *Rhaphoxiella*, gen. n. *Batzella mollis*, on the other hand, belongs to *Rhaphoxya*, while *Batzella inaequalis*, Hentschel (1911), although without microscleres, may justly be referred to *Strongylacidon*, for although the megascleres tend to be anisostrongylote, their arrangement in the skeleton is much the same as in *S. sansibarensis*, Lendenfeld, the genotype.

Desmacidon plicatum, Hentschel, is identical with *Halichondria stelliderma*, Carter (= *Desmacidon stelliderma* (Carter)), a species which rightly belongs to *Strongylacidon*, but *Desmacidon psammodes*, Hentschel, represents one new genus, and *Homaxodictya dendyi*, Hentschel, represents a second, for which the names *Anomomyxilla*, gen. n., and *Anomodoryx*, gen. n., are here proposed. *Desmacidon arenosa*, Whitelegge, and *D. chaliniformis* (Carter), Dendy, are species of very doubtful affinity in which the skeleton, except for the microscleres, which resemble those of the Myxilleae, is replaced by sand and other foreign inclusions. For these, too, a new genus is necessary, and the name *Psammodoryx*, gen. n., is proposed.

All these forms are of doubtful affinity but, with the exception of *Hemimycale* and *Rhaphoxiella*, show some relationship to the Myxilleae and, pending further information,

should be included in an appendix to that sub-family. *Plumocolumella*, Burton, must likewise be included in such an appendix.

The following is a summary of the genera discussed above :

Genus *Batzella*, Topsent.

GENOTYPE.—*Halichondria inops*, Topsent, 1891, p. 533, pl. xxii, fig. 1.

DIAGNOSIS.—Reduced Myxilleae with skeleton composed of slender strongyla scattered sparsely throughout choanosome : no special dermal skeleton ; no microscleres.

Genus monotypic.

Genus *Strongylacidon*, Lendenfeld.

GENOTYPE.—*Strongylacidon sansibarensis*, Lendenfeld, 1897, p. 110, pl. x, figs. 106–116.

DIAGNOSIS.—Reduced Myxilleae with skeleton of slender strongyla, often slightly tylote at one or both ends, arranged in loose fibres running vertically to surface ; fibres tending to branch and anastomose in places, giving rise to an irregular network ; distal end of fibres projecting slightly at surfaces ; no special dermal skeleton ; microscleres chelae unguiferae.

The above diagnosis is based on examination of a preparation from the holotype in the British Museum collection.

Genus includes : *S. sansibarensis*, Lendenfeld, *Halichondria stelliderma*, Carter (with its synonym *Desmacidon plicatum*, Hentschel).

Genus *Plumocolumella*, Burton.

GENOTYPE.—*Fibulia carnosa*, Carter, 1886, p. 51.

DIAGNOSIS.—Reduced Myxilleae with skeleton of bundles of oxeote tornota running vertically to surface and ending in dermal brushes ; fibres usually curved or sinuous, often branching and anastomosing to form an irregular network ; microscleres isochelae unguiferae.

For list of species, see Burton, *loc. cit.*, p. 425.

Genus *Anomomyxilla*, gen. n.

GENOTYPE.—*Desmacidon psammodes*, Hentschel, 1911, p. 322, fig. 19.

DIAGNOSIS.—Reduced Myxilleae with skeleton of slender strongylote tornota, sometimes modified to irregular styli, arranged in loose fibres running vertically to surface and ending in loose dermal brushes ; fibres tending to branch and anastomose giving rise, in places, to an irregular network ; main skeleton containing much sand and foreign spicules ; dermis supported by a close-meshed network of fibre filled with sand and foreign spicules ; microscleres isochelae unguiferae and sigmata.

Genus monotypic.

Genus *Anomodoryx*, gen. n.

GENOTYPE.—*Desmacidon dendyi*, Whitelegge, 1902, p. 79, pl. x, fig. 9.

DIAGNOSIS.—Reduced Myxilleae with skeleton of amphitylote tornota arranged in slender fibres which branch and anastomose to form radial fibre systems running vertically to surface ; no special dermal skeleton ; microscleres chelae arcuatae and sigmata.

Genus monotypic.

Genus *Psammodoryx*, gen. n.

GENOTYPE.—*Dysidea chaliniformis*, Carter, 1885, p. 217.

DIAGNOSIS.—Reduced Myxilleae (?) with skeleton composed of a reticulation of horny fibres filled with sand and foreign spicules; microscleres isochelae unguiferae.

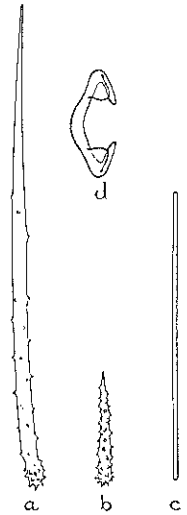
The genus includes, besides the genotype, *Desmacidon arenosa*, Whitelegge.

Hemimycale, gen. n. (Text-fig. 10.)

GENOTYPE.—*Desmacidon columella*, Bowerbank, 1874, p. 243, pl. lxxviii, figs. 6–8.

DIAGNOSIS.—Reduced Mycaleae with skeleton of loose fibres of styli, sometimes modified to anisostrongyla, running vertically to surface; fibres tending to branch and anastomose; no special dermal skeleton; no microscleres.

TEXT-FIG. 10.—Spicules of *Hemimycale*, gen. n., *columella* (Bowerbank). × 200.



TEXT-FIG. 11.—*Hymedesmia*, cf. *tenuissima* (Dendy). *a*, Large acanthostyle; *b*, small acanthostyle; and *c*, tornote. × 300; *d*, chela, × 360.

Hemimycale columella (Bowerbank) is a species of uncertain affinity and has, as a result, been placed in several different genera at different times. The original figure of its spicules is erroneous and has led to much misconception. Instead of anisostrongyla, such as figured by Bowerbank, its skeleton is composed of styli (Text-fig. 10), with occasional strongyla as a modification of these. There is good reason, therefore, for placing the species among the Mycaleae.

Genus *Rhaphoxiella*, gen. n.

GENOTYPE.—*Batzella corticata*, Thiele, 1905, p. 438, fig. 58.

DIAGNOSIS.—Axinellidae with skeleton of loose, irregular fibres, formed of curved styli, oxea or strongyla, running vertically to surface; numerous spicules, including also short oxea and strongyla, scattered between fibres; dermal skeleton a tangential reticulation of short strongyla; no microscleres.

Genus monotypic.

Section CLATHRIEAE.

Genus *Hymedesmia*, Bowerbank.

Hymedesmia mertoni, Hentschel.

H. mertoni, Hentschel, 1912, p. 376, pl. xx, fig. 34.

OCCURRENCE.—Stn. XXV, 17th March, 1929: in Papuan Pass, 20–25 fath., foraminifera and coral fragments.

REMARKS.—A thin incrustation on *Hyatella sinuosa* has a similar spiculation to that described by Hentschel for *Hymedesmia mertoni*. It differs in the absence of the larger sigmata, and of the smaller chelae, and in having longer tornota, measuring up to ·16 mm. long. The larger acanthostyli, too, measure no more than ·14 mm. These differences are, however, of doubtful importance.

H. mertoni is evidently the post-larval form of a species of Myxilleae, and the spicular characters at such a stage are probably subject to a greater variation than at any other stage in the life-history. This I hope to demonstrate shortly in dealing with the post-larval stages of species of sponges from the British Isles. Meanwhile, I propose to regard the present specimen, despite its differences, as a representative of this species.

DISTRIBUTION.—Malay Area.

Hymedesmia cf. *tenuissima* (Dendy). (Text-fig. 11.)

Myxilla tenuissima, Dendy, 1905, p. 169, pl. xi, fig. 5.

OCCURRENCE.—Stn. XXV, 17th March, 1929: In Papuan Pass, 20–25 fath., foraminifera and coral fragments.

REMARKS.—The specimen forms a thin incrustation on *Thorectopsamma irregularis*, sp. n. The skeleton consists of acanthostyli of two sizes, measuring ·315 and ·07 mm. long respectively, the longer basally-spined, and the shorter entirely-spined, which echinate the surface of the *Thorectopsamma*. Strongylote tornota, measuring ·18 by ·002 mm., are associated with the acanthostyli and disposed usually at right angles to them. The microscleres are chelae arcuatae measuring ·028 mm. chord.

The specimen agrees with *Hymedesmia tenuissima* (Dendy) in general appearance only, but the latter has no long acanthostyli, and its chelae are more robust. Both are probably young forms of a single species in which case the differences between them are unimportant.

DISTRIBUTION.—Ceylon.

Genus *Paracornulum*, Hallmann.

Paracornulum dubium (Hentschel).

Cornulum dubium, Hentschel, 1912, p. 346, pl. xix, fig. 19; *Paracornulum dubium*, Hallmann, 1920, p. 772.

Occurrence.—Stn. XVIII, 9th March, 1929: ¼ mile N. of N. Direction Is., 20 fath., sand and thick *Halimeda*.

Distribution.—Aru Island.

Genus *Clathria*, Schmidt.

Clathria, Schmidt, 1862, p. 57; *Echinoclathria*, Carter, 1884, p. 204; *Antherochalina*, Lendenfeld, 1887, p. 786.

Remarks.—Reasons are given under *Echinochalina* (see p. 562) for regarding *Echinoclathria*, Carter, as a synonym of *Clathria*.

The genus *Antherochalina*, Lendenfeld, was founded for the reception of *Veluspa polymorpha*, var. *infundibuliformis*, Maclay, and for 8 new species in addition. In the ordinary course of events the first-named species would be taken as lectotype, but since in this case it is imperfectly known, the first of the new species, *Antherochalina crassa*, is chosen. This species belongs to the genus *Clathria* and *Antherochalina* must accordingly be regarded as a synonym thereof. The remaining species of *Antherochalina* may be identified as follows:

A. elegans	=	*Syringella elegans* (Lendenfeld).
A. frondosa	=	*Clathria frondosa* (Lendenfeld).
A. venieroides	=	*Phakellia flabellata* (Carter).
A. dura	=	*Phakellia flabellata* (Carter).
A. concentrica	=	*Phakellia flabellata* (Carter).
A. perforata	=	*Ophlitaspongia* (*Echinoclathria*) *tenuis* (Carter).
A. tenuispina	=	*Ophlitaspongia* (*Echinoclathria*) *tenuis* (Carter).

Clathria aculeata, Ridley.

C. aculeata, Ridley, 1884, p. 443, pl. xl, fig. I; pl. xlii, fig. κ; Ridley and Dendy, 1887, p. 147.

Occurrence.—Low Isles, the Thalamita Flat, between Porites Pond and North-east Moat, and south of Tripneustes Spit.

Distribution.—Torres Strait.

Clathria rubens (Lendenfeld).

(For synonymy and description see Hallmann, 1912, p. 218.)

Occurrence.—Stns. II and III, 24th November, 1929: Linden Bank, 28 fath., shell and sand. Stn. XVI: ½ mile W. of N. Direction Is., 20 fath., stony. Stn. XVII, 9th March, 1929: ¼ mile W. of N. Direction Is., 19 fath., sand, thick *Halimeda*. Stn. XIX, 10th March, 1929: ½ mile N. of Eagle Is., 10 fath., shell, gravel, rich *Halimeda*.

Remarks.—The first specimen is practically identical with that figured by Hallmann (*loc. cit.*, pl. xxxii, fig. 1), but differs in having toxa which rarely, if ever, exceed ·06 mm. in length. The other three have an external form very like that of *Ophlitaspongia subhispida* (Carter) as figured by Hallmann (1912, pl. xxxvi, fig. 1), and a spiculation which may be regarded as intermediate between that of *O. subhispida* and *Clathria rubens*. In order that the spiculation of the first of these species should be derived from the second, all that is necessary is a shortening of the toxa, the loss of the already rare chelae, and the complete suppression of the already rare spines on the accessory styli. These changes are partially realized in the specimens here assigned to *C. rubens*.

From Hallmann's (*loc. cit.*, p. 226) description of *C. transiens*, this species seems to be exactly intermediate between *C. rubens* and *Ophlitaspongia subhispida* in spiculation, while its external form approaches that of the present specimens of *C. rubens*.

In a revision of the species of Clathrieae, it would be necessary, therefore, to consider the possibility that these three species may be synonymous.

Distribution.—Australia (east coast).

Genus *Tenacia*, Schmidt.

Tenacia frondifera (Bowerbank).

Halichondria frondifera, Bowerbank, 1875, p. 288: *Amphilectus frondifer*, Vosmaer, 1880, p. 115; *Clathria frondifera*, Ridley, 1884, p. 448, pl. xlii, fig. i; pl. liii, fig. j; Ridley and Dendy, 1887, p. 149; Topsent, 1892, p. 23; Lindgren, 1897, p. 480; *idem*, 1898, p. 27; Dendy, 1905, p. 170; Hentschel, 1912, p. 360.

Occurrence.—Stn. IX, 22nd February, 1929: Penguin Channel, 12–14 fath., sand and thick *Halimeda*.

Remarks.—Although this species has been referred persistently to *Clathria*, it really belongs to *Tenacia*.

Distribution.—Red Sea; Indian Ocean; Malay Area; Australia (north coast).

Tenacia procera (Ridley).

(For synonymy see Dendy, 1921, p. 64, under *Clathria procera*.)

Occurrence.—Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., rock and shell gravel, mud on edges of pit. Stn. XVII, 9th March, 1929: ¼ mile N. of N. Direction Is., 19 fath., sand and thick *Halimeda*.

Distribution.—Indian Ocean; Australia (north coast).

Tenacia paucispina (Lendenfeld).

(For synonymy and description see Hallmann, 1912, p. 178, under *Rhaphidophlus paucispinus*.)

Occurrence.—Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., rock and shell gravel.

Remarks.—The present specimen consists of a tangled, anastomosing mass of angular and somewhat nodose branches, each 3–5 mm. in diameter. It corresponds more closely in form with the var. *multiporous*, Whitelegge, than with the typical form, but the spicules are quite typical, except that the toxa may occasionally reach a length of ·16 mm.

Distribution.—Australia (east coast).

Tenacia coralliophila (Thiele).

Rhaphidophlus coralliophilus, Thiele, 1903, p. 959, fig. 25.

Occurrence.—Low Isles, the Thalamita Flat.

Remarks.—The single specimen forms a low, irregularly-massive incrustation, and was named by its collectors the "red, conical sponge". The dimensions of the spicules are: Stout styli, ·36 by ·012 mm.; large subtylostyli, ·56 by ·012 mm.; small subtylostyli, ·26 by ·007 mm.; acanthostyli, ·14 mm. long; chelae ·016 mm. and toxa ·06–·2 mm. The size of the various categories of spicules varies a good deal, and intermediate forms between the styli and the two kinds of subtylostyli appear to be common.

Distribution.—Ternate.

Genus *Ophlitaspongia*, Bowerbank.

Ophlitaspongia rimosa (Ridley).

Desmacidon rimosa, Ridley, 1884, p. 609, pl. liii, fig. F; pl. liv, fig. m.

Occurrence.—Low Isles, Inner Ramparts and the Thalamita Flat.

Remarks.—The several specimens are all in the form of low, rounded cushions, with furrowed surfaces, resembling extremely closely the holotype. The colour, in spirit, varies from a pale flesh tint to drab, but in life it was green, brown and scarlet lake.

The occurrence of this species on the Great Barrier Reef is of unusual interest, since this is only the second record of it, the first being from East Africa.

Distribution.—Mozambique, Portuguese East Africa.

Ophlitaspongia eccentrica, sp. n. (Plate I, figs. 8, 9; Text-fig. 12A.)

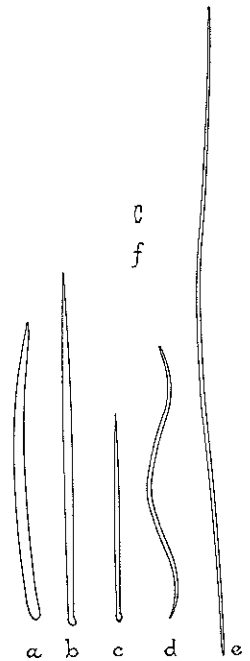
Holotype.—B.M. 30.8.13.109.

Occurrence.—Low Isles, Crab Spit.

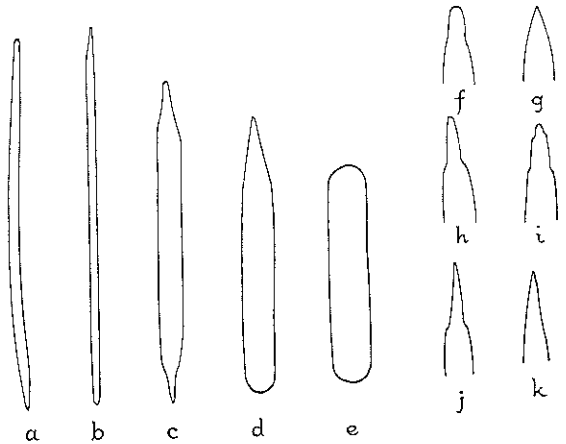
Diagnosis.—Sponge encrusting, massive or irregularly lamellate; skeleton composed of an irregular network of fibres cored by smooth styli, with smooth slender styli of two sizes occurring interstitially; microscleres palmate isochelae and toxa (merging into toxiform oxea ?).

Remarks.—The specimens upon which the diagnosis of this species is based are in a poor state of preservation. Nothing but the skeleton is left, so that it is impossible to describe the external characters apart from the shape. The coring spicules measure ·36 by ·017 mm., the interstitial styli, of two sizes, ·44 by ·008 mm., and ·24 by ·005 mm. Oxea (modified toxa ?) of various sizes, up to ·8 by ·007 mm., occur scattered sparsely in the meshes of the main skeleton, and toxa, up to ·32 by ·004 mm., and chelae, from ·014 to ·018 mm. long, are also present.

The species is peculiar in the presence of oxea, presumably derived by modification from the toxa, and in the differentiation of the auxiliary styli into two distinct sizes.



Text-fig. 12A.—*Ophlitaspongia eccentrica*, sp. n. *a*, Style of main fibres; *b* and *c*, interstitial styli or subtylostyli; *d*, toxote; *e*, toxiform oxeote; and *f*, chela; all × 150.



Text-fig. 12B.—*Protophlitaspongia oxeata*, sp. n. *a*, *b*, oxea; *c–e*, abnormal forms of megascleres; *f–k*, ends of oxea enlarged. *a–e*, × 500; *f–k*, × 1,500.

Protophlitaspongia, gen. n.

GENOTYPE.—*Siphonochalina bispiculata*, Dendy.

DIAGNOSIS.—Clathrieae with skeleton composed of an irregular reticulation of spongin fibres cored by hastately-pointed oxea, with numerous similar spicules scattered in its meshes; without special dermal skeleton or microscleres.

REMARKS.—The affinities of this genus are obscure, and the supposed relationships to the other Clathrieae rest rather on suggested resemblances of the spicules to similar spicules in *Ophlitaspongia* than on any obvious feature. Dendy's (1895, p. 246) description of the skeleton of *Siphonochalina bispiculata* is quite clear and accurate except that there is no dermal skeleton and the spicules scattered in the soft tissues are numerous. His suggestion that "there is a well-developed dermal skeleton composed of radiating tufts of long slender oxea" is incorrect; these tufts being merely the projecting ends of the spicules coring the main fibres, and not in any sense constituting a special dermal skeleton. The short oxea I do not regard as microscleres since they are connected to the larger spicules by intermediates and resemble them in all respects but size.

Protophlitaspongia oxeata, sp. n. (Text-fig. 12B.)

HOLOTYPE.—B.M. 30.8.13.45.

OCCURRENCE.—Stn. XXV, 17th March, 1929: In Papuan Pass, 20–25 fath., foraminifera and coral fragments.

DIAGNOSIS.—Sponge ramose, branches cylindrical, 3–5 mm. diameter; surface smooth, even, porose; texture tough, elastic; colour, in spirit, light brown; oscules few, conspicuous, 1–2 mm. diameter, arranged in linear series; skeleton an irregular reticulation of fibres, in which primary fibres usually contain multiserially-arranged spicules and secondaries are aspiculous or contain a single row of spicules; numerous spicules scattered between meshes of main skeleton; spicules hastately-pointed oxea, ·16 by ·004 mm., occasionally modified to styli.

REMARKS.—The species differs from the genotype mainly in the external form and in the absence of the small oxea.

Genus *Echinochalina*, Thiele.

GENOTYPE.—*Ophlitaspongia australiensis*, Ridley.

REMARKS.—There is a good deal of confusion concerning the genera *Echinochalina*, Thiele, and *Echinoclathria*, Carter, resulting mainly from the errors of Ridley and Dendy, and Hallmann. *Echinoclathria* was proposed by Carter (1884, p. 204), without diagnosis or genotype, but with recognizable descriptions of some unnamed species. The identity of these species is doubtful, but the meagre descriptions of them suggest that the genus *Clathria* would have been more appropriate for their reception. The following year, Carter (1885, pp. 355–7) added four new species to the genus. The first of these, *Echinoclathria tenuis*, here chosen as genolectotype, is a *Clathria*, and, of the remainder, *Echinoclathria nodosa* and *E. subhispida* belong to *Ophlitaspongia*. The fourth, *Echinoclathria gracilis*, is congeneric with *Ophlitaspongia australiensis*, Ridley, the genotype of *Echinochalina*, Thiele (1903, p. 961). *Echinoclathria* is therefore a synonym of *Clathria*, but Ridley and Dendy referred to it a number of species rightly belonging to *Echinochalina*. To make matters worse, Hallmann (1912, p. 288) accepted Thiele's genus *Echinochalina*, but amended the diagnosis so as to exclude the genotype. Actually, such action was not only incorrect but quite unnecessary, for *Echinochalina*, in the sense in which Thiele intended it, may be used to include not only the genotype but also those species which Hallmann wished to put in it.

Echinochalina intermedia (Whitelegge).

(For possible synonymy see Dendy, 1921, p. 71, under *Echinoclathria intermedia*.)

OCCURRENCE.—Stn. XVI, 9th March, 1929: ½ mile W. of N. Direction Is., 20 fath., stony.

REMARKS.—The specimen, though of larger size, agrees almost exactly with that described by Dendy (*loc. cit.*). Whether these two are conspecific with the holotype and other specimens recorded from Australia, is, however, a matter of doubt.

DISTRIBUTION.—Indian Ocean; Australia (east coast).

Echinochalina anomala, Hallmann. (Plate I, fig. 13.)

Echinochalina anomala, Hallmann, 1912, p. 292, fig. 68.

OCCURRENCE.—Stn. XIX, 10th March, 1929: ½ mile N. of Eagle Is., 10 fath., shell gravel and rich *Halimeda*.

REMARKS.—As the external form of the species has never been illustrated, and is in fact known only from imperfect material, a photograph of the present specimen is given.

DISTRIBUTION.—Australia (east coast).

Coelocarteria, gen. n.

GENOTYPE.—*Phlocodictyon singaporense*, Carter.

DIAGNOSIS.—Clathrieae with skeleton composed of long oxea, often modified to strongyla, and short strongyla, with minute palmate isochelae for microscleres.

Coelocarteria singaporense (Carter).

Phlocodictyon singaporense, Carter, 1883, p. 326, pl. xiii, fig. 17; *Rhizochalina singaporensis*, var., Ridley, 1884, p. 421, pl. xli, fig. s; *R. singaporensis*, Ridley and Dendy, 1887, p. 34; Lindgren, 1897, p. 481; *idem*, 1898, p. 297, pl. xix, fig. 11; *Histoderma singaporense*, Thiele, 1903, p. 955.

OCCURRENCE.—Stn. XVII, 9th March, 1929: ¼ mile N. of N. Direction Is., 19 fath., sand and thick *Halimeda*; Stn. XVIII, 9th March, 1929: ½ mile S.E. of Lizard Is., 20 fath., shell, gravel and rich *Halimeda*.

DISTRIBUTION.—Malay Area.

Family Axinellidae.

Genus *Trachyopsis*, Dendy.

Trachyopsis halichondrioides, Dendy.

T. halichondrioides, Dendy, 1905, p. 147, pl. x, fig. 10; Burton, 1926, p. 75, figs. 6–7.

Occurrence.—Stn. XXIV, 13th March, 1929: ¾ mile N.E. Pasco Reef, 16½ fath., hard and shell bottom.

Distribution.—Indian Ocean.

Trachyopsis aplysinoides (Dendy).

Halichondria aplysinoides, Dendy, 1921, p. 39, pl. iii, figs. 3–5; pl. xii, fig. 9; *Trachyopsis aplysinoides*, Burton, 1926, p. 78.

Occurrence.—Stn. X, 22nd February, 1929: Satellite Reef, 14–17 fath., coral, shell, gravel and mud.

Distribution.—Indian Ocean.

Genus *Leucophloeus*, Carter.

Leucophloeus fenestratus, Ridley.

L. fenestratus, Ridley, 1884, p. 464, pl. xii, fig. s; *Hymeniacidon fenestratus*, Lindgren, 1897, p. 483; *idem*, 1898, p. 312, p. 124; *nec Leucophloeus fenestratus*, Dendy, 1921.

Occurrence.—Low Isles, Mangrove Park.

Distribution.—Malay Area: Australia.

Genus *Ciocalypta*, Bowerbank.

Ciocalypta penicillus (Bowerbank).

(For synonymy see Topsent, 1921, p. 687.)

Occurrence.—Stn. XVI, 9th March, 1929: ½ mile W. of N. Direction Is., 20 fath., stony.

Distribution.—Eastern Atlantic from N. Europe to S. Africa; Indian Ocean; Malay Area; Australia (all coasts).

Genus *Collocalypta*, Dendy.

Collocalypta mertoni (Hentschel).

Ciocalypta mertoni, Hentschel, 1912, p. 424, pl. xiv, fig. 4; pl. xxi, fig. 59.

Occurrence.—Stn. XXIII, 12th March, 1929: Turtle Is., 8 fath., mud and shell.

Distribution.—Aru Is.

Genus *Acanthella*, Schmidt.

Acanthella cavernosa, Dendy.

A. stipitata, Carter, var. Ridley and Dendy, 1887, p. 178; *A. cavernosa*, Dendy, 1921, p. 120, pl. vii, fig. 7; pl. xvii, fig. 3.

Occurrence.—Off North Anchorage, 17th October, 1928, 9 fath. Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., mud and rock. Stn. XXV, 17th March, 1929: In Papuan Pass, 20–25 fath., foraminifera and coral fragments.

Remarks.—The three specimens vary slightly in shape but agree closely in spiculation. One of them is almost identical externally with the holotype of *A. cavernosa*, while the other two resemble *A. vulgata*, Thiele, from Japan. The spiculation in each case is approximately the same as that of *A. cavernosa*.

Since Ridley and Dendy believed their specimen to be very like the type of *A. stipitata*, Carter, a word of explanation is necessary here regarding our knowledge of that species. According to the original description the spiculation of *A. stipitata* consists of styli only, and the species is therefore not a true *Acanthella*. In any case, however, it is so inadequately described as to be practically unrecognizable. *A. stipitata*, Carter, recorded by Dendy (1897, p. 237), is a *Rhaphoxya* and identical with *R.* (*Acanthella*) *cactiformis* (Carter).

Distribution.—Australia (north coast); Indian Ocean.

Genus *Pararhaphoxya*, gen. n.

Genotype.—*P. tenuiramosa*, sp. n

Diagnosis.—Axinellidae with axial skeleton of flexuous strongyla and curved oxea and styli; with an extra-axial skeleton of oxea; spicules slender and irregularly ended.

Remarks.—The genus combines some characters of both the genera *Phakellia* and *Rhaphoxya*. The skeleton arrangement is the same as in *Phakellia*, and the flexuous strongyla typical of it are present, but the oxea and styli have the same slender character and the same peculiar ends as those of *Rhaphoxya*.

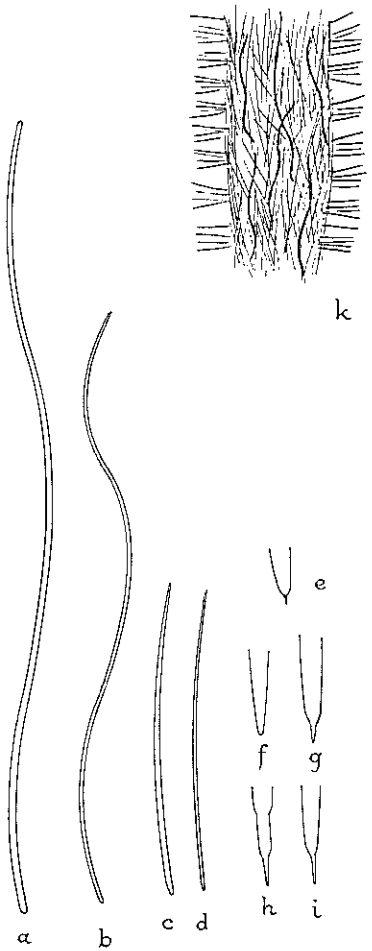
Pararhaphoxya tenuiramosa, sp. n. (Text-fig. 13.)

Holotype.—B.M. 30.8.13.145.

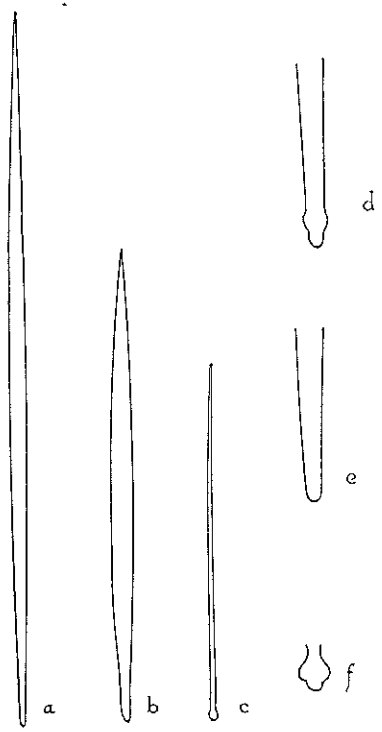
Occurrence.—Stn. XVI, 9th March, 1929: ½ mile W. of N. Direction Is., 20 fath., stony.

Diagnosis.—Sponge stipitate, dichotomously branched; branches slender, maximum diameter 3 mm.; surface hispid; colour, in spirit, greyish-white; oscules small, inconspicuous, distributed over sides of branches; skeleton composed of an axial core of flexuous strongyla, curved oxea and styli arranged longitudinally, and an extra-axial, radially-arranged skeleton of curved oxea; strongyla varying in length and diameter, up to 1·5 mm. long and ·004–·014 mm. in diameter, and oxea and styli up to ·6 by ·006 mm.

Remarks.—The holotype consists of a short stem bearing very slender, regularly dichotomosing branches, rising to a height of 20 cm.



TEXT-FIG. 13.—*Pararaphoxya tenuiramosa*, sp. n. *a*, Flexuous strongyle; *b*, flexuous oxeote; *c* and *d*, styli, × 100; *e–i*, ends of oxea enlarged; *k*, longitudinal section through a branch to show disposition of skeleton, semi-diagrammatic.



TEXT-FIG. 14.—Spicules of *Polymastia megasclera*, sp. n. *a*, Subtylostyle of radial bundles; *b*, subtylostyle of cortical palisade, and *c*, tylostyle of sub-cortical tangential layer, all × 100; *d* and *e*, variations found in the bases of *a* and *b*; *f*, enlarged view of base of *c*.

Family SUBERITIDAE.

Genus *Pseudosuberites*, Topsent.

Pseudosuberites andrewsi, Kirkpatrick.

P. andrewsi, Kirkpatrick, 1900, p. 135, pl. xii, fig. 2; pl. xiii, fig. 7.

OCCURRENCE.—Low Isles, the Thalamita Flat.
DISTRIBUTION.—Xmas Is.

Genus *Laxosuberites*, Topsent.

Laxosuberites proteus, Hentschel.

L. proteus, Hentschel, 1909, p. 389, pl. xxii, figs. 1–3, text-fig. 20–23; Burton, 1930, p. 669.

OCCURRENCE.—Low Isles, the Thalamita Flat.
REMARKS.—The colour of the specimen in life is recorded as gamboge.
DISTRIBUTION.—Australia (south-west coast); Gulf of Manaar.

Genus *Polymastia*, Bowerbank.

Polymastia megasclera, sp. n. (Text-fig. 14.)

HOLOTYPE.—B.M. 30.8.13.155.
OCCURRENCE.—Low Isles, the Thalamita Flat and Mangrove Park.
DIAGNOSIS.—Sponge irregular, low-growing and massive, bearing numerous, irregularly distributed, wart-like papillae on upper surface; texture tough, incompressible; surface even, coarsely pilose; colour, in spirit, brown externally, papillae and choanosome flesh-coloured, cortex white; skeleton composed of radial bundles of long tylostyli, with tylostyli of various sizes scattered profusely in choanosome, a sub-cortical tangential layer of short, slender tylostyli and a cortical palisade of tylostyli of various sizes, but composed mainly of stout, fusiform tylostyli; spicules of three main types, long tylostyli of radial bundles, ·9 by ·02 mm., short, slender tylostyli, varying from ·24 to ·44 by ·008 mm., and stout fusiform tylostyli, ·6 by ·032 mm.

REMARKS.—The holotype is a spreading mass 8 cm. by 6 cm. across by 1 cm. thick, bearing small papillae barely raised above the surrounding surface.

The skeleton is fairly typical, being composed of radial bundles of long tylostyli, with shorter tylostyli scattered between, a tangential layer and a palisade of short tylostyli. The tylostyli scattered in the choanosome are so numerous, so variable in size, and include so many developmental and intermediate forms, that it is not easy to tell precisely how many different types are present. The small slender spicules usually have a well-developed head, often with annular swellings, while annular swellings are commonly found in both the long and slender and in the fusiform tylostyli (*cf.* Text-fig. 14*d*). A second, very small, specimen differs in having a non-pilose surface.

In addition to its peculiar external form, the species differs from all other species in the shape of the fusiform styli which make up the larger part of the cortical palisade.

Family Tethyadae.

Genus *Tethya*, Lamarck.

Genolectotype.—*T. lyncurium*, Lamarck (*fide* Topsent, 1920, pp. 640–646).

Tethya, Lamarck, 1815, p. 69; *Tethia*, Lamarck, 1816, p. 384: *Tethium*, Blainville, 1830, p. 507; *Donatia*, Nardo, 1833, p. 522: *Lyncuria*, Nardo, 1834, p. 715: *Tethea*, Siebold, 1843, p. 363; *Tethyum*, Lieberkühn, 1859, p. 522: *Amniscos*, Gray, 1867, p. 542; *Columnitis*, Schmidt, 1870, p. 25; *Alemo*, Wright, 1881, p. 15.

Remarks.—Scudder attributes the genus *Tethya* to Oken, who used the name in 1815, but according to Sherborn (Index Animalium) it had already been used by Lamarck.

Tethya robusta (Bowerbank).

(For synonymy see Burton, 1924, p. 1037, under *Donatia robusta*).

Occurrence.—Low Isles, the Thalamita Flat.
Distribution.—Indian Ocean; Malay Area; Australia (all coasts).

Tethya japonica, Sollas.

T. japonica, Sollas, 1888, p. 430, pl. xliv, figs. 7–14; *Donatia japonica*, Burton, 1924, p. 1039.

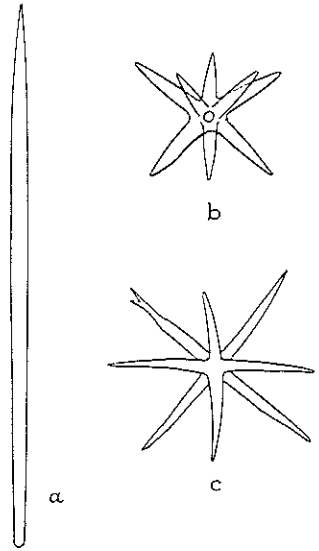
Occurrence.—Stn. XIX, 10th March, 1929: ½ mile N. of Eagle Is., 10 fath., shell gravel.
Distribution.—Malay Area; Indian Ocean.

Genus *Tethyorrhaphis*, Lendenfeld.

Tethyorrhaphis oxyaster, sp. n. (Text-fig. 15.)

Holotype.—B.M. 30.8.13.30.
Occurrence.—Stn. IV, 24th November, 1929: Linden Bank, 38 fath., mud.
Diagnosis.—Sponge of usual form and anatomy; megascleres styli, widest at centre and narrowing gradually to a rounded proximal end, up to 1·12 by ·024 mm.; megasters of 2 sorts, cortical spherasters with slight centrum and 10–12 stout, smooth rays, variable in size up to ·12 mm. in diameter, and choanosomal oxyasters, with smooth, often curved rays, 8–12 in number, without centrum, varying in diameter from ·02–·2 mm.; microsters absent, but spirasters, often bearing lateral branches and measuring ·018 by ·003 mm. are present.
Remarks.—The species differs from the only other known species, *T. laevis*, Lendenfeld (see Burton, 1924, p. 1043), in the absence of microsters, and in the shape and size of the megasters. In all other respects they agree closely. The third microsclere has been called hitherto a microrhabd, on the assumption that the Tethyadae belonged to the Astrotetraxonida. The fact that this microsclere is not a microrhabd but a true spiraster, settles emphatically the much-debated question of the systematic position of the family, which is here placed next to the Clavulidae.

The characteristic feature of the present species, apart from the absence of microsters, is the presence of two closely similar forms of megaster, the one exclusively cortical and the other choanosomal. A typical cortical megaster has a centrum ·024 mm. in diameter, and the rays are ·012 mm. thick at the base. In the choanosomal megaster there is no centrum, and the rays measure, in the larger examples, ·12 mm. long by ·008 mm. thick at the base.



Text-fig. 15.—Spicules of *Tethyorrhaphis oxyaster*, sp. n. *a*, Style, × 100; *b*, cortical megaster, and *c*, choanosomal megaster, both × 130.

Family Clavulidae.

Genus *Timea*, Gray.

Timea stellata, (Bowerbank).

Hymedesmia stellata, Bowerbank, 1866, p. 150; *idem*, 1874, p. 71, pl. xxviii, figs. 5–8; *Timea stellata*, Gray, 1867, p. 544; *Hymedesmia stellata*, Bowerbank, 1882, p. 67; Topsent, 1900, p. 114, pl. iii, fig. 15; *Stelligera stellata*, Babić, 1922, p. 270, fig. 1.

Occurrence.—Stn. XXV, 17th March, 1929: In Papuan Pass, 20–25 fath., foraminifera and coral fragments.
Remarks.—The species is here recorded from extra-European waters for the first time. The specimen, which forms a thin crust on *Thorectopsamma irregularis*, sp. n., is quite typical.
Distribution.—Europe (coasts of British Isles, France and Mediterranean Sea).

Genus *Spirastrella*, Schmidt.

The laudable attempt by Vosmaer (1911) to reduce the number of specific names applicable to the genus *Spirastrella* and to demonstrate that a large number of so-called species are merely growth forms of other species has already been criticized by Topsent (1918) on the grounds that the subordination of specific names was carried too far. It is conceivable that Vosmaer may eventually be proved to have been correct in his action, but, while it cannot be denied that his work was a step in the right direction, the specimens of *Spirastrella* present in the Great Barrier Reef collections suggest that in some respects at least his conclusions require modification. These specimens, to the number of 31, appear to be divisible among three distinct species, and, so far as this collection is concerned, in all cases a particular external form is associated with a definite set of spicular characters. For the time being, therefore, I propose to regard them as representing distinct species without inquiring more closely into the very much wider problem of the fate of the remaining species of the genus.

Of the three species of *Spirastrella* represented on the Great Barrier Reef, two at least may be shown to be boring sponges in the early stages. Certainly the perforation of the coral fragments in which they are found is of a very simple type, and contrasts strikingly with the labyrinthine nature of the canals and chambers of *Cliona*, yet the similarity between the skeletons of *Spirastrella* and *Cliona* suggest that, at the very least, these two genera should not be assigned to different families as has hitherto been the custom.

Spirastrella inconstans (Dendy).

Subcrites inconstans, et varr. *macandrina*, *digitata*, *globosa*, Dendy, 1887, pp. 154–157, pls. ix, x.

Occurrence.—Batt Reef; Low Isles, Crab Spit, Mangrove Park, and between Madrepore Moat and Mangrove Park. Stn. XXII, 11th March, 1929: to E. of Snake Reef, 13½ fath., mud, with foraminifera and shell. Stn. XXIII, 12th March, 1929: in lee of Turtle Is., 8 fath., mud and shell.

Remarks.—Of the twenty specimens assigned to this species, 10 are very like the type of *Suberites inconstans*, var. *globosa*, in external appearance and almost identical with specimens S.E.612d and S.E.98 (of tropus *glaebosa*, Vosmaer, 1911, pl. i, figs. 3–4). The symbiotic barnacles are present in considerable numbers in each specimen, and the skeleton is composed of a coarse-meshed isodictyal network of tylostyli. The microscleres are slender spinispirae* measuring up to ·035 mm. long (even to ·07 in one specimen). Six of the remaining specimens are typical examples of *S. inconstans*, var. *digitata*, having the same type of skeleton as the var. *globosa*, but showing a marked diminution in the number of cirripedes present in the dermal regions. Of the remainder, three are intermediate in form between the varieties *globosa* and *digitata*, but agree in all other respects, except for some variation in the number of cirripedes present.

The last specimen corresponds closely anatomically with all the others, but has the external form of *Spirastrella aurivillii*, var. *excavans*, Lindgren, a single stout papilla perforating coral limestone. From this specimen it appears that *S. inconstans* (Dendy) may pass through a boring stage in early life, and that the whole life-history is similar to that of *Cliona celata* or any other of the typical boring sponges.

Distribution.—Indian Ocean.

* It is worth mentioning that spinispirae are abundantly present in the type of *S. inconstans*, var. *globosa*, although Dendy failed to remark them.

Spirastrella aurivillii, Lindgren.

S. aurivillii, et varr. *excavans*, *libera*, Lindgren, 1897, p. 484; 1898, p. 40, pl. xvii, fig. 11; pl. xviii, fig. 4; pl. xix, fig. 22.

Occurrence.—Low Isles, the Thalamita Flat.

Remarks.—The five specimens agree with *Spirastrella aurivillii*, var. *excavans*, in all respects and a sixth agrees equally with the var. *libera*. There can, therefore, be little doubt that they represent stages in a boring *Spirastrella* very similar in habitus to *S. inconstans* (Dendy).

Distribution.—Java.

Spirastrella semilunaris, Lindgren.

S. semilunaris, Lindgren, 1897, p. 484; 1898, p. 41, pl. xix, fig. 23.

Occurrence.—Stn. XXII, 11th March, 1929: to east of Snake Reef, 13½ fath., mud, with foraminifera and shells. Stn. XXIII, 12th March, 1929: in lee of Turtle Is., 8 fath., mud and shell.

Remarks.—The four specimens all have the form of S.E.1945 (Vosmaer, 1911, pl. iii, fig. 2) and the spiculation of *S. semilunaris*, Lindgren.

Comparison of the Main Characters of the Species of Spirastrella *found on the Great Barrier Reef.*

	inconstans.	aurivillii.	semilunaris.
Form	Massive with conspicuous oscules, often digitate with deep cloacae	Boring, with flattened papillae lying almost level with substratum, or digitate. Oscules at ends of papillae	Creeping and agglutinating, incorporating numerous foreign bodies in its substance. Oscules not seen.
Skeleton	Coarse, multispicular, isodictyal	Densely-packed halichondroid	Loosely arranged, mainly scattered spicules.
Megascleres	Slender	Stout	Slender.
Microscleres	Slender, beset with small, wart-like tubercles	Slender, bearing long processes	Stout and short, with conical rays.
Symbionts	Present	Absent	Absent.
Colour, in spirit.	Brick-red usually	Purplish	Brown.

Order KERATOSA.

Family Spongiidae.

Genus *Phyllospongia*, Ehlers.

Genotype.—*Spongia papyracea*, Esper.

Diagnosis.—Spongiidae with skeleton of slender pithed fibres, of pale-coloured spongin, arranged in a sub-isodictyal network; without foreign inclusions in fibres and without sandy cortex.

Remarks.—The genus *Phyllospongia* was originally established by Ehlers (1870, p. 22) for *Spongia papyracea*, Esper, but has gradually undergone corruption until now it is merely a receptacle for all soft-fibred horny sponges of flabellate or cup-shaped form. The major fault lies with Lendenfeld (1889), who treated the genus in the most unconventional way possible, and in order to unravel the present tangle it will be necessary to begin with his work.

Lendenfeld divided the genus into three sub-genera: (1) *Antheroplax*, (2) *Spongionella*, and (3) *Carterispongia*. The first of these was a new name proposed for a group of species which included *Geelongia vasiformis*, Carter, and as *Geelongia* is a valid generic name, and has priority, *Antheroplax* must be considered a synonym of it. *Spongionella* was established by Bowerbank (1866, p. 359) for *S. pulchella*, since re-described by Topsent (1929, pp. 1–12). *Carterispongia* (*errore Carteriospongia*), Hyatt (1877, p. 541), includes, as the first species, *Spongia otahitica*, Esper, which is synonymous with *Spongia foliascens*, Pallas (1766, p. 395). *S. foliascens*, Pallas, is therefore accepted here as the genolectotype of *Carterispongia*, Hyatt. *Spongia papyracea*, Esper, the true type of *Phyllospongia*, is relegated by Lendenfeld to the subgenus *Spongionella* without comment.

The genus *Phyllospongia*, with *Spongia papyracea*, Esper, as genotype, is characterized by a skeleton of slender pithed fibres of pale-coloured spongin which form an irregularly isodictyal skeleton. There are no sandy inclusions in the fibres or in the cortex. The genus *Carterispongia* is without a type-specimen. Pallas's description is fairly complete, but no figure is given, and under these conditions it will be necessary to choose a neotype. For this purpose I take the specimen B.M. 25.11.1.411 from Coin Peros, Indian Ocean. This is practically identical in form with the specimen figured by Lendenfeld (1889, pl. v, fig. 3) under the name *Phyllospongia foliascens*, conforms well to the accepted conception of the species and is from the type-locality. Its skeleton consists of fibres of the same type as those found in *Spongia papyracea*, Esper, but many of them, usually those running vertically to the surface, are cored with sand-grains. The meshes of the skeleton are also much more irregular and there is a sandy layer at the surface. Whether it will be possible to maintain the distinction between *Phyllospongia* and *Carterispongia* remains to be seen, but there is sufficient justification for regarding them as distinct for the time being.

The genus *Mauricea* is very like *Carterispongia*, but the foreign inclusions in the fibres are few and sparsely scattered and there is only a very slight layer of sand at the surface. It may, however, be necessary to unite the two genera.

The genus *Geelongia* may be best described as a *Spongionella*, in which there is a thick sandy cortex and in which the primary fibres are cored by sand.

Actually, *Geelongia* (syn. *Antheroplax*) and *Spongionella* have much in common, while the same may be said of *Carterispongia* and *Phyllospongia*, but these two pairs of genera belong to totally different divisions of the Keratosa. Similarly, the various species included by Lendenfeld under his comprehensive heading of *Phyllospongia* are of a most diverse order, having this only in common, that they are flabellate or cup-shaped in form.

Phyllospongia dendyi, Lendenfeld.

P. dendyi, varr. *frondosa* et *digitata*, Lendenfeld, 1889, p. 177, pl. xiv, fig. 5.

Occurrence.—Batt Reef or Low Isles.

Remarks.—The present specimen is intermediate between the vars. *frondosa* and *digitata* described by Lendenfeld, and, since these two varieties were founded on unessential characteristics, this subdivision of the species is not accepted here.

Distribution.—Australia (west coast).

Genus *Carterispongia*, Hyatt.

Genolectotype.—*Spongia foliascens*, Pallas.

Diagnosis.—Skeleton of slender, pithed fibres of pale-coloured spongin arranged in a very irregular network; ascending fibres cored by foreign inclusions; dermis strengthened by a layer of foreign *débris*.

Carterispongia foliascens (Pallas).

Spongia foliascens, Pallas, 1766, p. 395: *Phyllospongia foliascens*, Lendenfeld, 1889, p. 196, pl. v, fig. 3; pl. vi, figs. 1, 3, 4, 10; pl. vii, fig. 11; pl. xiv, fig. 2; pl. xxiv, fig. 6; *Phyllospongia foliascens*, Topsent, 1897, p. 483: *Carteriospongia otahitica*, Keller, 1889, p. 302; (for further synonymy see Lendenfeld, *l. c.*).

Occurrence.—Low Isles and Batt Reef.

Distribution.—Red Sea; Indian Ocean; Malay Area; Australia* (all coasts); New Zealand*; Tropical Pacific.*

Carterispongia vermicularis (Lendenfeld).

Phyllospongia vermicularis, Lendenfeld, 1889, p. 201, pl. xv, fig. 5.

Occurrence.—Stn. XIX, 10th March, 1929: about ½ mile N. of Eagle Is., 10 fath., shell, gravel, rich *Halimeda*.

Remarks.—The single specimen is not in a good state of preservation, which makes its identification a little difficult. It consists of a sub-clathrous mass of branches having the appearance of *Carterispongia vermicularis*, as figured by Lendenfeld (*loc. cit.*). At the same time, the branches in the type measured only 2 mm. in diameter, whereas those of the present specimen measure up to 10 mm. On the other hand, they agree in the structure of the skeleton. Direct comparison is not possible since, although Lendenfeld

* (*Fide* Lendenfeld, *l. c.*)

has indicated its presence in the British Museum collection, careful search has failed to reveal the type-specimen.

DISTRIBUTION.—Australia (west coast).

Carterispongia clathrata (Carter).

Hircinia clathrata, Carter, 1881, p. 366; *Hyatella* clathrata*, Lendenfeld, 1889, p. 115, pl. xii, figs. 15, 16; pl. xx, fig. 4; *Hircinia clathrata*, Dendy, 1889, p. 96.

OCCURRENCE.—Stn. XXII, 11th March, 1929: E. of Snake Reef, 13½ fath., mud, with foraminifera and shells. Stn. XXIII, 12th March, 1929: Turtle Is., 8 fath., mud and shell.

REMARKS.—This is apparently the first occasion on which specimens of this species preserved in alcohol have been examined, and it is quite evident that the species should not be included in *Hircinia*. Neither the holotype nor Lendenfeld's specimens are available for examination, but as neither Carter nor Lendenfeld mention the presence of filaments, it must be presumed that these are absent, as they certainly are in Dendy's specimens and those from the Barrier Reef.

DISTRIBUTION.—Indian Ocean; Australia; West Indies (*fide* Lendenfeld, *loc. cit.*).

Genus *Spongia*, Linnaeus.

Spongia, Linnaeus, 1759, p. 1348: *Euspongia*, Bronn, 1859, p. 22: *Ditela*, Schmidt, 1862, p. 24: *Hippospongia*, Schultze, 1879, p. 614.

DIAGNOSIS.—Spongiidae with skeleton of pale-coloured, slender spongin fibres, differentiated into primary fibres, running vertically to surface, connected by a complicated and irregular network of secondary fibres free from inclusions.

REMARKS.—Although the Bath sponge was the first to be recognized and named, and is the one most quoted in our literature, it is unusually difficult to choose a specimen which shall represent the type of the species. Since 1758, when Linnaeus first used the name for what is known, in a loose and indefinite way, as the Bath Sponge, the species has been again mentioned by Linnaeus (1767), and by Pallas (1766), Houttuyn (1772), Ellis and Solander (1786), Gmelin (1789) and Esper (1794). In one case only is the specimen assigned to this species now available, namely, that described by Esper, and this was subsequently made the type of *Spongia adriatica*, var. *quarnerensis*, by Ehlers (1870). This specimen is now preserved in the Museum at Erlangen. The position is rendered more complicated by the fact that all authors subsequent to Esper have given either a casual reference to the species only, or have assigned the specimens before them to one or other of the numerous varieties of the species now recognized. Under the circumstances, it seems that no one specimen can be said more than any other to represent that elusive animal, the Bath Sponge, and no one can be regarded, more than any other, as the type of the species. One of two alternatives must therefore be adopted: either to abandon the name altogether or choose a neotype. The first is inadvisable as the name is so well-known, and, as regards the second course, the obvious thing would be to select Esper's specimen as the neotype. Since, however, accessibility for examination is an important factor, and there are obvious difficulties in the way of this if Esper's specimen be chosen, and as a matter purely of convenience, I select a specimen named by Schulze, *S. officinalis*, var. *adriatica*, and deposited in the British Museum (No. 83.12.4.28) as the neotype of *S. officinalis* and the lectotype of var. *adriatica*. The var. *adriatica* becomes therefore the typical variety of *S. officinalis*.

The neotype thus chosen has a skeleton conforming with the accepted ideas of the diagnosic features of the species *S. officinalis*, and expressed in the diagnosis of the genus *Spongia* given above. There can therefore be little objection to accepting this specimen as the type of the species, and, on the other hand, there is great advantage to be gained, in that, for the first time in its history, the species is placed on a definite and stable basis.

A similar difficulty is encountered in determining the type of *Hippospongia*. This genus was established by Schulze (1879, p. 614) for *Spongia equina*, Schmidt (1862, p. 23), and the original specimen (or specimens ?) is, so far as may be ascertained, not to be found. Under the circumstances, I choose a specimen in the British Museum, agreeing very closely in external characters with that figured by Schulze (*loc. cit.*, pl. xxxv, fig. 14). This has a skeleton agreeing in all respects with that of the neotype of *Spongia officinalis*. The genera *Spongia* and *Hippospongia* must thus be regarded as synonyms. This is an eminently satisfactory conclusion as no author in the past seems to have been sure of the exact value of the two genera.

Thus, it is not unusual to find a species placed first in *Spongia* (= *Euspongia*) and then in *Hippospongia* (*cf.* Lendenfeld, 1889, pp. 300–325, where this is well illustrated). In other cases, one species has been consistently placed in *Spongia*, while another species, which in actual fact is at most only varietally distinct from it, has been as consistently placed in *Hippospongia*.

The only attempt made to diagnose and compare the two genera under discussion is that contained in Lendenfeld's Monograph (1889, pp. 245 and 280). Here the genus *Euspongia* (= *Spongia*) is diagnosed: "Massive Spongidae with distinct main, and branched, continually anastomosing connecting fibres. The meshes of the connecting fibre net are mostly under 0·04 mm. wide. The surface is conulated and destitute of

* The genus *Hyatella* was established by Lendenfeld (1889, p. 102) who diagnosed it: Aulenidae which consist of a reticulating lamella with large vestibular cavities, which are more extensive than the septa between them. The thicker connecting fibres of the skeleton are over 0·03 mm. thick. The meshes of the skeleton net over 0·2 mm. wide. Mostly hard and incompressible sponges.

This diagnosis does not contain a single feature by which the genus could be recognized with any degree of certainty. Nor is it possible to glean, from the characters of the various species assigned to it, what Lendenfeld's conception of the genus may have been, since these are all inadequately described and the few of them that can be recognized, or are available for examination, belong obviously to several different genera. When we come to the question of the genotype, the situation is no better. Lendenfeld says (*l. c.*, p. 102): "The first described sponge referable to this genus is the *Spongia sinuosa* of Pallas . . ." This leaves little doubt as to what he considered to be the type of the genus, but, unfortunately, although several authors have identified sponges with *Spongia sinuosa*, Pallas, I fail to see any possibility of recognizing this species.

Pallas's description of *Spongia sinuosa* reads: "Incrustat varia corpora, semipollicari circiter strato; interna crustae facies poris coecis inaequalibus sparsa, exterior cavitatibus majusculis, oblongis vel cotyloideis, confertissimis obsita. *Substantia* tenaciuscula, mollis, grisco-flavescens, ex fibris maxime perpendicularibus, per creberrimas anastomoses tenerioresque fibrillas contextis, facta. Crustarum margo tenuiter veli instar diffunditur & sensim crassescit atque cavernosus fit. *Odor* combustae animalis. *Locus:* Oceanus Indicus ?"

It is impossible to recognize anything by this! The genus must therefore be treated as unrecognizable and the use of the name *Hyatella* abandoned.

a dense cortex. Vestibular cavities absent or small." The genus *Hippospongia* is diagnosed: "Spongidae consisting of reticulate lamellae between which extensive vestibular lacunae are situated. These are wider than the septa between them and are thick. The connecting fibres form a network with meshes 0·1–0·4 mm. wide. The dry skeletons of the wide-meshed species are soft and elastic."

The first expresses the usually accepted conception of the genus *Spongia*, in so far as this could hitherto have been defined, and the latter is quite clearly based on Schulze's figure of *Hippospongia equina* (Schmidt). After due allowance is made for the obvious defects in the construction of Lendenfeld's diagnoses, we are left with the impression that the only difference between *Spongia* and *Hippospongia* is the more cavernous design of the internal skeleton of the latter, and this, far from being of generic importance, is a character of doubtful value in the determination even of varieties or of a species. How little Lendenfeld was guided by his own diagnoses is shown by a casual examination of the species he assigns to the two genera.

The name *Euspongia* was proposed by Bronn (1859, p. 22) to replace *Spongia*, but no explanation was given either then or subsequently, by this or any other author, as to the reason for such a change, although it has been almost universally accepted. So far as may be judged, the objection to using the name *Spongia* lies in the fact that it means literally a sponge, and that we can no more have this than we could have a genus of birds named *Aves*. If that were so, then it is impossible to imagine that the case is met by rejecting a name meaning "a sponge" and substituting one meaning "a true sponge", and since it is contrary to accepted procedure to change a name once given, I propose to revive the use of the word *Spongia*. Vosmaer's suggestion, that "Es ist zweifelsohne besser den Namen *Spongia* fallen zu lassen, da er für sehr verschiedene Schwämme in Anwendung gebracht ist", is indefensible.

Ditela, Schmidt (1862, p. 24, pl. ii, fig. 6), with genotype *D. nitens*, is also a synonym of *Spongia*, as shown by a preparation in the British Museum collection, from the type. The secondary reticulation figured by Schmidt is formed, obviously, by the dried strands of sarcode.

Spongia officinalis, Linnaeus.

Occurrence.—Mangrove Park, Low Isles and Batt Reef.

Remarks.—Judging by the range in form shown by the numerous specimens of commercial sponges in the British Museum collection, including between 400 and 500 individuals presented to the British Museum by Mr. L. R. Crawshay, it seems probable that we shall ultimately recognize one species only, *S. officinalis*, and that this species will be divisible into a number of ill-defined tropi, like those of *Spirastrella purpurea*, recognized by Vosmaer (1911). Since, however, it is hoped that Mr. Crawshay will soon publish his observations on the sponges of the West Indies and since an opinion on this material can only realize its greatest value in conjunction with observations made in the field, I do not propose to consider the Crawshay collection any further here.

The Barrier Reef specimens here assigned to *S. officinalis* are of two forms, which I propose to call α and β respectively. The first, represented by numerous specimens, is spherical or subspherical in form with numerous oscules on the upper surface, and the second is represented by a single bi-ridged specimen.

Form α (= *Euspongia irregularis*, var. *pertusa*, Lendenfeld, see Stephenson, 1931) resembles closely in form and texture the Bahamas Reef Sponge and is, in my opinion, not even varietally distinct from it. It is, moreover, identical with *E. officinalis*, var. *ceylonensis*, Dendy, *E. trincomaliensis*, Lendenfeld, and *E. officinalis*, var. *arabica*, Keller.

Form β approximates closely, in surface structure and texture, to the West Indian Grass Sponge (= *Hippospongia equina* (Schmidt)), but in form agrees very nearly with *Hippospongia canaliculata*, Lendenfeld. There is, too, a resemblance to the Cuban Hard Head (= *H. equina*). On the other hand, except in form, it does not differ greatly from form α, and is obviously congeneric with it and certainly conspecific even when judged by the standard set in Lendenfeld's monograph.

From the Crawshay collections referred to above, it seems certain that the variability of the form in commercial sponges is far greater than has been hitherto suspected, in which case the Australian sponge is identical with the West Indies form. This connection between the faunas of Australia and West Indies has been commented on elsewhere (p. 514).

Distribution.—Australia; Indian Ocean; Malay Area; West Indies.

Spongia nardorus (Lendenfeld).

Aphrodite nardorus, Lendenfeld, 1886, p. 306, pl. xxxv, figs. 24–26; *Hippospongia aphroditella*, *idem*, 1889, p. 312, pl. xi, figs. 11–14; pl. xii, fig. 13; *Ceratodendron haeckelii*, Marshall, 1892, p. 5, pls. ii, iii, pl. vi, figs. 8–15; pl. vii, fig. 1.

Occurrence.—Stn. XIX, 10th March, 1929: about ½ mile N. of Eagle Is., 10 fath., shell, gravel, rich *Halimeda*. Stn. XXI, 11th March, 1929: ½ mile N.W. of Howick Is., 10 fath., mud and shell, foraminifera. Stn. XXII, 11th March, 1929: E. of Snake Reef, 13½ fath., mud, foraminifera, and shell. Stn. XXIII, 12th March, 1929: in lee of Turtle Is., 8 fath., mud and shell

Distribution.—Australia (Torres Straits and Bass Straits).

Thorectopsamma, gen. n.

Genotype.—*T. irregularis*, sp. n.

Diagnosis.—Spongiidae with laminated fibres completely filled with sand-grains, or other foreign matter; skeleton a regular reticulation of quadratic mesh, with secondary fibres only slightly smaller than primary fibres; spongin dark-coloured; no special dermal skeleton.

Remarks.—The genus appears to be closely related to *Thorecta*, *Thorectandra* and *Spongionella*, and is accordingly placed in the family *Spongiidae* following the usage of Lendenfeld (1889). The characteristic feature of *Thorectopsamma* is that all fibres are densely packed with sand-grains, whereas in the three genera mentioned the fibres contain either no foreign matter at all, or a line of sand-grains coring the primary fibres only.

Thorectopsamma irregularis, sp. n.

Holotype.—B.M. 30.8.13.217.

Occurrence.—Stn. XXV, 17th March, 1929: In Papuan Pass, 20–25 fath., foraminifera and coral fragments.

DIAGNOSIS.—Sponge irregularly massive; surface conulose, conuli 1 mm. high and 1–2 mm. from each other; oscules not seen; colour, in spirit, black on upper parts, shading to drab below; meshes of skeleton ·6 to 1·6 mm. across, primary fibres ·2 mm. thick, secondary fibres ·12 mm. thick.

REMARKS.—There is nothing remarkable about the external form of this species, but the skeleton is interesting. The fibres are so densely charged with sand-grains that in most places it is impossible to determine their structure. At several points, however, the fibre is, for a short interval, free of inclusions and the laminated character becomes visible, and this, and the regularity of the skeleton as a whole, suggests that *Thorectopsamma* is a *Thorecta* in which the whole of the fibre is filled with foreign matter.

Genus *Hircinia*, Nardo.

GENOLECTOTYPE.—*I. spongiastrum*, Nardo.

Ircinia (vel Jrcinia), Nardo, 1833, col. 521; *Hircinia*, Nardo, 1834, p. 714; *Stematumenia*, Bowerbank, 1845, p. 406; *Filifera*, Lieberkühn, 1859, p. 370; *Sarcotragus*, Schmidt, 1862, p. 35; *Polytherses*, Duchassaing and Michelotti, 1864, p. 67; *Euricinia*, Lendenfeld, 1889, p. 554; *Hircinella*, *idem*, *l. c.*, p. 564; *Dysidicinia*, *idem*, *l. c.*, p. 565; *Psammocinia*, *idem*, *l. c.*, p. 579.

DIAGNOSIS.—Spongiidae with skeleton of pithed fibres differentiated into primary fasciated systems of fibres, often filled with foreign inclusions, connected by transverse or irregularly-disposed secondary fibres; interstices of skeleton filled to a greatly varying extent with "filaments".

REMARKS.—The genus *Ircinia* was established by Nardo (1833) for *I. spongiastrum* and three other species, the types of which appear to be lost; but the original diagnosis of the genus leaves no doubt that it was intended for those sponges with a horny skeleton, the larger fibres of which are fasiculated, and spongin filaments. The genera *Filifera*, Lieberkühn, and *Stematumenia*, Bowerbank, the descriptions of which are accompanied by figures, must therefore be regarded as identical with it. Later, Nardo (1834, p. 714) altered the spelling to *Hircinia*, which is classically more correct, and since this form has been accepted by subsequent authors, there is no reason why it should not continue to be used.

The following names fall into synonymy with *Hircinia*: *Polytherses*, Duchassaing and Michelotti, and *Euricinia*, *Hircinella*, *Dysidicinia* and *Psammocinia*, all of Lendenfeld. In spite of the absence of filaments from the genoholotype, *Sarcotragus*, Schmidt, must also be so treated (*cf. I. dendroides*, p. 580).

Hircinia irregularis (Poléjaeff).

Cacospongia irregularis, Poléjaeff, 1884, p. 63, pl. vi, fig. 10; pl. viii, fig. 5; *Hircinia gigantea*, Lendenfeld, 1889, p. 588, pl. xxvii, fig. 7; pl. xxviii, fig. 2; pl. xxxvi, figs. 1, 6, 10.

OCCURRENCE.—Stns. II and III, 24th November, 1928: Linden Bank, 28 fath., shell and sand. Stn. XIX, 10th March, 1929: about ½ mile N. of Eagle Is., 10 fath., shell, gravel, rich *Halimeda*.

REMARKS.—The specimens agree closely with the holotype in all respects. Those recorded from Port Jackson as *Hircinia gigantea*, which are now in the British Museum collection, are conspecific with *H. irregularis* (Poléjaeff), but they are much larger and have more prominent conules.

DISTRIBUTION.—Australia (north and east (?) coasts).

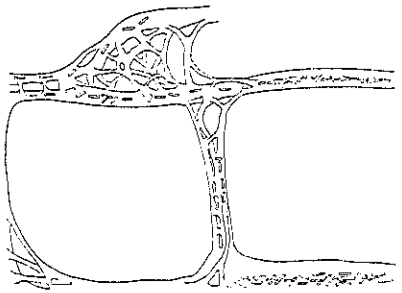
Hircinia echinata, Keller.

H. echinata, Keller, 1889, p. 347, pl. xxi, fig. 13; *H. variabilis*, var. *hirsuta*, Row, 1911, p. 372.

OCCURRENCE.—Stn. XIX, 10th March, 1929: about ½ mile N. of Eagle Is., 10 fath., shell, gravel, rich *Halimeda*.

REMARKS.—A sub-spherical specimen, 11 cm. in diameter, agrees closely with Keller's description of *H. echinata*. The present specimen is conspecific with Row's *Hircinia variabilis*, var. *hirsuta*, from the Red Sea, of which I have examined the type. The identity of *H. variabilis*, var. *hirsuta*, with *H. echinata*, Keller, would thus appear to be well established, although not checked by comparison with the type-specimen of the latter.

DISTRIBUTION.—Red Sea.



TEXT-FIG. 16.—*Hircinia ramosa*, Keller. Section at right angles to surface. × 52.

Hircinia ramosa, Keller. (Plate I, fig. 11; Text-fig. 16.)

H. ramosa, Keller, 1889, p. 345, pl. xx, fig. 5; Row, 1911, p. 372.

OCCURRENCE.—Stn. XIX, 10th March, 1929; ½ mile N. of Eagle Is., 10 fath., shell, gravel, rich *Halimeda*.

REMARKS.—The specimen agrees closely with the holotype and with Row's specimen.

Row's observation that the skeleton of his specimen "is quite free from foreign bodies" is wrong. Spicule fragments are present in the fibres, but not in such numbers as in the Barrier Reef specimen. Text-fig. 16 shows the peculiar clathrous structure commonly seen in both primary and secondary fibres.

DISTRIBUTION.—Red Sea.

Hircinia pinna, Hentschel.

H. pinna, Hentschel, 1912, p. 443, pl. xv, fig. 4; pl. xvi, fig. 5.

OCCURRENCE.—Stns. II and III, 24th November, 1928: Linden Bank, 28 fath., shell and sand.

DISTRIBUTION.—Aru Island.

Hircinia aruensis, Hentschel.

H. aruensis, Hentschel, 1912, p. 445, pl. xvi, fig. 6.

Occurrence.—Stn. XXIV, 13th March, 1929 : ¾ mile N.E. of Pasco Reef, 16½ fath., hard and shelly bottom.

Distribution.—Aru Island.

Hircinia ramodigitata, sp. n. (Plate I, fig, 12 ; Text-fig. 17.)

Holotype.—B.M. 30.8.13.219.

Occurrence.—Stn. XII, 24th February, 1929 : Penguin Channel, 10–15½ fath., rock and shell gravel.

Diagnosis.—Sponge ramo-digitate ; surface conulose ; oscules few, 2 mm. diameter, dispersed ; texture compressible ; colour, in spirit, drab ; skeleton a reticulation of primary and secondary fibres ; primary fibres simple, cored with sand-grains and sponge spicules ; secondary fibres simple or forming an irregular network, rarely containing foreign inclusions ; filaments absent ; dermis containing a reticulation of polygonal mesh formed of sand and spicules.

Remarks.—The external form of the species is shown sufficiently well on Plate I, fig. 12, to obviate the need for further description, and Text-fig. 17 gives a tolerably clear idea of the structure of the skeleton. The distance between adjacent primary fibres is variable within fairly wide limits, making the surface conuli irregular in distribution. The secondary fibres may be simple, or may form an irregular network by branching and anastomosis. Foreign inclusions are confined almost entirely to the primary fibres, only an occasional sand-grain or piece of spicule being found in the secondaries. The primary fibres average ·096 mm. thick and the secondaries ·048 mm. Filaments are absent, but the choanosome is filled with a filamentous alga which simulates the appearance of the " *Hircinia*-filaments ".

There is no well-marked dermal skeleton, but the dermis contains a polygonal reticulation of sand-grains and fragments of spicules which, in some places at all events, appear to be held in place by a coating of spongin of so pale a colour as to be almost inappreciable.

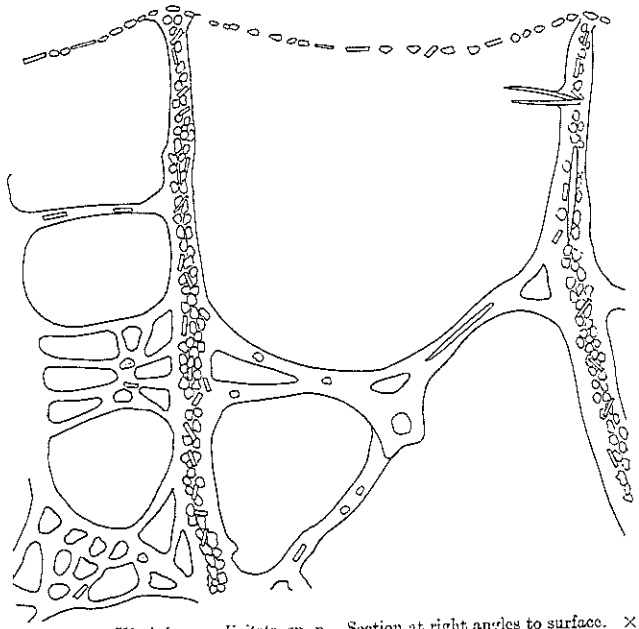
Although filaments are absent, the species has been assigned to *Hircinia* owing to its likeness in all other respects to *H. variabilis* (Schulze). In external form and the structure of the fibres of the skeleton, the holotype of *H. ramodigitata*, sp. n., is singularly like a specimen of *H. variabilis* from Trieste, B.M. 83.12.4.23, identified by Schulze, but the sand in the dermis in Schulze's specimen is not arranged in a reticulation as in the present species, and the secondary fibres form a more clearly marked network.

Hircinia dendroides (Poléjaeff).

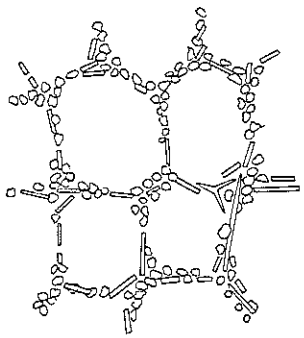
C. dendroides, et varr. *dura*, *friabilis*, Poléjaeff, 1884, p. 60, pl. viii, figs. 1–3 ; pl. vi, fig. 14 ; *Hircinia schulzei*, Dendy, 1905, p. 221, pl. xvi, fig. 3.

Occurrence.—Stn. X, 22nd February, 1929 : Satellite Reef, 14–17 fath., coral, shell, gravel and mud. Stn. XXI, 11th March, 1929 : ½ mile N.W. of Howick Is., 10 fath., mud and shell. Stn. XXIII, 11th March, 1929 : Turtle Is., 8 fath., mud and shell. Stn. XXV, 17th March, 1929 : Papuan Pass, 20–25 fath., foraminifera and coral fragments.

Stn. XXVII, 18th March, 1929 : Papuan Pass, 17 fath., coarse sand. North Anchorage, 17th October, 1928 : 9 fath.



Text-fig. 17*a*.—*Hircinia ramodigitata*, sp. n. Section at right angles to surface. × 70.



Text-fig. 17*b*.—*Hircinia ramodigitata*, sp. n. Section tangential to surface, showing network of sand-grains and foreign spicules. × 70.

Remarks.—The two varieties of this species recognized by Poléjaeff differ in two details only ; in var. *friabilis* the fibres are filled with coarse *débris*, chiefly sand, and the dermis contains an even layer of similar material, and in var. *dura* the fibres contain

only extraneous siliceous spicules and the dermis is without foreign inclusions of any sort. Of the five specimens in the present collection, four agree in skeleton with the type of var. *dura* and one with var. *friabilis*. On the other hand, the one specimen agreeing with the var. *friabilis* in skeleton is identical with the var. *dura* in external form, and those agreeing with the var. *dura* in skeleton approximate closely to var. *friabilis* in external features. It seems probable, therefore, that the differences between the two varieties are of less significance than even Poléjaeff supposed. Possibly it is that the character of the material enclosed within the fibres of a given individual is determined by the nature of the substratum. The evidence in the present instance is not conclusive in this respect, however, since of the four containing only siliceous spicules, one was growing on a mixture of coral, shell, gravel and mud, another on a mixture of mud and shell *débris*, and the third on coarse sand. The nature of the bottom on which the fourth was growing is not known. In each of the first three there would appear to be considerable opportunity for the inclusion of sand-grains, as in the var. *friabilis*, but this has not taken place. Perhaps it is that local variations in the nature of the substratum, of which we are not aware, may be responsible for this anomaly. Each one of these individuals bears unmistakable evidence of having grown on large fragments of calcareous *débris*, chiefly coral, and shows no sign of contact with a muddy or sandy substratum. The one individual corresponding to the var. *friabilis* contains, on the other hand, considerable quantities of foreign inclusions corresponding to those forming the substratum, viz. chiefly the remains of foraminifera and small calcareous particles, with a sprinkling of quartz-grains and a few foreign spicules, so that here at least there is some correlation between the nature of the substratum and the type of material included by the sponge in its fibres.

Each of the present specimens contains some filaments, but the numbers present vary considerably, and in one specimen they are so rare as to be virtually absent. It is not difficult to conceive of their being entirely absent in some individuals, and we are compelled to regard the presence or absence of these filaments as a character of doubtful taxonomic value.

Hircinia schulzei, Dendy, is quite evidently identical with this species, while *Hippospongia frondosa*, Hentschel (1912, p. 435), has a great deal in common and may be identical with it.

Distribution.—Malay Area; Indian Ocean.

Genus *Dysidea*, Johnston.

Duscideia, Johnston, 1842, p. 185; *Dysidea*, Johnston, 1842, p. 251; *Dysidia*, Agassiz, 1846, p. 131; *Spongelia*, Nardo, 1847, p. 3; *Dyscideia*, Lieberkühn, 1859, p. 363; *Duscidea*, Delage and Hérouard, 1899, p. 230.

Diagnosis.—Spongiidae with skeleton normally composed of a reticulation of primary and secondary fibres, usually entirely filled with foreign inclusions.

Remarks.—Johnston (1842, p. 185) established the genus *Duseideia*, but later in the same work (p. 251) altered the spelling to *Dysidea*. Since there is no rule as to which name shall be used, and as the second spelling is in accordance with the recommendations of the International Commission on Nomenclature, and with the standard practice of transliteration (or transcription), the name *Dysidea* is accepted here.

The genus *Dysidea* corresponds to *Spongelia*, as used by the majority of authors; but this name actually post-dates *Dysidea*. The genus *Spongelia* was established by Nardo in 1834 (p. 714) without diagnosis, and without having any species assigned to it. In 1847 (p. 3), Nardo refers to the species *Spongelia elegans*, which was subsequently re-described by Schmidt (1862, p. 28, pl. iii, fig. 5); and as it is probable that Schmidt had access to Nardo's types, *S. elegans* is here accepted as the genotype of *Spongelia*, in which case the name *Spongelia* must date from 1847.

Dysidea fragilis (Montagu). (Plate II, figs. 2–11; Text-figs. 18–33.)

Spongia fragilis, Montagu, 1818, p. 114, pl. xvi, figs. 1, 2; Gray, 1821, p. 360; Fleming, 1828, p. 526; Templeton, 1836, p. 471; *Duscideia fragilis*, Johnston, 1842, p. 187; pl. xiii, fig. 6; pl. xiv, fig. 4; *Spongelia fragilis*, Nardo, 1847, p. 3; *Spongia tupha*, Lieberkühn, 1859, p. 358; *Spongelia elegans*, Schmidt, 1862, p. 28, pl. iii, fig. 5; *S. avara*, *idem*, *l. c.*, p. 29, pl. iii, fig. 6; *S. incrustans*, *idem*, *l. c.*, p. 29, pl. iii, fig. 7; *S. pallescens*, *idem*, *l. c.*, p. 30, pl. iii, fig. 8; *S. pallescens*, Schmidt, 1864, p. 28; (?) *S. fistularis*, *idem*, *l. c.*, p. 28, pl. ii, figs. 28, 29; pl. iii, fig. 4; (?) *S. perforata*, *idem*, *l. c.*, p. 28; *Dysidea fragilis*, Bowerbank, 1864, p. 211, pl. xiv, figs. 270–272; *Spongelia elegans*, Kölliker, 1864, p. 66; *Dysidea fragilis*, Bowerbank, 1866, p. 381; *Spongelia fragilis*, Schmidt, 1870, p. 77; *Dysidea fragilis*, Bowerbank, 1874, p. 175, pl. lxix, figs. 1–3; *D. coriacea*, *idem*, *l. c.*, p. 341, pl. xci, fig. 20; D. *fragilis*, Carter, 1876, p. 232; *Spongelia pallescens* subsp. *fragilis* varr. *incrustans*, *tubulosa*, *ramosa*, subsp. *elastica* varr. *massa*, *lobosa*, Schulze, 1879, p. 138, pl. v, figs. 1–4; pl. vi, figs. 2–3, 5–7; *S. elegans*, *idem*, *l. c.*, p. 151, pl. v, fig. 5; *S. avara*, *idem*, *l. c.*, p. 127, pl. vi, figs. 1, 4; pl. viii, figs. 1–7, 13, 14; *S. spinifera*, *idem*, *l. c.*, p. 152, pl. v, fig. 6; pl. vi, figs. 8–10; *Dysidea fragilis*, Bowerbank, 1882, p. 188; *D. coriacea*, *idem*, *l. c.*, p. 189; *Spongelia pallescens*, Poléjaeff, 1884, p. 42, pl. iii, fig. 1; *Dysidea fragilis*, Carter, 1885, p. 215; *D. cinerea*, Keller, 1889, p. 337, pl. xx, fig. 2; *D. nigra*, *idem*, *l. c.*, p. 338; *Spongelia spinifera*, Lendenfeld, 1889, p. 653; *S. elegans*, *idem*, *l. c.*, p. 655, pl. xxxix, fig. 2; *S. elastica*, *idem*, *l. c.*, p. 657; pl. xxxviii, fig. 8; pl. xliii, fig. 7; *S. elastica*, var. *massa*, *idem*, *l. c.*, p. 658, pl. xliii, fig. 7; *S. elastica* var. *lobosa*, *idem*, *l. c.*, p. 659; pl. xxxviii, fig. 8; *S. fragilis*, *idem*, *l. c.*, p. 660, pl. xxxvii, fig. 10; *S. fragilis* var. *irregularis*, *idem*, *l. c.*, p. 662, pl. xxxvii, fig. 10; *S. fragilis*, var. *incrustans*, *idem*, *l. c.*, p. 664; *S. fragilis*, var. *tubulosa*, *idem*, *l. c.*, p. 665; *S. avara*, *idem*, *l. c.*, p. 667, pl. xliii, figs. 3, 4, 6; *S. fragilis* var. *ramosa*, Dendy, 1905, p. 208; *S. elastica* var. *lobosa*, *idem*, *l. c.*, p. 208; *S. elastica* var. *crassa*, *idem*, *l. c.*, p. 209; *Dysidea cinerea*, Row, 1911, p. 365; *Spongelia spinifera* var. *australis*, Hentschel, 1912, p. 446; *S. fragilis* var. *clathrata*, *idem*, *l. c.*, p. 447; *S. fragilis* var. *ramosa*, Dendy, 1916, p. 139; *S. cinerea*, *idem*, *l. c.*, p. 140; *S. elegans* var., *idem*, *l. c.*, p. 140.

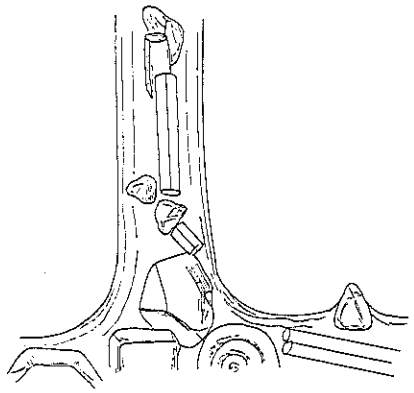
Occurrence.—Stn. X, 22nd February, 1929: Satellite Reef, 14–17 fath., coral, shell, gravel and mud. Stn. XVII, 9th March, 1929: ¼ mile north of N. Direction Is., 19 fath., sand and thick *Halimeda*. Stn. XXIV, 13th March, 1929: ¾ mile N.E. of Pasco Reef, 16½ fath., hard and shell bottom.

Remarks.—The original description of *Spongia fragilis* clearly shows what Montagu (1818, p. 114) intended the name should represent, and this is supplemented by a more detailed description, together with figures, by Johnston (1842, p. 187, pl. xiii, fig. 6; pl. xiv, fig. 4). In the Bowerbank collection, preserved in the British Museum, is a specimen, B.M. 30.7.3.447, labelled "*Dysidea fragilis*, Type Specimen". The handwriting is unknown, but may be that of Johnston, and the specimen itself may have belonged to Montagu, and may actually be the one on which he based his original description. This is, however, pure surmise, for although there is reason to believe that some of the types of both Montagu and Johnston are in the Bowerbank collection, there is nothing on the labels to show this for a certainty. Under the circumstances, the matter can best be met by accepting this specimen as the neotype of *Spongia fragilis*, Montagu. The type being fixed, the next and more important step is to seek out the characters of the species and, more particularly, measure the variations to which these characters may

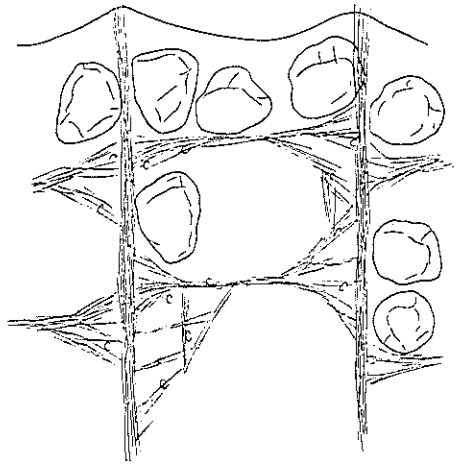
be subject. That the species is a variable one in all respects has been taken for granted, but, unfortunately, so much has been taken for granted that although the species figures prominently in the literature, and has been recorded from many parts of the world, it is impossible from the available records to express in precise terms its characters. As a result, we have, on the one hand, a large number of diverse forms identified by various authors as *Dysidea* (*Spongelia*) *fragilis*, or as varieties thereof, which may or may not belong to the species; and, on the other hand, we have numerous other species described which may conceivably be synonymous with it.

In addition to the specimen already discussed, there are in the Bowerbank collection nearly twenty other examples labelled "*Dysidea fragilis*, Montagu", collected from various parts of the British Isles. From their general resemblance to each other it may be safely assumed that these are all conspecific. In external form they vary to some extent, most of them being small and roundly massive or thinly encrusting with small oscules scattered irregularly over the surface. In some of these, incipient mammillate lobes may be seen, each bearing an oscule at the summit. By easy stages we pass from such forms to those consisting of a basal mass from which arise flabellate, mammillate or digitate upgrowths, which may fuse to give rise to irregular ridges or crests bearing oscules in linear series along the upper border of the crest. The oscules tend to be laterally placed on the digitate processes and apically in all other cases. The surface conuli are always present, but vary slightly in height and in the distance from each other. The distribution of the conuli is determined by the position of the main fibres of the skeleton, and varies as the distance between neighbouring main fibres varies. The type consists of a large massive specimen, 4 cm. high by 7 cm. long by 4 cm. across, with three large oscules on the upper surface, the largest 2 cm. in diameter, leading into deep cloacae.

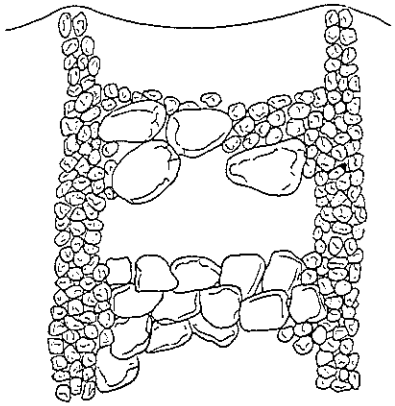
The variations in external form are considerable, but are only of such magnitude as might be expected in such a species, but the variation in the structure of the skeleton is more striking. In the type (Text-fig. 19) it consists of fibres formed of foreign spicules, with large grains of sand scattered between. The reticulation so formed contains primary or ascending fibres and more slender and irregular secondary or transverse fibres. The spicules are mainly oxea with some styli, but include also numerous microscleres, sigmata, toxa and anisochelae. At first sight the specimen appears to be an example of *Gellius angulatus* (Bowerbank) containing sand-grains and foreign spicules, but other considerations suggest that it is a *Dysidea*, in which the spicules of *Gellius angulatus* form the major part of the foreign inclusions. Very little spongin is visible. A second specimen from the Bowerbank collection, B.M. 30.7.3.440, has for skeleton a reticulation of fibres filled with sand-grains, with no visible spongin. The secondary fibres are as regular as the primaries and thicker, the latter being due to the larger size of the enclosed sand-grains (Text-fig. 20). In B.M. 30.7.3.442, a third specimen, the fibres are again filled with sand-grains, but these are all small, and the secondary fibres, instead of being regular transverse fibres, form an irregular secondary network. Spongin is abundantly visible (Text-fig. 21). A fourth specimen, B.M. 30.7.3.441, has primary fibres filled with large sand-grains, the secondary fibres, which again form an irregular network, are for the most part without inclusions, but may contain fine sand-grains or a few fragments of spicules (Text-fig. 22). A fifth specimen, B.M. 30.7.3.446, has a similar skeleton to that of the fourth specimen, but spongin is less conspicuous in the primary fibres (Text-fig. 23). The remaining specimens have skeletons of characters similar to those of the foregoing



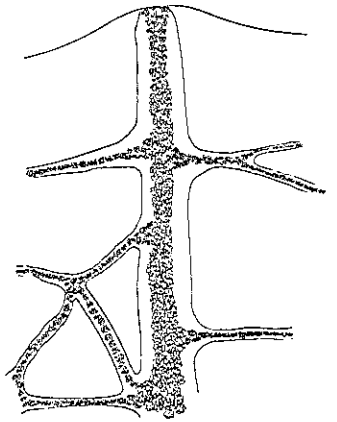
TEXT-FIG. 18.—*Dysidea fragilis* (Montagu), showing structure of fibre.



TEXT-FIG. 19.—Neotype of *Spongelia fragilis* (Montagu), B.M. 30.7.3.447. From a section at right angles to surface. × 50.

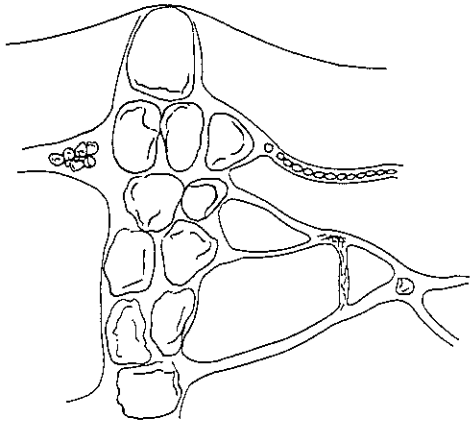


TEXT-FIG. 20.—*Dysidea fragilis* (Montagu), from the Bowerbank collection (B.M. 30.7.3.440). From a section at right angles to surface. × 50.

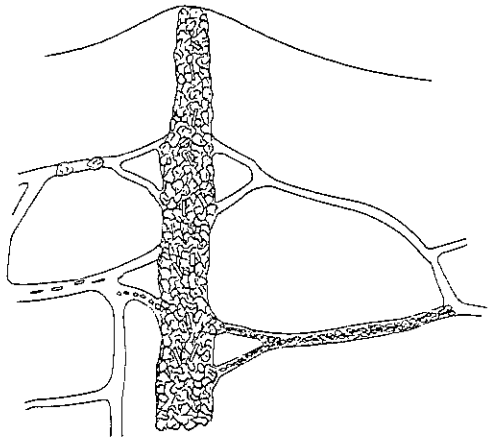


TEXT-FIG. 21.—*Dysidea fragilis* (Montagu), from the Bowerbank collection (B.M. 30.7.3.442). From a section at right angles to surface. × 50.

five specimens, or are of an intermediate nature. In each case the type of skeleton figured here is only the predominant form, and transitions from this to most of the others may be found in a single individual by careful searching.

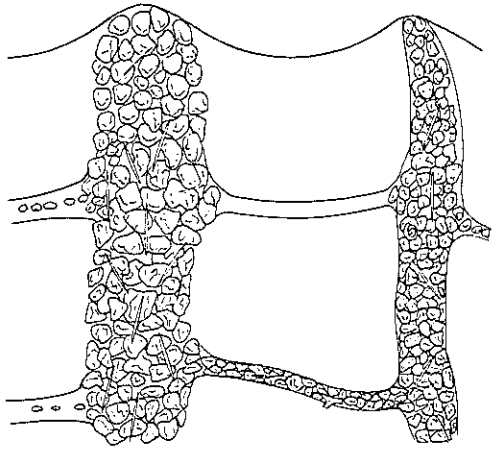


TEXT-FIG. 22.—*Dysidea fragilis* (Montagu), from the Bowerbank collection (B.M. 30.7.3.441). From a section at right angles to surface. × 50.

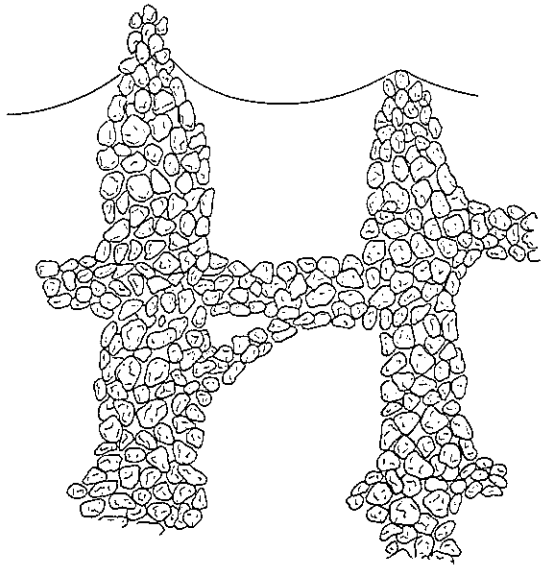


TEXT-FIG. 23.—*Dysidea fragilis* (Montagu), from the Bowerbank collection (B.M. 30.7.3.446). From a section at right angles to surface. × 50.

In case there may be a possibility that certain types of skeleton may be correlated with a particular external form, further researches were made with other specimens showing a greater similarity externally than those in the Bowerbank collection. These show conclusively how variable is the skeleton in this species, not only in the structure



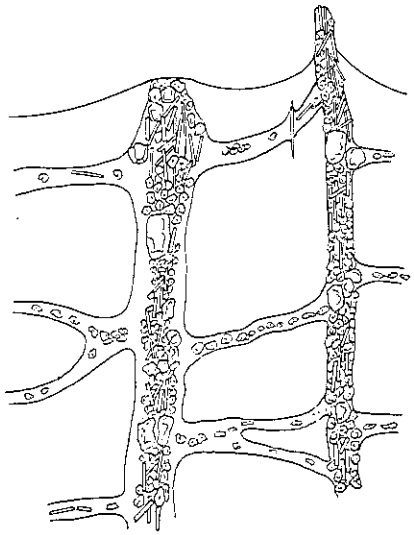
TEXT-FIG. 24.—*Dysidea fragilis* (Montagu), from the Dorset coast (B.M. 97.8.9.70–71). From a section at right angles to surface. × 50.



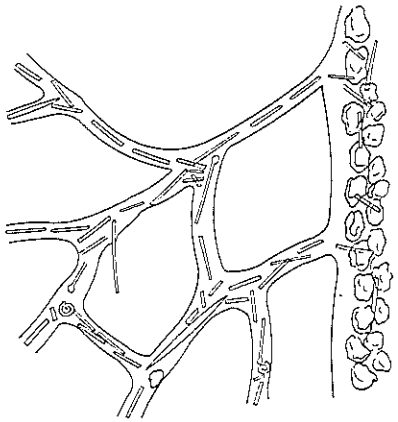
TEXT-FIG. 25.—*Dysidea fragilis* (Montagu), from Poole, Dorset (B.M. 89.7.26.7–12). From a section at right angles to surface. × 50.

of the main reticulation, but in the nature of the inclusions; and also that the type of skeleton bears no relation to the external form.

The material chosen consists of a group of specimens in the British Museum collection identified by various workers as *Spongelia fragilis* (Montagu). The first of these, B.M. 97.8.9.70–71, collected by Kirkpatrick on the Dorsetshire coast, is a small subspherical specimen about 1 cm. high (Plate II, fig. 9), with conulose surface and two small oscules on the upper surface. The skeleton consists of a coarse reticulation of primary fibres of spongin filled with moderately large sand-grains and occasional foreign spicules. The primary fibres are connected at intervals by more slender secondary fibres, which may be



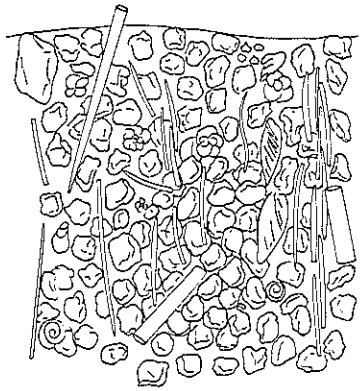
TEXT-FIG. 26.—*Dysidea fragilis* (Montagu), from the English Channel (B.M. 25.11.1.1034). From a section at right angles to surface. × 50.



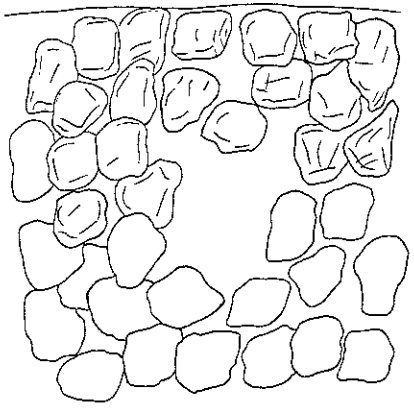
TEXT-FIG. 27.—*Dysidea fragilis* (Montagu), from Littlehampton. From a section at right angles to surface. × 50.

completely filled with sand-grains, or may contain only a central core thereof, or may be entirely free from foreign inclusions (Text-fig. 24). The second specimen, B.M. 89.7.26.7–12, from Poole, is slightly larger than the first (Plate II, fig. 10), but resembles it closely in external appearance. In this, the skeleton is a coarse reticulation of fibres entirely filled with moderately large sand-grains. The secondary fibres are stout, and always completely filled with sand. Spongin is nowhere apparent in this sponge, although its presence may be assumed in view of the compact and regular structure of the fibres (Text-fig. 25). A third specimen, B.M. 25.11.1.1034, from the English Channel (?), closely resembling the first two specimens (Plate II, fig. 5), is slightly larger still, with oscules in linear series along the upper surface. In this the skeleton is again a reticulation of primary and secondary fibres, but both are much more slender, and the secondary

fibres are irregular and often branched. The inclusions are mainly foreign spicules and small grains of sand, with a few foraminifera and large sand-grains. In the primary fibres the inclusions do not occupy the whole of the fibre, and a considerable quantity of spongin is visible surrounding them. In the secondary fibres, too, much spongin is visible (Text-fig. 26). In a fourth specimen, from the Sussex coast, the external form is very like that of the three already discussed, and the skeleton agrees on the whole with that of B.M. 97.8.9.70–71. An interesting modification occurs, however, in that the secondary fibres (Text-fig. 27), instead of remaining simple or only slightly branched, form an irregular network reminiscent of *Spongelia avara* (see Schulze, 1879, pl. vi, fig. 5). The general resemblance between these four specimens is such that no one would hesitate to regard them as representatives of a single species, yet the differences in the skeleton are considerable. The only conclusion to be drawn is, therefore, that the skeleton in this



TEXT-FIG. 28.—*Dysidea fragilis* (Montagu), from Norway (B.M. 10.1.1.598). From a section at right angles to surface. × 50.

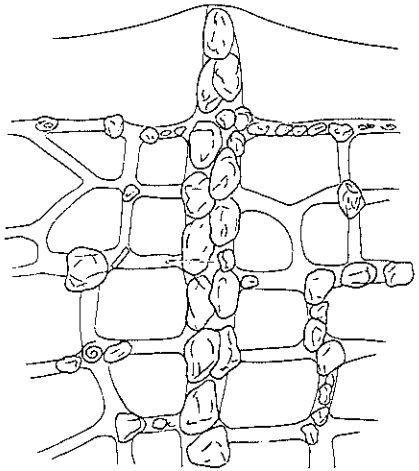


TEXT-FIG. 29.—*Dysidea fragilis* (Montagu), from Hastings (B.M. 81.5.5.31–3). From a section at right angles to surface. × 50.

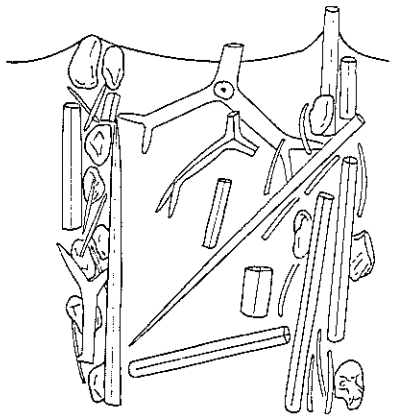
species consists typically of a reticulation of spongin fibres, with stout primary and slender secondary fibres, which may be filled, or even replaced, to a varying degree by foreign inclusions; and that these inclusions may be of differing nature, such as sand-grains, sponge-spicules or foraminifera. Further, that the secondary fibres may be simple transverse connectives, or may branch and anastomose to form an irregular reticulation.

Comparing this group of four specimens with others already described, we see that the variations found in them only foreshadow what takes place in others. The specimen of *S. fragilis* recorded by me (1930, p. 496) from Norway, B.M. 10.1.1.598, has the same external form as B.M. 89.7.26.7–12, but has a somewhat coarser texture (Plate II, fig. 11), and the skeleton consists of a dense mass of sand-grains, sponge-spicules and foraminifera completely filling the choanosome. There is no visible sign of spongin, and the only hint of the suppressed reticulation typical of this species is found in the arrangement of some of the foreign spicules in ascending bands vertical to the surface (Text-fig. 28). A second specimen from Hastings, B.M. 81.5.5.31–33, collected and

identified by Ridley, has a similar skeleton composed entirely of large sand-grains (Text-fig. 29). The specimen itself is depressed and spreading (Plate II, fig. 6). The surface conules are coarse and obtusely ended and the texture of the sponge harsh, as would



TEXT-FIG. 30.—*Spongelia pallescens*, Schmidt (B.M. 67.7.26.9). From a section at right angles to surface. × 50.

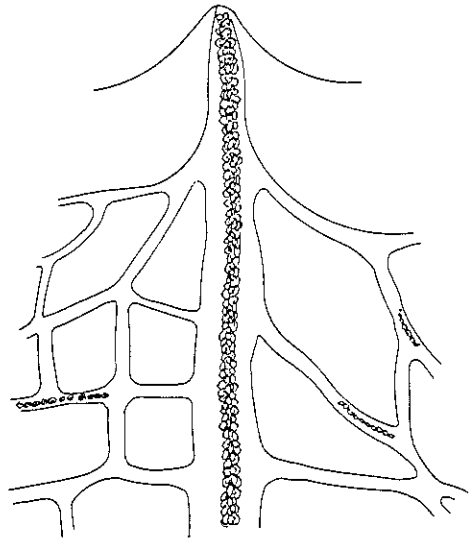


TEXT-FIG. 31.—*Spongelia pallescens*, Schmidt, from S.W. of Ireland (B.M. 82.7.28.12–15). From a section at right angles to surface. × 50.

naturally result from the tissues of the sponge being filled with coarse sand. The depressed form of the sponge is not unusual, since in the same jars as B.M. 97.8.9.70–71 and 89.7.26.7–12, and obviously conspecific with them, occur thinly encrusting and depressed

forms. In some cases these depressed forms bear low mammillate processes, each with an oscule at the summit. The significance of this will be seen later.

A specimen, B.M. 67.7.26.9, from the Adriatic, purchased of O. Schmidt and labelled, in his handwriting, *Spongelia pallescens*, has a similar external form to those specimens from the English coast described above (Plate II, fig. 4). This appears to be the type-specimen figured by Schmidt (1862, pl. iii, fig. 8), and is accepted here as the holotype of *S. pallescens*. In this the skeleton consists of stout primary fibres filled with sand-grains, and an irregular reticulation of secondary fibres sprinkled with sand-grains (Text-fig. 30).



TEXT-FIG. 32.—*Spongelia pallescens*, var. *elastica*, Schulze (B.M. 83.12.4.26). From a section at right angles to surface. × 50.

Carter's specimen (1876, p. 232) of *S. pallescens* from S.W. Ireland, B.M. 82.7.28.12–15, is a small, massive specimen with the usual surface conulation, with oscules on the upper surface and a coarse texture. The skeleton is composed of the spicules of *Stryphnus ponderosus* (Bowerbank), and a few sand-grains arranged in an incipient reticulation, but with no visible spongin (Text-fig. 31).

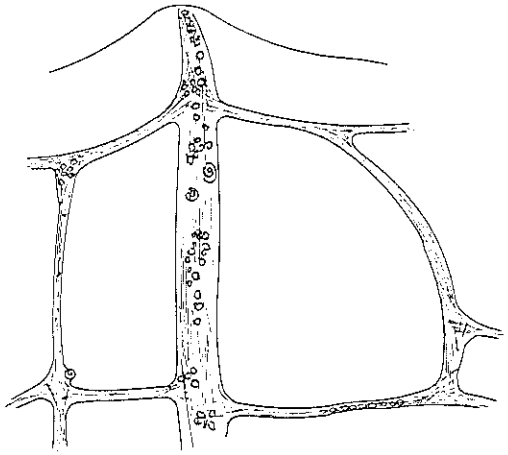
All the specimens enumerated above may be regarded as conspecific, and, now that some measure of the variation of the skeleton has been found, it is possible to consider which of the forms hitherto described belong also to *Dysidea fragilis* (Montagu).

Dysidea coriacea, Bowerbank, represented in the Bowerbank collection by two specimens, has the encrusting form and external appearance commonly found in *D. fragilis*, and is apparently conspecific with that species. In the first of the two specimens the skeleton is intermediate between those of B.M. 10.1.1.598 and B.M. 97.8.9.70–71. The skeleton of the second consists of primary fibres with very little foreign matter

included, and an irregular secondary network of fibres free from inclusions, very much as in *Spongelia pallescens*, var. *elastica* (Text-fig. 32).

According to Schulze (1879, p. 125), *Spongia tupha*, Pallas (1766, p. 398), is a *Spongelia* (= *Dysidea*), and Schmidt (1862, p. 58) has suggested the possibility of its identity with his *Spongelia elegans*, Nardo. Pallas's description of *Spongia tupha* is not sufficient for the recognition of the species, and such speculations as those of Schulze and Schmidt are meaningless. On the other hand, the *Spongia tupha* of Martens (1824, p. 534) and Lieberkühn (1859, p. 358) is almost certainly the same thing as *Dysidea fragilis* (Montagu).

Spongelia elegans, Nardo, the type of the genus *Spongelia*, is unrecognizable from the original description, but Schmidt (1862, p. 28, pl. iii, fig. 5) has assigned certain specimens to it which appear to be digitate forms of *Dysidea fragilis*. The specimens of both Nardo and Schmidt are not available for examination, but as the latter probably saw



TEXT-FIG. 33.—*Spongelia pallescens*, var. *fragilis*, Schulze (B.M. 83.12.14.18). From a section at right angles to surface. × 50.

Nardo's types, and as his figure can be recognized with some degree of accuracy, *Spongelia elegans*, Nardo, is here accepted as a synonym of *Dysidea fragilis*. In the same work Schmidt describes three new species of *Spongelia*, *S. avara*, *S. incrustans* and *S. pallescens*. The last of these has been shown above to be a synonym of *Dysidea fragilis*, and *Spongelia incrustans* from Schmidt's figure is almost certainly the same. *S. avara* seems to differ from *Dysidea fragilis* in that the surface conules are from 2 mm. to 5 mm. apart, but whether this can be regarded as sufficient reason for specific distinction is doubtful, though it is true that the specimen identified by Schulze (1879) as *Spongelia avara*, Schmidt, may conceivably be specifically distinct from Montagu's species. The difference between the holotype of *S. avara* and Schulze's specimens is due entirely to a greater distance between the conules in the latter, though this is hardly a matter for specific distinction.

It would be impracticable here to consider in detail every specimen, but the list of synonyms given above has been compiled by comparison of type and authentic specimens, or with written descriptions where no specimens were available, with a large series of

Dysidea fragilis from European waters, and there is little reason to doubt that all the forms therein mentioned are conspecific.

DISTRIBUTION.—Almost cosmopolitan.

Dysidea reticulata (Thiele).

Dysidcopsis reticulata, Thiele, 1899, p. 28, pl. iii, fig. 7; *Spongelia elegans*, Shaw, 1927, p. 438.

OCCURRENCE.—Stn. XXV, 17th March, 1929: in Papuan Pass, 20–25 fath., foraminifera and coral fragments.

REMARKS.—The specimen is fragmentary, and consists of irregular cylindrical branches with finely conulose surface. The surface conuli are only barely perceptible, but their positions are marked by small, light-coloured patches, the ends of the sand-filled primary fibres showing through the dermis. The skeleton is an irregular network of sand-filled fibres, in which primary fibres can with difficulty be recognized. The sand-grains are mainly of small size and the primary fibres measure ·09 mm. in diameter, the secondary fibres being about ·048 mm. in diameter.

The Barrier Reef specimen does not agree in all respects with the holotype of the species, particularly in the matter of the appearance of the surface. In the holotype the surface conuli are more pronounced, and the sponge itself consists of a basal mass from which short digitate processes arise. The specimens described by Shaw (*loc. cit.*) as *Spongelia elegans*, Nardo, are, however, intermediate to some degree betwen the holotype and the present specimen. They consist mainly of bunches of erect digitate processes, and in some the basal mass is conspicuous, but in others the processes arise directly from the substratum. They show also that the development of the surface conuli is subject to some variation, and comparing them with the holotype and the Barrier Reef specimen, it seems probable that all are representatives of a single species.

DISTRIBUTION.—Celebes; Tasmania.

Dysidea herbacea (Keller).

Spongelia herbacea, Keller, 1889, p. 336, pl. xx, fig. 1; *Dysidcopsis palmata*, Topsent, 1897, p. 482, pl. xx, fig. 25; *Spongelia delicatula*, Row, 1911, p. 364; *S. digitata*, Sollas, 1902, p. 220, pl. xiv, fig. 4; pl. xv, fig. 2; *Dysidcopsis topsenti*, Hentschel, 1912, p. 439; *Spongelia elegans*, var., Dendy, 1916, p. 140; *nec Spongelia elegans*, Nardo et Auctt.

OCCURRENCE.—Between Anchorage Reefs and Mangrove Park, Mangrove Park, Low Isles and Batt Reef. Stn. XXIII, 12th March, 1929: in lee of Turtle Is., 8 fath., mud and shell.

DISTRIBUTION.—Red Sea; Indian Ocean; Malay Area; Australia (south coast).

Family APLYSINIDAE.

Genus *Luffariella*, Thiele.

Luffariella variabilis (Poléjaeff).

Luffaria variabilis, Poléjaeff, 1884, p. 69, pl. ix, figs. 1–6; *Luffariella variabilis*, Thiele, 1899, p. 25.

OCCURRENCE.—Stn. XXI, 11th March, 1929: ½ mile N.W. of Howick Is., 10 fath., mud, shells and foraminifera. Stn. XXIV, 13th March, 1929: ¾ mile N.E. of Pasco Reef, 16½ fath., hard, shelly.

REMARKS.—The two specimens have the massive form of the second of Poléjaeff's specimens, but the surface characters of his ramose form. In other features they agree closely with both.

DISTRIBUTION.—New Hebrides and Tahiti.

Genus *Aplysina*, Nardo.

Aplysina mollis, Row, var. *aruensis*, Hentschel.

A. mollis, var. *aruensis*, Hentschel, 1912, p. 436.

OCCURRENCE.—Stn. X, 22nd February, 1929: Satellite Reef, 14–17 fath., coral, shell, gravel and mud.

REMARKS.—The two sponges consist of irregular basal masses from which digitate processes, several centimetres high and up to ·5 cm. diameter, arise. They appear to agree with Hentschel's (*loc. cit.*) description of var. *aruensis*, but to differ markedly from Row's specimen. If the identification of the present specimens proves correct, it will probably be necessary to regard the var. *aruensis* as a distinct species.

DISTRIBUTION.—Aru Island.

Genus *Druinella*, Lendenfeld.

Druinella purpurea (Carter).

Aplysina purpurea, Carter, 1880, p. 36; Dendy, 1889, p. 971; *A. purpurea*, Carter, 1881, p. 366; *nec* Dendy, 1905, p. 224, and Row, 1911, p. 377; *nec Psammopemma purpureum* (Carter), Kirkpatrick, 1900, p. 358.

OCCURRENCE.—Low Isles, the Thalamita Flat, Mangrove Park and North-east Moat.

REMARKS.—The original description gives little information concerning the characters of the species, except that it is "cactiform on the surface", irregular, and black-purple in colour. Later, Carter (1881) described other specimens from Ceylon and Australia, under the same name, and one of these he figured. According to these figures the sponge from Ceylon is cactiform and black-purple in colour, with a skeleton in which the main fibres are fasciculated (*cf.* Carter, 1881, pl. ix, fig. 1*h*). On the other hand, Dendy's specimen from the Gulf of Manaar has a different type of skeleton and belongs to the genus *Druinella*, Lendenfeld. In either case, it is more probable that Dendy's sponge, from the type-locality, should be conspecific with the holotype than Carter's second specimen, from Ceylon. Therefore, if it should prove that the holotype is definitely lost, as seems probable, I would suggest that Dendy's specimen from the Gulf of Manaar be taken as neotype; and provisionally, I accept this sponge as the type of the species.

The four specimens of the present collection all agree with the type, as here understood, so that the species certainly extends from India to the Great Barrier Reef; and it is of interest to record another typical example from Cape Boileau, N.W. Australia (B.M. 30.12.1.13).

Too much stress laid on the purple colour, and too little on the more essential details of anatomy, has led to errors by various authors. For example, Carter's specimens of

Aplysina purpurea from Ceylon and Australia belong to the genus *Psammaplysilla*, Keller, and may even be conspecific with the genotype, *P. arabica*. Lendenfeld (1889, p. 636) has suggested the identity of *Holopsamma fuliginosum*, Carter, and *Pseudoceratina durissima*, Carter, with *Aplysina purpurea*, Carter (1881, *nec* 1880), but all three are generically distinct, and none is congeneric with *A. purpurea*, Carter, *sensu stricto*.

Psammopemma purpureum (Carter), Kirkpatrick (1900, p. 358), is probably synonymous with *Halisarca rubitingens*, Carter.

DISTRIBUTION.—India; N.W. Australia; Great Barrier Reef.

Druinella ramosa, Thiele.

D. ramosa, Thiele, 1899, p. 24, pl. iii, fig. 3; pl. iv, fig. 5.

OCCURRENCE.—Outer Barrier, Ribbon Bay, middle zones, 4th June, 1929; Outer Barrier, Yonge Bay, Reef Crest, 5th June, 1929.

DISTRIBUTION.—Celebes.

Family APLYSILLIDAE.

Genus *Aplysilla*, Schulze.

Aplysilla rosea (Barrois).

(For synonymy see Burton, 1930, p. 510.)

OCCURRENCE.—Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., rock and shell gravel, mud on edges of pit.

DISTRIBUTION.—Mediterranean; Atlantic coasts of Europe; Australia (east coast).

Genus *Dendrilla*, Lendenfeld.

Dendrilla membranosa (Pallas).

Spongia membranosa, Pallas, 1766, p. 398; *S. membranacea*, Esper, 1794, p. 256, pl. xxxiv; *Spongelia cactus*, Selenka, 1867, p. 565; *Aplysilla cactus*, Schulze, 1878, p. 417; *Dendrilla rosea*, Lendenfeld, 1883, p. 271, pl. x, figs. 3, 4; pl. xii, figs. 16, 19–23; pl. xiii, figs. 24–27, 29–31; *Aplysina membranosa*, Ridley, 1884, p. 391; *A. pallasi, idem, l. c.*, p. 600; *Luffaria roseu*, Carter, 1885, p. 201; *Aplysina caespitosa, idem, l. c.*, p. 282; *A. massa, idem, l. c.*, p. 284; *A. noevus, idem, l. c.*, p. 285; ? *A. eruor, idem, l. c.*, p. 286; *Dendrilla membranosa*, Lendenfeld, 1889, p. 715; *D. rosea* var. *typica, idem, l. c.*, p. 718, pl. xliv, figs. 4, 7, 11; pl. xlv, figs. 3, 4, 7, 9, 11; *D. rosea* var. *digitata, idem, l. c.*, p. 718, pl. xliv, fig. 8; pl. xlv, fig. 8; *D. ianthelliformis, idem, l. c.*, p. 719; *D. cavernosa, idem, l. c.*, p. 719, pl. xliv, figs. 3, 5, 12; pl. xlv, figs. 2, 5; *Spongelia chilensis*, Thiele, 1905, p. 485, fig. 20; *Dendrilla antarctica*, Topsent, 1908, p. 11, pl. iii, fig. 2; pl. iv; *Aplysina praetensa*, Row, 1911, p. 374, pl. xxxvi, fig. 11; *Cacospongia cavernosa, idem, l. c.*, p. 377; *Dendrilla rosea*, var. *typica*, Hentschel, 1912, p. 930; *D. mertoni, idem, l. c.*, p. 433; *Dendrilla antarctica*, Hentschel, 1914, p. 137; *Megalopastas retiaria*, Dendy, 1916, p. 137, pl. iv, fig. 27; *Dendrilla antarctica*, Topsent, 1917, p. 31; *D. cavernosa*, Shaw, 1927, p. 437; *D. membranosa*, Burton, 1929, p. 448.

OCCURRENCE.—Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., rock and shell gravel. Stn. IX, 22nd February, 1929: Penguin Channel, 12–14 fath.

REMARKS.—The above list of synonyms is probably far from complete. It includes only the names of species and varieties whose representative specimens, in most cases type-specimens, have been examined, or such species as are obviously shown by their

original descriptions to be synonyms of *D. membranosa* (Pallas). Doubtless a number of other described species will prove eventually to be synonymous with this species.

The various specimens here regarded as belonging to this species differ in slight details of form, colour, thickness of fibre and in the size of the meshes forming the skeleton, all of which are commonplace variations. The external form ranges from encrusting to irregularly massive, flabellate or digitate.

DISTRIBUTION.—Red Sea; Indian Ocean; Malay Area; Australia (north coast); Antarctic; S. America.

Genus *Basta*, Oken.

Basta, Oken, 1815, p. 77; *Ianthella*, Gray, 1869, p. 49.

REMARKS.—The name *Ianthella* has been universally accepted for *Spongia flabelliformis*, Pallas, and its allies, but, unfortunate though it be, it is not possible to ignore the earlier name given by Oken. This author included two species in the genus *Basta*, *B. ventilabrum* and *B. flabelliformis*, and added "Hierher *Spongia basta*." Whatever else he may have meant, and his references to the genus and its species are not very lucid, it is clear that Oken regarded *Spongia basta*, Pallas, as the representative of his genus *Basta*, with *B. flabelliformis*, Pallas, as a second species. It is not clear what the *B. ventilabrum* mentioned by Oken was intended to represent.

Basta flabelliformis (Pallas).

Spongia flabelliformis, Pallas, 1766, p. 380; *Ianthella flabelliformis*, Gray, 1869, p. 49; *Verongia flabelliformis*, Ehlers, 1870, p. 11; *Ianthella flabelliformis*, Lendenfeld, 1889, p. 696, pl. xlvii, figs. 1–4, 6; pl. xlviii, figs. 1–4; pl. xlix, figs. 1–3; Whitelegge, 1902, p. 62 (sep. copy); Hentschel, 1912, p. 434; Wilson, 1925, p. 474. (For further synonymy see Lendenfeld, 1889.)

OCCURRENCE.—Stn. XII, 24th February, 1929: Penguin Channel, 10–15½ fath., rock and shell gravel.

DISTRIBUTION.—Indian Ocean; Malay Area; Philippines; Australia (north, east and west coasts).

SPONGES OF THE SAVILE KENT COLLECTION FROM THE GREAT BARRIER REEF; WITH A NOTE ON *CALLYSPONGIA RAMOSA* (GRAY).

I. THE SAVILE KENT COLLECTION.

The following species are represented in the British Museum collection by specimens collected by Savile Kent; but as these specimens bear only the label "Great Barrier Reef: Savile Kent Coll.", and no more exact information is available as to the locality, it has been thought better to include them in an appendix.

Unlike the species of which material was obtained by the Great Barrier Reef Expedition, the species represented by the Savile Kent collection are exclusively Australian.

Haliclona brassicata (Carter).

Phakellia brassicata, Carter, 1885, p. 363; *Renicra vasiformis*, *idem*, 1886, p. 445; *R. brassicata*, Dendy, 1895, p. 236.

OCCURRENCE.—Great Barrier Reef: Savile Kent coll.

DISTRIBUTION.—Australia (east and south coasts).

Callyspongia ramosa (Gray).

Spongia ramosa, Gray, 1843, p. 295; *Pachychalina ramosa*, Dendy, 1898, p. 318, pl. xxxiii. (See also p. 603.)

OCCURRENCE.—Great Barrier Reef: Savile Kent coll.

DISTRIBUTION.—New Zealand: Australia (east and south coasts).

Genus *Euplacella*, Lendenfeld.

Euplacella, Lendenfeld, 1887, p. 798; *Placochalina*, *idem*, *l. c.*, p. 790.

GENOLECTOTYPE.—*E. australis*, Lendenfeld, 1887, p. 789.

DIAGNOSIS.—Chalininae with main skeleton a coarse reticulation of stout, horny fibres cored by oxea; special dermal skeleton of more slender fibres forming a reticulation of polygonal mesh, subdivided by secondary fibres, echinated at nodes by brushes of spicules set at right angles to surface.

REMARKS.—The original diagnosis of *Euplacella* reads: "Dünnplatige Plocochalininae mit glatter Oberfläche und zahlreichen regelmässig vertheilten Osculis, welche ausschliesslich auf einer Seite vorkommen. Skeletnetz eng, hexactinellid, mit dicker Fasern. Mit kleinen, schlanken wenig zahlreichen Nadeln." In this the statements concerning the skeleton and the spicules contain nothing diagnostic, as they are applicable equally to all Chalininae of the "Pachychalina" type. The genus is founded, therefore, entirely on the external form. The genus *Placochalina* is similarly founded on external form, viz.: "Grosse, derbe, gestielte, plattige, Placochalininae mit hochwelliger Oberfläche, dicken Skeletfasern und undeutlichen oder mit einem Netz übersponnenen Osculis". On comparing Lendenfeld's descriptions and figures of the various species assigned to these genera, it is apparent that the species are not only congeneric, but the majority are conspecific. On the other hand, the one essential feature characterizing them all, and distinguishing them sharply from other genera of the "Pachychalina" group, namely, the peculiar structure of the dermal skeleton, is entirely overlooked.

External form cannot be used alone as a means of generic distinction in a group in which this feature is so variable. The characteristic structure of the dermal skeleton must therefore be the chief means of diagnosis. And on this basis, a number of other species must be included in the genus *Euplacella* as here understood. These include *Siphonochalina annulata*, Ridley and Dendy, *Pachychalina elongata*, Ridley and Dendy, *Chalinissa communis*, Lendenfeld (see p. 598), *Phylosiphonia stalagmitis*, Lendenfeld, and *P. elegans*, Lendenfeld.

Euplacella australis, Lendenfeld.

E. australis, Lendenfeld, 1887, p. 789 ; *E. frondosa*, *idem*, *l. c.*, p. 789, pl. xxi. fig. 36 ; *Pachychalina australis*, Whitelegge, 1906, p. 457.

Occurrence.—Great Barrier Reef : Savile Kent coll.

Remarks.—The single specimen is typical in all respects.

Distribution.—Australia (north, east, west and south coasts).

Euplacella annulata (Ridley and Dendy).

Siphonochalina annulata, Ridley and Dendy, 1886, p. 331 ; *eidem*, 1887, p. 31, pl. vii, fig. 2 ; *Phylosiphonia annulata*, Lendenfeld, 1887, p. 789, pl. xxiii, fig. 45 ; *Siphonochalina annulata*, Whitelegge, 1906, p. 459.

Occurrence.—Great Barrier Reef ; Savile Kent coll.

Remarks.—Two specimens were obtained : the first consists of a group of tubes, 9 cm. high, rising from a common base ; and the second is stipitate, with a series of 7 tubes arranged fan-wise at the top of a stout stalk, the total height of the specimen being 17 cm. In both the skeleton is typical.

Distribution.—Australia (south and east coasts).

Euplacella communis (Lendenfeld).

Chalinissa communis, var. *flabellum*, Lendenfeld, 1887, p. 772, pl. xx, fig. 32 ; pl. xxvii, figs. 5, 11, 13, 15 ; *C. communis*, var. *digitata*, *idem*, *l. c.*, p. 772, pl. xx, fig. 30 ; *C. tenuifibris*, *idem*, *l. c.*, p. 773, pl. xx, fig. 29 ; *C. serpens*, *idem*, *l. c.*, p. 773, pl. xx, fig. 33 ; *C. elegans*, *idem*, *l. c.*, p. 773, pl. xx, fig. 27 ; *C. rigida*, *idem*, *l. c.*, p. 773 ; *C. elongata*, *idem*, *l. c.*, p. 774, pl. xx, fig. 34 ; *C. ramosa*, *idem*, *l. c.*, p. 774, pl. xx, fig. 31.

Occurrence.—Great Barrier Reef ; Savile Kent coll.

Remarks.—The representatives of the species included in the above list of synonyms are so obviously conspecific, when examined side by side, that it is unnecessary to say more about them.

Distribution.—Australia (east coast).

Euplacella mollissima, Lendenfeld.

Cavochalina bilamellata, Carter, 1885, p. 287 ; *Euplacella mollissima*, Lendenfeld, 1887, p. 790, pl. xxi, fig. 37 ; *Placochalina pedunculata*, var. *dura*, *idem*, *l. c.*, p. 791, pl. xxi, fig. 38 ; *P. pedunculata*, var. *poculum*, *idem*, *l. c.*, p. 792, pl. xxi, fig. 39 ; *P. pedunculata*, var. *mollis*, *idem*, *l. c.*, p. 792, pl. xxi, fig. 35. *Nec Spongia bilamellata*, Lamarck ; *nec Cribrochalina poculum*, Schmidt.

Occurrence.—Great Barrier Reef ; Savile Kent coll.

Remarks.—It is doubtful whether this species is really distinct from *E. australis*, Lendenfeld.

There is a large series of specimens in the British Museum collection which shows clearly that the various species and varieties included in the synonymy list above are identical.

Distribution.—Australia (north, east and south coasts).

Tedaniopsamma, gen. n.

Genotype.—*Hircinia flabellopalmata*, Carter.

Diagnosis.—Myxillinae with main skeleton composed of a reticulation of horny fibres, filled with sand, with styli and raphides scattered in its interstices.

Remarks.—Lendenfeld (1889, p. 605) assigned *Hircinia flabellopalmata*, Carter, to the genus *Sigmatella*, remarking that the proper spicules were strongyla only. The spicules in the holotype of this species are styli and slender raphides, and the same is true of the three specimens from the Barrier Reef, which agree exactly with the holotype in external form also. The sponge figured by Lendenfeld (*loc. cit.*) appears to be the holotype, so that that author's statement regarding the spiculation may be taken to be the result of inaccurate observation.

Tedaniopsamma flabellopalmata (Carter).

Hircinia flabellopalmata, Carter, 1885, p. 313 ; *Sigmatella flabellipalmata*, Lendenfeld, 1889, p. 616, pl. xxxix, fig. 1 ; pl. xli, fig. 5.

Occurrence.—Great Barrier Reef : Savile Kent coll.

Remarks.—Three specimens, the largest 60 cm. high by 30 cm. across.

Distribution.—Australia (south coast).

Clathria transiens, Hallmann.

C. transiens, Hallmann, 1912, p. 226, pl. xxxiii, figs. 1–3 ; pl. xxxiv, fig. 2 ; text-figs. 47, 48*a*.

Occurrence.—Great Barrier Reef ; Savile Kent coll.

Distribution.—Australia (south coast).

Wilsonella australiensis, Carter.

W. australiensis, Carter, 1885, p. 366 ; *Clathria australiensis*, Dendy, 1896, p. 33.

Occurrence.—Great Barrier Reef ; Savile Kent coll.

Distribution.—Australia (south coast).

Ophlitaspongia tenuis (Carter).

(For synonymy see Hallmann, 1912, p. 261.)

Occurrence.—Great Barrier Reef ; Savile Kent coll.

Remarks.—The single specimen is thinly lamellar, very proliferous, anastomosing and low-growing. Thus it resembles in outward form both *Clathria angulifera*, Dendy, and *Wilsonella connectens*, Hallmann (1912, pl. xxxii, fig. 2), but the spiculation is typical.

Distribution.—Australia (south coast).

Ophlitaspongia axinelloides, Dendy.

O. axinelloides, Dendy, 1896, p. 39.

Occurrence.—Great Barrier Reef ; Savile Kent coll.

Distribution.—Australia (south coast).

Echinochalina glabra (Ridley and Dendy).

Echinoclathria glabra, Ridley and Dendy, 1886, p. 476; *idem*, 1887, p. 163, pl. xxix, fig. 11; pl. xxi, fig. 2; Dendy, 1896, p. 40; *Thalassodendron viminalis*, Whitelegge, 1901, p. 87; *Echinoclathria intermedia*, *idem*, 1902, p. 214; *Echinochalina reticulata*, *idem*, 1907, p. 506, pl. xlv, fig. 25; *E. glabra*, *idem*, *l. c.*, p. 507; *E. reticulata*, Hallmann, 1912, p. 289, pl. xxx, fig. 2, text-fig. 66; *E. reticulata*, var., *idem*, *l. c.*, p. 290, pl. xxxi, fig. 1; *E. glabra*, *idem*, *l. c.*, p. 290, text-fig. 67; *E. anomala*, *idem*, *l. c.*, p. 294, text-fig. 69.

Occurrence.—Great Barrier Reef; Savile Kent coll.

Remarks.—The various specimens recorded under the names included in the above list of synonyms agree in general features, but differ in small details of spiculation. There is, however, nothing to justify a specific distinction, and such differences as are present amount to no more than the normal fluctuating variations.

Distribution.—Australia (south and east coasts).

Crella incrustans, var. *digitata*, Hallmann.

C. incrustans, var. *digitata*, Hallmann, 1912, p. 156, pl. xxiii, fig. 2, text-figs. 28, 29.

Occurrence.—Great Barrier Reef; Savile Kent coll.

Remarks.—The specimen has the external form of *C. incrustans*, var. *digitata*, and the spiculation of the var. *perramosa*.

Distribution.—Tasmania.

Genus *Halichondria*, Fleming.

Halichondria, Fleming, 1828, p. 520; *Halispongia*, Blainville, 1830, p. 495; *Spuma*, Michlucho-Maclay, 1870, p. 13.

Remarks.—The first species mentioned by Blainville as belonging to *Halispongia* is *Spongia papillaris*, Grant (= *Halichondria panicea*, Auctt.). This is here taken as the genolectotype, so that *Halispongia* becomes a synonym of *Halichondria*.

Spuma borealis, as figured by Michlucho-Maclay, is obviously identical with *Halichondria panicea*.

Halichondria phakellioides, Dendy and Frederick. (Plate II, fig. 1.)

H. phakellioides, Dendy and Frederick, 1924, p. 498, pl. xxxvi, fig. 10.

Occurrence.—Great Barrier Reef; Savile Kent coll.

Remarks.—A single specimen, composed of a number of vertical lamellae set at varying angles to each other, agrees closely with the holotype. A second specimen in the British Museum collection was obtained from Swan River, W. Australia.

Distribution.—Australia (west and south-west coasts).

Carterispongia elegans (Lendenfeld).

Phyllospongia elegans, Lendenfeld, 1889, p. 192, pl. v, fig. 4; pl. vii, fig. 2.

Occurrence.—Great Barrier Reef; Savile Kent coll.

Remarks.—Three specimens were obtained, all of typical external form. In one

of them the usual sandy inclusions of the fibres and cortex are replaced by foreign sponge spicules.

Distribution.—Australia (west and east coasts).

Spongia officinalis, Linnaeus, var. *mollissima*, Schmidt.

Spongia mollissima, Schmidt, 1862, p. 23; *Spongia officinalis*, subsp. *mediterranea*, var. *mollissima*, Hyatt, 1877, p. 511, pl. xvi, fig. 21; *S. officinalis*, subsp. *mediterranea*, var. *zimocciformis*, *idem*, *l. c.*, p. 511; *Euspongia officinalis*, var. *mollissima*, Schulze, 1879, p. 616, pl. xxxv, figs. 1, 2; Lendenfeld, 1889, p. 268.

Occurrence.—Great Barrier Reef; Savile Kent coll.

Remarks.—Two large massive sponges, the larger 25 cm. by 16 cm. by 12 cm. high, appear to agree closely with this variety.

Distribution.—Mediterranean.

Spongia lignea, Hyatt.

S. lignea, Hyatt, 1877, p. 515; *Euspongia officinalis*, var. *dura*, Lendenfeld, 1886, pp. 531, 533; *idem*, 1889, p. 275, pl. xii, fig. 2; pl. xxii, fig. 7.

Occurrence.—Great Barrier Reef; Savile Kent coll.

Remarks.—Hyatt's original description leaves much to be desired, but the reference to the hard, cork-like texture of the sponge makes it almost certain that the present identification is correct.

Distribution.—Australia (east coast).

Spongia equina (Schmidt).

Euspongia equina, Schmidt, 1868, p. 4. (For further synonymy see Lendenfeld, 1889, pp. 302–8.)

Occurrence.—Great Barrier Reef; Savile Kent coll.

Remarks.—A large subspherical sponge, 28 cm. in greatest diameter, so abundantly infested with barnacles that its identification is rendered uncertain. From the small areas of the sponge unaffected by the commensals, it appears to be *Spongia equina* (Schmidt).

Distribution.—Mediterranean; West Indies; Australia (all coasts).

Spongia zimocca, Schmidt.

S. zimocca, Schmidt, 1862, p. 23, pl. iv, figs. 3, 4; *Euspongia zimocca*, Schulze, 1879, p. 614, pl. xxxv, fig. 10; Lendenfeld, 1889, p. 261, pl. xxii, fig. 4; pl. xxxviii, fig. 6.

Occurrence.—Great Barrier Reef; Savile Kent coll.

Remarks.—A single specimen, dorso-ventrally flattened, measuring 22 cm. by 14 cm. by 3 cm., seems to be identical with this species.

The species has been previously identified from Australia by Lendenfeld (*loc. cit.*).

Distribution.—Mediterranean; Australia (east coast).

Genus *Fasciospongia*, gen. n.

GENOTYPE.—**Stelospongia australis*, var. *fovea*, Lendenfeld, 1889, p. 518.

DIAGNOSIS.—Skeleton of stout, pithed fibres; primary fibres forming well-marked fasciated systems, each connected to neighbouring systems by a loose reticulation of secondary fibres; primary fibres cored by a weak line of broken sponge spicules; no special dermal skeleton.

REMARKS.—In the structure of the fibres and the nature of the inclusions in the primary fibres, this species agrees with *Cacospongia* (see Topsent, 1929, pp. 9–10, text-figs. 2, 3). The distinction of the new genus depends on the fact that the primary systems run to the surface and are connected by an irregular system of secondary fibres.

The structure of the fasciated fibres is seen well in *Stelospongia costifera*, Lendenfeld, and *S. pulcherrima*, Lendenfeld, both of which must be regarded as belonging to *Fasciospongia*.

Fasciospongia fovea (Lendenfeld).

Stelospongia australis, var. *fovea*, Lendenfeld, 1889, p. 518, pl. xxiv, fig. 8; pl. xxv, fig. 4; pl. xxxi, figs. 7, 9; pl. xxxii, fig. 9.

OCCURRENCE.—Great Barrier Reef; Savile Kent coll.

REMARKS.—This species is tolerably well figured by Lendenfeld. His pl. xxxi, fig. 7, shows the conspicuous nature of the fasciated primary fibres, but unfortunately Lendenfeld figures them as a series of straight lines instead of an intricate system of anastomosing and connected fibres. *Cacospongia amorpha*, Poléjaeff, is, contrary to Lendenfeld's assertion, not a synonym of the present species.

DISTRIBUTION.—Australia (all coasts).

Genus *Euryspongia*, Row.

GENOTYPE.—*E. lactea*, Row, 1911, p. 366, pl. xxxix, fig. 23; pl. xli, figs. 27, 28.

DIAGNOSIS.—Skeleton composed of primary fibres, often cored with sand-grains, and connected by an irregular reticulation of secondary fibres; fibres laminated, non-pithed (?); no special dermal skeleton.

Euryspongia canalis (Lendenfeld).

Stelospongia canalis, Lendenfeld, 1889, p. 495, pl. xxiv, fig. 10; pl. xxix, figs. 2, 4, 5, 7; pl. xxxi, fig. 1; pl. xxxii, fig. 6.

OCCURRENCE.—Great Barrier Reef; Savile Kent coll.

REMARKS.—There is little to add to the original description, except that the main fibres often contain an axial filling of sand-grains, and that the description of the connecting fibres given by Lendenfeld is incorrect. He says, "The skeleton consists of simple main fibres, which are joined by simple or slightly branched connecting fibres." In actual fact the connecting fibres form a very irregular network between the main fibres, and it is this, coupled with the structure of the fibres, that determines the resemblance of this species to *Euryspongia lactea*, Row.

A second specimen in the British Museum collection is labelled Swan River (West Australia).

DISTRIBUTION.—Australia (south, east and west coasts).

* Genus *Stelospongos*, Schmidt.

Stelospongos, Schmidt, 1870, p. 29; *Stelospongia*, Schulze, 1879, p. 613; *Stelospongus*, Carter, 1885, p. 303.

REMARKS.—The genus *Stelospongos* was founded by Schmidt but no species were named, and the diagnosis given is hopelessly inadequate. The name is therefore a *nomen nudum*. Unfortunately, under a revised spelling, it was made popular by Schulze and Lendenfeld, and has been used for a number of species of horny sponges, of which the only common feature is a fibre of stiff texture when dried.

II. CALLYSPONGIA RAMOSA (GRAY).

Callyspongia ramosa (Gray).

Spongia ramosa, Gray, 1843, p. 295; *Pachychalina ramosa*, Dendy, 1898, p. 318, pl. xxxiii: *Chalina polychotoma*, var. *trichotoma*, Carter, 1885, p. 115: *Cladochalina nuda*, Ridley, 1884, p. 395, pl. xli, fig. 1; *C. nuda*, var. *abruptispicula*, *idem*, *l. c.*, p. 396, pl. xli, fig. 3: *Tozochalina robusta*, Ridley and Dendy, 1887, p. 50 (*nec T. robusta*, Ridley); *Chalinopora paucispina*, Lendenfeld, 1887, p. 765; *Cladochalina dendroides*, *idem*, *l. c.*, p. 769, pl. xix, fig. 21; *C. mammillata*, *idem*, *l. c.*, p. 769; *C. tenuirhaphis*, *idem* *l. c.*, p. 769, pl. xix, fig. 24; *Pachychalina paucispina*, *idem*, *l. c.*, p. 776; *P. ramulosa*, et varr. *lamella* et *digitata*, *idem*, *l. c.*, p. 777, pl. xix, fig. 22; *P. macrospina*, *idem*, *l. c.*, p. 777; *P. elegans*, *idem*, *l. c.*, p. 777, pl. xix, fig. 18; *P. rigida*, *idem*, *l. c.*, p. 778, pl. xix, fig. 14; *P. oculata*, *idem*, *l. c.*, p. 778; *Ceraochalina papillata*, et varr. *macropora*, *intermedia* et *micropora*, *idem*, *l. c.*, pp. 780, 781, pl. xix, fig. 16; *C. nuda*, et varr. *oxyus* et *oxystrongylus*, *idem*, *l. c.*, pp. 781, 782: *C. levis*, *idem*, *l. c.*, p. 782, pl. xix, fig. 19: *C. microrhaphis*, *idem*, *l. c.*, p. 783: *C. multiformis*, et varr. *maeandra*, *elegans*, *lamella*, *digitata*, *mollis* et *dura*, *idem*, *l. c.*, pp. 783, 784, pl. xix, figs. 15, 20, 23, 25; pl. xxvii, figs. 4, 25; *C. tenella*, *idem*, *l. c.*, p. 785; *C. reteplax*, *idem*, *l. c.*, p. 785, pl. xix, fig. 17; *C. cuplax*, *idem*, *l. c.*, p. 785, pl. xix, fig. 13; *C. extrema*, *idem*, *l. c.*, p. 785; *Dactylochalina mollis*, *idem*, *l. c.*, p. 812; *D. candelabrum*, *idem*, *l. c.*, p. 812; *D. condata*, *idem*, *l. c.*, p. 813, pl. xviii, fig. 2; *D. australis*, *idem*, *l. c.*, p. 813; *Euchalinopsis dendroides*, *idem*, *l. c.*, p. 816, pl. xviii, fig. 8; *E. minima*, *idem*, *l. c.*, p. 816, pl. xviii, fig. 3; *Euchalina typica*, *idem*, *l. c.*, p. 817, pl. xviii, fig. 5; pl. xxvii, fig. 24: *E. paucispina*, *idem*, *l. c.*, p. 818; *E. macropora*, *idem*, *l. c.*, p. 818; *E. exigua*, et varr. *simplex* et *arborea*, *idem*, *l. c.*, p. 818, pl. xviii, figs. 6, 10; *E. phillippinensis*, *idem*, *l. c.*, p. 819; *Tozochalina difficilis*, Brøndsted, 1923, p. 132, fig. 14; *Chalina oculata*, var. *novae-zealandiae*, Dendy, 1924, p. 326; *Ceraochalina pergamentacea*, *idem*, *l. c.*, p. 327; *Pachychalina affinis*, Brøndsted, 1924, p. 455, fig. 13; *Tozochalina chalmeri*, *idem*, 1926, p. 5, fig. 4; *Cladochalina dendyi*, Burton, 1929, p. 421.

DIAGNOSIS.—Sponge typically branching and erect, with oscules in linear series along margins of branches or scattered over faces of branches; oscules level with surface, mammillate or incipiently fistulous (collar-like margins); branches rounded or flattened, with tendency to fuse, forming irregularly massive or flabellate individuals; main skeleton a regular network with ascending fibres bi- or multispicular, conjunctive fibres usually unispicular; dermal skeleton of small, primary meshes, subdivided into a few secondary meshes, usually unispicular, sometimes echinated; spicules oxea, with abruptly pointed ends, ·03 to ·1 by ·002 to ·01 mm.; toxa, often absent, ·03 to ·1 mm. chord.

REMARKS.—*Spongia ramosa*, Gray, was re-described by Dendy (1898, *loc. cit.*) from four specimens from New Zealand. These were divided into two varieties, quite unnecessarily, as can now be seen. The sponges are erect, with long, cylindrical branches bearing numerous small oscules level with the surface, sometimes arranged in linear series along the sides of the branches, sometimes scattered generally over the surface of the sponge. The external form, therefore, resembles closely that of *Haliclona oculata* (Pallas).

The skeleton is differentiated into main and dermal portions, the latter being readily detachable from the outer ends of the ascending fibres of the main skeleton. The main skeleton consists of the usual quadratic mesh of spiculo-fibre, the ascending (primary) fibres being cored by a somewhat plumose series of spicules and the conjunctive (secondary) fibres by a linear series of single spicules. The dermal skeleton is unispicular throughout, and resembles, almost exactly, that of *Callyspongia fallax*, Duchassaing and Michelotti. The spicules are oxea, ·04 by ·005 mm., nearly straight, and abruptly pointed at each end. The lectotype of the species is specimen A (Dendy, *loc. cit.*, pl. xxxiii). The remaining three specimens differ so little in the main details of the skeleton, external form, texture, etc., that it is unnecessary to say anything more on this point, and it is most emphatically a waste of time to attempt to divide them into varieties. Two points may, however, be noted. In specimen B (B.M. 42.12.2.122) the dermal skeleton is echinated as in the type of *Patuloscula* (*cf.* p. 542, Text-fig. 6), and a few, very rare, toxa are present in the meshes of the dermal skeleton. This at first sight would appear to suggest a varietal, or even specific difference. In fact, if we were to attempt to maintain our old ideas of classification, the lectotype would be placed in the genus *Chalina*, or *Pachychalina* (according to the taste of the author), and specimen B in the genus *Toxochalina*. Further, specimen B is so like specimen C in all essential details that no one would hesitate to pronounce them identical, yet specimen C, although possessing very rare toxa, has a dermal skeleton which is not echinated. Moreover, while both specimen B and specimen C are in all other respects indistinguishable from it, the lectotype has a non-echinated dermal skeleton, and is without toxa. We have to be prepared, therefore, to regard the presence or absence of toxa, and the presence or absence of echinating spicules in the dermal skeleton, as features without taxonomic significance.

Dendy (*loc. cit.*, p. 318) included, as a synonym of *Chalina* (*Spongia*) *ramosa* (Gray), *Ceraochalina levis*, Lendenfeld. The specimens, three in number, described by Lendenfeld under this name are in the British Museum: The first (B.M. 86.10.27.436), from Port Chalmers, New Zealand, is a Sponge—Alga pseudomorph; the second (B.M. 86.8.27.443), the figured specimen (Lendenfeld, 1887, pl. xix, fig. 19), also from Port Chalmers, has the same appearance macro- and microscopically as the lectotype of *Spongia ramosa*, but the branches are twice as thick, the oxea are ·06 mm. long, though having the same characteristic shape, and the toxa, up to ·06 mm. chord, are abundant. The third specimen (B.M. 86.8.27.433), from Torres Straits, Australia, is indistinguishable externally from the second specimen and has the same arrangement of the fibres in the skeleton. Toxa are, however, absent, and the oxea measure only ·04 by ·002 mm., as against ·06 by ·004 mm. The oxea have not, moreover, the abruptly-pointed ends, but every now and then one finds an occasional stouter oxeote with the characteristic shape. In all probability these two specimens are conspecific, yet, according to present ideas, one is a *Ceraochalina* and the other a *Toxochalina*. Whether they can really be considered identical is a little doubtful on account of the geographical separation, but this is a point to which reference will be made later. At all events, specimen 2, the figured specimen, is the lectotype, and this is certainly identical with *Chalina* (*Spongia*) *ramosa* (= *Callyspongia ramosa*, Gray, on account of the structure of the dermal skeleton).

Since Lendenfeld's time, Brøndsted has described several species from New Zealand. One of these, *Toxochalina chalmeri*, from Port Chalmers, is, although I have not seen the specimen, unquestionably identical with the lectotype of *Ceraochalina levis*, Lendenfeld (= *Callyspongia ramosa* (Gray)). Similarly, there can be no question that *Toxochalina difficilis*, Brøndsted, from Carnley Harbour, New Zealand, is also of the same identity, although the oxea measure ·08 by ·009 mm. Moreover, *Pachychalina affinis*, a piece of which I have been able to examine, through the kindness of Dr. Brøndsted, differs from the type of *Callyspongia ramosa* only in that the meshes of the dermal skeleton are larger, and the oxea measure ·07 by ·006 mm. The latter have, however, the characteristic shape, the ends being more pronouncedly abrupt than is shown in Brøndsted's figure (1924, p. 454, fig. 13). Further, the typical toxa are present, though in very small numbers, but because there are so many foreign spicules in (or on ?) the dermis of this specimen, their significance was not readily apparent.

It will be useful at this juncture to quote Brøndsted's remarks, made *à propos* of his *Toxochalina difficilis*: "Here we have one of the many cases where the difficulties in classifying amongst the *Monaxonida* are clearly seen. The structure of the skeleton as well as the shape of the oxea are exactly as in *Chalina*: while the sponge, if the microscleres are to be decisive for classification, is to be included amongst the *Gelliinae*.

"Although it is most natural, in my opinion, to place *Toxochalina* among the *Chalininae*, I here still refer it to the *Gelliinae* which I find most practical. As well known, it is impossible to find a usable limit between 'greater' and 'lesser' amount of spongin, while the diagnosis 'microscleres present' and 'microscleres absent' is an absolute distinction, and therefore practical. Sooner or later the genus, however, will be included among the *Chalininae*; we often see that microscleres appear in separate groups independent of one another, groups in which the primordial forms all are devoid of microscleres. But as yet it would be to break up the well-defined *Chalinine*-group, if we include in it the genus *Toxochalina*." The following observations will show how justified are these remarks, and will perhaps clear up some of the doubts expressed therein. On one point, however, I disagree with Brøndsted—that concerning the value of the presence or absence of microscleres as a diagnostic feature. This is not an "absolute distinction" as the present paper shows, and as I have seen over and over again in examining specimens in the British Museum collection. Indeed, it is to the acceptance by nearly all authors of this false premise that so many of our difficulties are due.

Returning now to the synonymy of *Callyspongia ramosa* (Gray), it happened that in examining the types of *Ceraochalina levis*, Lendenfeld, my attention was drawn to the similarity to Gray's species of many of the species described by Lendenfeld in his 'Chalineen des Australischen Gebietes,' the book on which our present classification of the Chalininae (if not the Haploscleridae) is mainly based. Subsequent investigations, the results of which are given below, showed that many of these species are undoubtedly synonymous with *Callyspongia ramosa*:

1. *Cladochalina dendroides* (Port Chalmers): External form typical, but branches slightly flattened. Margins of oscules produced into collar-like extensions. Skeleton generally typical, but dermal skeleton echinated. Oxea, of characteristic shape, ·07 by ·006 mm., and toxa abundant, up to ·07 mm. chord. Lendenfeld overlooked the toxa, which are very conspicuous, and described the megascleres as "Oxyus gerade . . . 0,05 mm. lang und 0,004 mm. dick."

2. *Cladochalina mammillata* (Port Chalmers): Described as "Unregelmässig lappige Schwämme mit Erhebungen, auf deren Gipfel . . . weiten Oscula liegen" The

truth is that the type (and only specimen!) has virtually the same shape as *Cladochalina dendroides*, but the branches have coalesced and the oscules become mammilliform. The skeleton is typically that of *Callyspongia ramosa*, with a few toxa present. The oxea are mainly ·07 by ·003 mm. (not ·053 by ·005 as Lendenfeld says), with here and there stouter forms, ·07 by ·006 mm. (*cf. supra*, *Ceraochalina levis* specimen 3, p. 604).

3. *Cladochalina tenuirhaphis* (Port Chalmers): This provides a striking transition from a form like *Cladochalina dendroides* to *C. mammillata*, the coalescence of the branches being only partial. The same dermal skeleton is present as in those two species, and in every way the identity of *C. tenuirhaphis* with *Callyspongia ramosa* is obvious. The only differences of note are the absence of toxa and a variability in the size of the oxea. These vary from ·07 by ·002 mm. to ·07 by ·005 mm. (according to Lendenfeld they are all ·05 by ·002 mm.), the thickest being as numerous as the thinnest, and all transitions between the two extremes being present. Moreover, the thicker spicules have the characteristically abrupt points.

4. *Pachychalina paucispina* (New Zealand: no other locality given): It will always be a mystery why Lendenfeld should have named this species "*paucispina*." The external form is practically identical with that of specimen B of *Spongia ramosa*, Gray (*cf.* Dendy, 1897, pl. xxxiii, fig. B), and the skeleton also, except that the oxea measure ·07 by ·007 mm. and toxa are abundant.

5. *Pachychalina ramulosa* (New Zealand: no other locality given): (*a*) Var. *lamella*. If we could imagine specimen B of *Spongia ramosa*, Gray, with more numerous and broader branches, some of which had coalesced at certain points, we should have a specimen identical with the type of *Pachychalina ramulosa*, var. *lamella*. For the rest, all features agree with those of the lectotype of *Callyspongia ramosa*, except that the oxea measure ·07 by ·003 to ·005 mm. (*b*) Var. *digitata* is absolutely typical of *Callyspongia ramosa*, except that the oxea measure ·06 by ·005 mm.*

6. *Pachychalina macrospina* (Port Chalmers): The naming here is an even greater mystery! The surface throughout is smooth, even, and totally devoid of spines. Lendenfeld describes the sponge as "Klein, abgeflacht". In reality, the type consists of two small fragments of a flattened branch such as might have belonged to a specimen like *P. ramulosa*, var. *lamella* (see above). The skeleton is quite typical, the oxea measuring ·07 by ·004 mm. for the most part, with occasional forms measuring ·07 by ·007 mm. Lendenfeld gives as measurements, ·059 by ·007 mm., and says the spicules are "Nicht sehr zahlreich." This last statement may have been in comparison with a totally different type of "*Pachychalina*" in which the fibres were multispicular. Certainly, the spicules in *P. macrospina* are as numerous as in *Callyspongia ramosa*. Toxa, too, may be found, but rarely.

7. *Pachychalina elegans* (Port Chalmers): The species is intermediate between the lectotype of *Callyspongia ramosa* and *Pachychalina ramulosa*, var. *lamella*, in external form (*cf.* Lendenfeld, 1887, pl. xix, fig. 18); and the skeleton is typical, except that toxa are abundant and the oxea measure ·06 by ·004 mm. Lendenfeld says the oxea are "zahlreich", but again, this must be the result of comparison with a totally different type of sponge.

* In this specimen the oxea are often converted to styli or strongyla by the rounding off of one or both ends. This feature may also be seen in every specimen so far discussed, though to a variable extent.

8. *Pachychalina rigida* (New Zealand, no other locality given): This is another semi-lamellate form (*cf. P. elegans* and *P. ramulosa*, var. *lamella*; see also Lendenfeld, *l. c.*, pl. xix, fig. 14). The skeleton is typical, except that the oxea are differentiated into two sizes, ·06 by ·004 and ·07 by ·008 mm., with occasional intermediates, and toxa are abundant. The specimen is less rigid than most of those discussed so far, and of a softer texture than any!

9. *Ceraochalina papillata*, var. *macropora* (New Zealand; no other locality given): The type differs from the lectotype of *Callyspongia ramosa* in having slightly more flattened branches, with more numerous oscules, which are, however, of the same diameter. The skeleton is typical, except that the oxea measure ·06 by ·003 to ·005 mm.

10. *Ceraochalina papillata*, var. *intermedia* (Port Chalmers): The only differences between the type of this variety and the lectotype of *Callyspongia ramosa* are that the branches are double the size, the dermal skeleton is echinated (as in one of the paratypes), and the oxea measure ·06 by ·003 mm.

11. *Ceraochalina papillata*, var. *micropora* (New Zealand; no other locality given): The type is a smaller specimen than that of the var. *macropora*, and the oscules have, in some cases, collar-like margins. If anything, the oscules are smaller, but not sufficiently so to justify a distinction into micro- and macroporous varieties.

12. *Ceraochalina levis* (Port Chalmers and Torres Straits): See above, p. 604.

13. *Ceraochalina microrhaphis* (Port Chalmers): This species differs from *Pachychalina ramulosa*, var. *lamella*, in one feature only—that the fibres of the dermal skeleton are echinated (*cf.* p. 603).

14. *Ceraochalina multiformis*.

(*a*) Var. *mocandra* (Port Chalmers): Lendenfeld's description of this variety and the name he gives it is misleading. The type consists of five flattened branches, arising from a common base, which have coalesced in somewhat irregular manner, giving rise to a sub-clathrous rather than a maeandrine individual. The form of the sponge is, however, typical but irregular. The skeleton is typical, with oxea usually ·04 by ·003 mm., but varying in diameter up to ·007 mm. and no toxa. The dermal skeleton is echinated.

(*b*) Var. *lamella* (New Zealand; no other locality given): The type is flabellate, with prominent oscules around the margins; such a specimen as might be formed by the fusion of a number of long tubes lying in one plane. At first sight, one is inclined to regard this sponge as belonging to different species from that under discussion, but there can be little doubt that it is merely an aberrant form of *Callyspongia ramosa* (Gray). The skeleton is practically identical with that of the lectotype of Gray's species, and with transitions to this flabellate form to be found already (*cf. Pachychalina ramulosa*, var. *lamella*), there is little need for doubt that *Ceraochalina multiformis*, var. *lamella*, must also be regarded as a synonym of *Callyspongia ramosa*.

(*c*) Var. *digitata* (Port Chalmers, Chatham Islands): The specimen from Port Chalmers is intermediate in external form between *Cladochalina tenuirhaphis* and *Cladochalina mammillata* (see above). Actually, one face of the sponge is identical in appearance with the first species and the other side with the other species. The skeleton is typical, the oxea measuring mostly ·07 by ·002 mm., but with numerous forms measuring ·007 mm. thick. The specimen from Chatham Islands (see Lendenfeld, 1887, pl. xix, fig. 20) is sub-flabellate and consists of flattened branches lying in one plane, many of the branches

being fused for the greater part of their length. The skeleton is identical with that of the Port Chalmers specimen.

(*d*) Var. *mollis* (Port Chalmers): The external form is not "fächerformig," but practically identical with that of *Cladochalina tenuirhaphis* (see above). The skeleton is typical, and the oxea ·06 by ·003 mm.

(*e*) Var. *dura* (Port Chalmers): The external form is flabellate and very like that of *Ceraochalina microrhaphis* (see above). The skeleton is quite typical and the oxea measure ·06 by ·003 to ·008 mm. (not ·0009 as stated).

15. *Ceraochalina reteplax* (Port Chalmers): The type is a piece of a branch, larger than is usual for *Callyspongia ramosa*, but showing all the essential characteristics of that species. The skeleton is typical; the dermal skeleton is echinated, the oxea are of two sizes, ·07 by ·003 mm. and ·07 by ·007 mm., and the toxa are very rare.

16. *Ceraochalina euplax* (New Zealand, according to a label on the specimen): This again is an aberrant form, the shape being flabellate (*cf. C. multiformis*, var. *lamella*, *C. ramosula*, var. *lamella*, etc.). Nevertheless, the skeleton is typical, and the toxa are present, and from a consideration of all its characters there can be no doubt that the type of this species must be considered identical with *Callyspongia ramosa*.

17. *Ceraochalina extrema* (Port Chalmers): This species, like *Pachychalina macrospina*, is described from a small fragment of what must have been a typical specimen of *Callyspongia ramosa*. The author's description and measurements are very incorrect. For example, the spicules are ·008 mm. thick, not ·0008 mm., as stated.

18. *Dactylochalina candelabrum* (Port Chalmers): The type is essentially like the lectotype of *Spongia ramosa*, with the same dermal skeleton, oxea of typical form, ·07 by ·005 mm., and abundant toxa.

19. *Euchalinopsis minima* (Port Chalmers, Port Phillip, S. Australia and Torres Straits, N. Australia). The first specimen, from Port Chalmers, has the external form of specimen D (*Chalina ramosa* (Gray), Dendy, 1898, pl. xxxiii), but in all other respects resembles the lectotype of Gray's species, except that the oxea measure ·055 by ·002 to ·005 mm. The Port Phillip specimen is indistinguishable in every respect from the Port Chalmers specimen, while the Torres Straits specimen agrees with Dendy's (1905) specimen of *Chalina subarmigera* (= *Callyspongia bulluta* (Lamarck)), except that it has no toxa.

20. *Euchalina paucispina* (Port Chalmers, Port Phillip, Port Jackson): The first specimen, the lectotype, from Port Chalmers, is a typical *Callyspongia ramosa* (Gray) with occasional toxa; the second, from Port Phillip, is also typical, but has very slender oxea and no toxa; and the third, from Port Jackson, is typical in every way, with very abundant toxa. In the third specimen, the toxa are much more abundant than the oxea, and it is incomprehensible that Lendenfeld should have overlooked them.

It has been suggested above that several of Lendenfeld's specimens from Australia might be conspecific with *Callyspongia ramosa*, and it is therefore desirable to make sure that the species is found in waters outside those of New Zealand and the Chatham Islands. The first specimen examined in this connection gives indubitable proof of the occurrence of the species at Mauritius. *Pachychalina oculata*, Lendenfeld (1887), has the external form of *Cladochalina mammillata* (see above), and has exactly the same type of main and dermal skeletons as the lectotype of *Callyspongia ramosa*. The oxea have the characteristic abruptly-pointed ends, and measure ·06 by ·007 mm., and toxa are abundant.

Further, the specimen of *Toxochalina robusta*, Ridley, from Bahia, identified by Ridley and Dendy (1887), is indistinguishable from some of the Port Chalmers specimens of *Callyspongia ramosa* (Gray), and the same may be said of *Cladochalina nuda*, Ridley (which has abundant toxa!), from Torres Straits. *C. nuda*, var. *abruptispicula*, is also conspecific with the Port Chalmers sponges, the name "*abruptispicula*" describing well the characteristic shape of the oxea of *Callyspongia ramosa*.

Among the species described from Australia by Lendenfeld, the following are also synonymous with *C. ramosa*: from Victoria, *Ceraochalina tenella*, *Euchalina phillipensis*, *Dactylochalina australis*, *Ceraochalina multiformis*, var. *elegans*, and *Chalinopora paucispina*; from New South Wales, *Euchalina exigua*, var. *simplex*, *E. macropora*, *E. typica*, *Euchalinopsis dendroides*, *Dactylochalina conulata* and *D. mollis*; from Queensland, *Euchalina exigua*, var. *arborea*. All these species and varieties show the same characters and variation as the species described by Lendenfeld from Port Chalmers, and are obvious synonyms of *Callyspongia ramosa* (Gray). Lendenfeld's descriptions of them are often faulty and usually inadequate, and should be ignored. The only point to mention in connection with the Australian specimens is that in rare cases, when the megascleres are much reduced, their ends tend to become strongylote, but as the typical oxea are always present, though often in very small numbers, there is no taxonomic significance in this. *Ceraochalina pergamentacea*, Dendy (1924), is also a synonym of *Callyspongia ramosa*, the specimen being typical in structure and possessing toxa.

The distribution of *Callyspongia ramosa* also extends to the Antarctic, as is shown by a typical specimen from McMurdo Sound in the British Museum collection, and by the fact that *Cladochalina dendyi*, Burton (1929), is synonymous with it.

The sponge wrongly identified by Dendy (1924, p. 328) as *Siphonochalina communis* differs from *Callyspongia ramosa* in one respect only—that the external form is tubular, and it is very probable that this, too, must be considered a synonym of Gray's species.

LIST OF WORKS REFERRED TO.

Agassiz, J. L. R. 1846. Nomenclatoris Zoologici Index, 393 pp.

Annandale, N. 1915. Some Sponges Parasitic on Clionidae with Further Notes on that Family. Rec. Ind. Mus. Calcutta, XI, pp. 457–478, 1 pl., 5 figs.

Arndt, W. 1927. Kalk- und Kieselschwämme von Curaçao. Bijdr. Dierk. Amsterdam, XXV, pp. 133–158, 3 pls., 16 figs.

Babić, K. 1922. Monactinellida und Tetractinellida des Adriatischen Meeres. Zool. Jahrb., Syst. XLVI, pp. 217–302, 2 pls., 50 figs.

Blainville, M. H. D. de. 1830. (Article Zoophytes, Zoophyta.) Dict. Sci. Nat. LX, pp. 1–546.

—— 1834. Manuel d'actinologie ou de zoophytologie. Paris, pp. viii + 695, 103 pls.

Bowerbank, J. S. 1845. Observations on the Spongiadae. Ann. Mag. Nat. Hist. London, XVI, pp. 400–410, 2 pls.

—— 1862. On the Anatomy and Physiology of the Spongiadae. Philos. Trans. London, CLIII, pp. 747–829, 1087–1135, 12 pls.

—— 1864. A Monograph of the British Spongiadae, I. London, 8vo, 290 pp., 37 pls.

—— 1866. A Monograph of the British Spongiadae, II. London, 8vo, 388 pp.

—— 1872. Contributions to a General History of the Spongiadae. Proc. Zool. Soc. London, pp. 115–129, 196–202, 626–635, 8 pls.

—— 1874. A Monograph of the British Spongiadae, III. London, 8vo, 376 pp., 92 pls.

—— 1875. Contributions to a General History of the Spongiadae. Proc. Zool. Soc. London, pp. 281–296, 4 pls.

—— 1882. A Monograph of the British Spongiadae, IV. London, 8vo, 250 pp., 17 pls.

BRONDSTED, H. V. 1923. Sponges from the Auckland and Campbell Islands. Vidensk. Medd. naturh. Foren. Kjobenhavn, LXXV, pp. 117–167, 36 figs.
—— 1924. Sponges from New Zealand. Vidensk. Med. naturh. Foren. Kjobenhavn, LXXVII, pp. 435–483, 33 figs.
—— 1926. Antarctic and Subantarctic Sponges collected by S. Wallin, 1924. Ark. Zool. Stockholm, 19A, 6, pp. 1–6, 4 figs.
BRONN, H. G. 1859. Die Klassen und Ordnungen des Thierreichs. Leipzig and Heidelberg, 8vo, 142 pp., 12 pls.
BURTON, M. 1924. The Genus *Chondrilla*. Ann. Mag. Nat. Hist. London, XIV, pp. 206–209.
—— 1924. A Revision of the Sponge Family Donatiidae. Proc. Zool. Soc. London, pp. 1033–1045, 1 pl.
—— 1926. Observations on some British Species of Sponges belonging to the Genus *Reniera*. Ann. Mag. Nat. Hist. London. XVII, pp. 415–424.
—— 1926. Sponges [in] Zoological Results of the Suez Canal Expedition. Trans. Zool. Soc. London. XXII, pp. 71–83, 7 figs.
—— 1926. *Stelletta purpurea*, Ridley, and its variations. Ann. Mag. Nat. Hist. London. XVIII, pp. 44–49.
—— 1926. The Relation between Spongin and Spicule in the Haplosclerida. Ann. Mag. Nat. Hist. London. XVIII, pp. 265–267.
—— 1927. A Revision of the Genera and Species contained in Lendenfeld's "Die Chalineen des australischen Gebietes," II. Ann. Mag. Nat. Hist. London. XX, pp. 502–512.
—— 1929. Porifera: Part II. Antarctic Sponges. Brit. Mus. ("Terra Nova") Rept. London, 4to, VI (4), pp. 393–458, 3 pls., 9 figs.
—— 1930. Additions to the Sponge Fauna of the Gulf of Manaar. Ann. Mag. Nat. Hist. London, V, pp. 665–676, 3 figs.
—— 1930. Norwegian Sponges from the Norman Collection. Proc. Zool. Soc. London, pp. 487–546, 2 pls., 8 figs.
—— 1931. The Interpretation of the Embryonic and Post-Larval Characters of certain Tetraxonid Sponges. Proc. Zool. Soc. London, pp. 511–525, 1 pl., 6 figs.
CARTER, H. J. 1873. On Two New Species of Gummineae, with Special and General Observations. Ann. Mag. Nat. Hist. London. XII. pp. 17–30, 1 pl.
—— 1876. Descriptions and Figures of Deep-sea Sponges. Ann. Mag. Nat. Hist. London, XVIII, pp. 226–240, 307–324, 388–410, 458–479, 5 pls.
—— 1880. Report on Specimens dredged up from the Gulf of Manaar. Ann. Mag. Nat. Hist. London, VI, pp. 35–61, 129–156, 5 pls.
—— 1881. Supplementary Report on Specimens dredged up from the Gulf of Manaar. Ann. Mag. Nat. Hist. London, VII, pp. 361–385, 1 pl.
—— 1882. New Sponges, observations on old ones, and a proposed New Group. Ann. Mag. Nat. Hist. London. X, pp. 106–125, 2 figs.
—— 1882. Some Sponges from the West Indies and Acapulco. Ann. Mag. Nat. Hist. London, IX, pp. 266–301, 346–368, 2 pls.
—— 1883. Contributions to our Knowledge of the Spongida: Pachytragida. Ann. Mag. Nat. Hist. London, XI, pp. 308–329, 344–369, 6 pls.
—— 1884. Catalogue of Marine Sponges, collected by Mr. Jos. Willcox, on the West Coast of Florida. Proc. Acad. Nat. Sci., Philadelphia, pp. 202–209.
—— 1885. Descriptions of Sponges from the Neighbourhood of Port Phillip Heads, South Australia. Ann. Mag. Nat. Hist. London. XV, pp. 107–117, 196–222, 301–321; XVI, pp. 277–294, 347–368, 1 pl.
—— 1886. Descriptions of Sponges from the Neighbourhood of Port Phillip Heads, South Australia. Ann. Mag. Nat. Hist. London. XVII, pp. 40–53, 112–127, 431–441, 502–516; XVIII, pp. 34–55, 126–149.
—— 1886. Supplement to the Descriptions of Mr. J. Bracebridge Wilson's Australian Sponges. Ann. Mag. Nat. Hist. London, XVIII. pp. 271–290, 369–379, 445–466, 1 pl.
DELAGE, Y. 1899. Spongiaires [in] Delage and Hérouard. Traité de Zoologie concrète, II (1), pp. 49–244, 12 pls.
DE LAUBENFELS, M. W. 1932. The Marine and Fresh-water Sponges of California. Proc. U.S. Nat. Mus., Washington, LXXXI (4), pp. 1–140, 79 figs.
DENDY, A. 1889. Report on a Second Collection of Sponges from the Gulf of Manaar. Ann. Mag. Nat. Hist. London. III, pp. 73–99, 3 pls.
—— 1890. Observations on West Indian Chalinine Sponges. Trans. Zool. Soc. London, XII, pp. 349–368, 6 pls.
—— 1892. Synopsis of the Australian Calcarea Heterocoela. Proc. Roy. Soc. Victoria, V, pp. 69–116.

DENDY, A. 1895. Catalogue of Non-Calcareous Sponges collected by J. Bracebridge Wilson, Esq., M.A. Proc. Roy. Soc. Victoria, VII, pp. 232–260.
—— 1896. Catalogue of Non-Calcareous Sponges collected by J. Bracebridge Wilson, Esq., M.A. Proc. Roy. Soc. Victoria, VIII, pp. 14–51.
—— 1897. Catalogue of Non-Calcareous Sponges collected by J. Bracebridge Wilson, Esq., M.A. Proc. Roy. Soc. Victoria, IX, pp. 230–259.
—— 1898. On the Sponges Described in Dieffenbach's 'New Zealand.' Trans. N.Z. Inst. XXX, pp. 316–320, 2 pls.
—— 1905. Report on the Sponges collected by Prof. Herdman at Ceylon. Rep. Pearl Oyster Fish., Suppl. XVIII, pp. 57–246, 16 pls.
—— 1913. Report on the Calcareous Sponges collected by H.M.S. "Sealark" in the Indian Ocean. Trans. Linn. Soc. London, Zool. XVI, pp. 1–29, 5 pls.
—— 1916. Report on the Non-Calcareous Sponges collected by Mr. James Hornell at Okhamandal in Kattiawar in 1905–6. Rep. Govt. Baroda Marine Zool., Okhamandal, II, pp. 93–146, 4 pls.
—— 1921. Report on the Sigmatotetraxonida collected by H.M.S. "Sealark" in the Indian Ocean. Trans. Linn. Soc. London, Zool. XVIII, pp. 1–164, 18 pls.
—— 1924. Porifera: Part I. Brit. Mus. ("Terra Nova") Rept. London. VI (3), pp. 269–392, 15 pls.
—— and FREDERICK, L. M. 1924. On a Collection of Sponges from Abrolhos Islands, Western Australia. J. Linn. Soc. London. XXXV, pp. 477–518, 1 pl.
—— and ROW, R. W. H. 1913. The Classification and Phylogeny of the Calcareous Sponges, with a Reference List of all the Described Species, Systematically Arranged. Proc. Zool. Soc. London. pp. 704–813.
DRAGNEWITSCH, P. 1905. Spongien von Singapore. Inaug. Dissert., Bern, 36 pp.
DUCHASSAING, F. DE, and MICHELOTTI, G. 1864. Spongiaires de la Mer caraïbe. Natuurk. verh. Mij. Haarlem, XXI, pp. 1–124, 25 pls.
EHLERS, E. 1870. Die Esper'schen Spongien. Erlangen. 4to, 36 pp.
ELLIS, J., and SOLANDER, D. 1786. The Natural History of Many Curious and Uncommon Zoophytes. London, 4to, 208 pp., 63 pls.
ESPER, E. J. C. 1794. Die Pflanzenthiere, II. Nürnberg. 4to, 303 pp., 49 pls.
FLEMING, J. 1828. A History of British Animals. Edinburgh, London, 8vo, xxiii, 565 pp.
GRANT, R. 1841. Outlines of Comparative Anatomy. London, 8vo, 656 pp.
—— 1861. Tabular View of the Primary Divisions of the Animal Kingdom. London, 8vo. vi, 91 pp.
GRAY, J. E. 1843. Catalogue of Radiated Animals. Travels in New Zealand (Dieffenbach), II. p. 264.
—— 1867. Notes on the Arrangement of Sponges. Proc. Zool. Soc. London, pp. 492–558.
—— 1869. Note on *Ianthella*, a New Genus of Keratose Sponges. Proc. Zool. Soc. London. pp. 49–51.
GRAY, S. F. 1821. A Natural Arrangement of British Plants. I. London. 8vo. 824 pp., 21 pls.
HAECKEL, E. 1869. Prodromus eines Systems der Kalkschwämme. Jena. Z. Naturw. V. pp. 235–254.
—— 1872. Die Kalkschwämme: eine Monographie, I and II, and Atlas, Berlin.
HALLMAN, E. F. 1912. Report on the Sponges obtained by the F.I.S. "Endeavour." Part I: Commonwealth of Australia Fisheries. Zool. Res. Fish. Exper. "Endeavour," 1909–10, II, pp. 115–300, 6 pls., 48 figs.
—— 1920. New Genera of Monaxonid Sponges related to the Genus *Clathria*. Proc. Linn. Soc. N.S. Wales, XLIV, pp. 767–792, 5 pls., 3 figs.
HENTSCHEL, E. 1909. Tetraxonida, I. Fauna S.W.-Australiens, von W. Michaelsen, II (21), Jena, pp. 347–402, 2 pls., 29 figs.
—— 1911. Tetraxonida, II. Fauna, S.W.-Australiens, von W. Michaelsen, III (10), pp. 279–393, 54 figs.
—— 1912. Kiesel-und Hornschwämme der Aru- und Kei-Inseln. Abh. Senckenb. naturf. Ges. Frankfurt-a-M. XXXIV, pp. 291–448, 9 pls.
—— 1914. Monaxone Kieselschwämme und Hornschwämme der Deutschen Südpolar-Expedition 1901–1903. Deutsche Südpolar-Expedition, XV (Zool. 7), pp. 37–141, 5 pls.
HOUTHUYN, M. 1772. Natuurlyke historie, of uitvoerige beschryving der Dieren, Planten en Mineralen. Amsterdam, 8vo, I.
HYATT, A. 1877. A Revision of the North American Poriferae. Mem. Boston Soc. Nat. Hist. II, pp. 481–554, 3 pls.
JOHNSTON, G. 1842. A History of British Sponges and Lithophytes. London, Edinburgh, Dublin, 8vo, 264 pp., 25 pls.

KELLER, C. 1879. Studien über Organization und Entwicklung der Chalineen. Z. wiss. Zool., XXXIII, pp. 317–349, 3 pls.
—— 1889. Die Spongienfauna des rothen Meeres. Z. wiss. Zool. XLVIII, pp. 311–405, 5 pls.
—— 1891. Die Spongienfauna des rothen Meeres. Z. wiss. Zool. LII, pp. 294–368, 5 pls.
KIESCHNICK, O. 1896. Silicispongiae von Ternate. Zool. Anz. XIX, pp. 526–534.
—— 1900. Kieselschwämme von Amboina. Denkschr. med.-naturw. Ges. Jena, VIII, pp. 545–582, 2 pls.
KIRKPATRICK, R. 1900. Description of Sponges from Funafuti. Ann. Mag. Nat. Hist. London, VI, pp. 345–362, 3 pls.
—— 1900. On the Sponges of Christmas Island. Proc. Zool. Soc. London, pp. 127–141, 2 pls.
KÖLLIKER, A. 1864. Icones histologicae, oder Atlas der vergleichenden Gewebelehre. Abth. I. Leipzig, 4to, pp. 46–74, 2 pls., 7 figs.
LAMARCK, J. B. P. DE M. 1815. Suite des polypiers empâtés. Mém. Mus. Paris, I, pp. 69–80, 162–168, 331–340.
—— 1816. Histoire naturelle des animaux sans vertèbres. Paris, 4to, II, 568 pp.
LENDENFELD, R. VON. 1883. Ueber Coelenteraten der Südsee. Z. wiss. Zool. XXXVIII, pp. 234–313, 4 pls.
—— 1886. A Monograph of the Australian Sponges, V and VI. Proc. Linn. Soc. N.S.W. X (3), pp. 282–325, 481–553, 13 pls.
—— 1886. Studies on Sponges. Proc. Linn. Soc. N.S.W., X, pp. 557–574, 6 pls.
—— 1887. Die Chalineen des australischen Gebietes. Zool. Jahrb. II, pp. 723–828, 10 pls.
—— 1888. Descriptive Catalogue of the Sponges in the Australian Museum, Sydney. London, 8vo, 260 pp., 12 pls.
—— 1889. A Monograph of the Horny Sponges. London, 4to, 936 pp., 50 pls.
—— 1897. Spongien von Sansibar. Abh. Senckenb. Naturf. Ges. XXI, pp. 93–133, 2 pls.
—— 1903. Tetraxonia [in] Das Tierreich, XIX, pp. 1–168, 44 figs.
—— 1906. Tetraxonia. Wiss. Ergebn. Deutsch. Tiefsee-Exped. XI (2), Jena, pp. 59–373.
LEVINSEN, G. M. R. 1887. Un coup d'oeil sur la faune de la mer de Kara. C. F. Lütken. Dijmphna-Togtets zool. Bot. Udbytte Kjøbenhavn, pp. 512, 513, 3 pls.
LIEBERKÜHN, N. 1859. Neue Beitrage zur Anatomie der Spongien. Arch. Anat. Physiol., pp. 515–529, 3 pls.
LINDGREN, N. G. 1897. Beitrag zur Kenntniss der Spongienfauna des Malaiischen Archipels und der Chinesischen Meere. Zool. Anz. XX, pp. 480–487.
—— 1898. Beitrag zur Kenntniss der Spongienfauna des Malayischen Archipels und der Chinesischen Meere. Zool. Jahrb. (Abt. Syst.), XI, pp. 283–378, 4 pls.
LINNAEUS, C. 1759. Systema naturae, II, ed. 10.
—— 1767. Systema naturae, III, ed. 12.
MARSHALL, W. 1892. Spongiologische Beiträge. Festschrift 70, Wiederk. Geburtst. Leuckart, 4to, 36 pp., 8 pls.
MARTENS, G. M. VON. 1824. Reise nach Venedig. Ulm and Baiern, 8vo, 1136 pp.
MICHLUCHLO-MACLAY, N. 1870. Über einige Schwämme des nordlichen Stillen Oceans und des Eismeeres. Mém. Acad. Imp. St. Pétersbourg, XV (3), 24 pp., 2 pls.
MONTAGU, G. 1818. An Essay on Sponges. Mem. Werner. Soc. Edinburgh, II, pp. 67–122, 14 pls.
NARDO, G. D. 1833. Auszug aus einem neuen System der Spongiarien. Isis (Oken), Coll. 519–523.
—— 1834. De Spongiis. Isis (Oken), Coll. 714–716.
—— 1847. Prospetto della Fauna marina volgare del Veneto estuario. Estratto dall' opera: Venezia e le sue lagune, 45 pp.
NORMAN, A. M. 1869. Final Dredging Report. Part II: Rep. Brit. Ass. 38, pp. 247–336.
OKEN, L. 1815. Lehrbuch der Naturgeschichte. Jena, 4to, III (1).
PALLAS, P. S. 1766. Elenchus Zoophytorum. Nurnberg, 4to, pp. 28, 451.
POLÉJAEFF, N. 1883. Report on the Calcarea dredged by H.M.S. "Challenger." Rep. Sci. Res. Voy. "Challenger," Zool. VIII, pp. 1–76, 9 pls.
—— 1884. Report on the Keratosa collected by H.M.S. "Challenger." Rep. Sci. Res. Voy. "Challenger," Zool. XI, pp. 1–88, 10 pls.
RIDLEY, S. O. 1881. Spongida (Account of the Zoological Collections made during the Survey of H.M.S. "Alert"). Proc. Zool. Soc. London, pp. 107–137, 140–141, 2 pls.
—— 1884. Spongiida [in] Rep. Zool. Colls. Voy. H.M.S. "Alert," London, 8vo, pp. 366–482, 582–630, 6 pls.

RIDLEY, S. O. 1884. Notes on Sponges, with Description of a New Species. Ann. Mag. Nat. Hist. London, XIV, pp. 182–187.
—— and DENDY, A. 1886. Preliminary Report on the Monaxonida collected by H.M.S. "Challenger." Ann. Mag. Nat. Hist. London, XVIII, pp. 325–351.
—— —— 1887. Monaxonida. Rep. Sci. Res. Voy. "Challenger," Zool. XX, 275 pp., 51 pls.
ROW, R. W. H. 1911. Report on the Sponges collected by Mr. Cyril Crossland in 1904–5. Part II: Non-Calcarea. J. Linn. Soc. Lond., Zool. XXXI, pp. 287–400, 7 pls., 26 figs.
SCHMIDT, E. O. 1862. Die Spongien des adriatischen Meeres. Leipzig, 4to, 88 pp., 7 pls.
—— 1864. Supplement der Spongien des adriatischen Meeres. Leipzig, 4to, 48 pp., 4 pls.
—— 1868. Die Spongien der Küste von Algier. (Drittes Supplement.) Leipzig, 4to, 44 pp., 5 pls.
—— 1870. Grundzüge einer Spongien-Fauna des atlantischen Gebietes. Leipzig, fol., 88 pp., 6 pls.
SCHULZE, F. E. 1878. Untersuchungen über den Bau und die Entwicklung der Spongien. Z. wiss. Zool. XXX, pp. 379–420, 4 pls.; XXXII, pp. 117–157, 4 pls.
—— 1879. Untersuchungen über den Bau und die Entwicklung der Spongien. Z. wiss. Zool. XXXII, pp. 593–660, 5 pls.; XXXIII, pp. 1–38, 4 pls.
SELENKA, E. 1867. Ueber einige neue Schwämme aus der Südsee. Z. wiss. Zool. XVII, pp. 565–571, 1 pl.
SHAW, M. 1927. On a Collection of Sponges from Maria Island, Tasmania. Proc. Zool. Soc. London, pp. 419–439, 1 pl., 4 figs.
SIEBOLD, C. F. E. VON. 1843. Bericht über die Leistungen in der Naturgeschichte der Annulaten. Arch. Naturgesch., IX (2), pp. 289–299.
SOLLAS, I. B. J. 1902. On the Sponges collected during the Skeat Expedition. Proc. Zool. Soc. London, pp. 210–221, 2 pls.
SOLLAS, W. J. 1886. Preliminary Account of the Tetractinellid Sponges dredged by H.M.S. "Challenger," 1872–76. Part I: The Choristida. Sci. Proc. R. Dublin Soc. V, pp. 177–199.
—— 1888. Report on the Tetractinellida collected by H.M.S. "Challenger" during the Years 1873–6. Rep. Sci. Res. Voy. "Challenger," London, Zool. XXV, pp. 1–458, 54 pls.
STEPHENSON, T. A. (and others). 1931. The structure and ecology of Low Isles and other reefs. Brit. Mus. (Barrier Reef) Rept., III, 2, 112 pp., 27 pls., 15 figs.
TEMPLETON, J. 1836. A Catalogue of the Species of Rayed Animals found in Ireland. Mag. Nat. Hist. IX, pp. 466–472.
THIELE, J. 1899. Studien über Pazifische Spongien. Zoologica, XXIV, pp. 1–33, 3 pls.
—— 1903. Kieselschwämme von Ternate. Abh. Senckenb. naturf. Ges., Frankfurt-a-M. XXV, pp. 933–968, 1 pl.
—— 1905. Die Kiesel- und Hornschwämme der Sammlung Plate. Zool. Jahrb. Jena, Suppl. VI, pp. 407–496, 114 figs.
TOPSENT, É. 1891. Essai sur la Faune des Spongiaires de Roscoff. Arch. Zool. expér. IX, pp. 523–554, 1 pl.
—— 1891. Deuxième Contribution a l'Étude des Clionides. Arch. Zool. expér. IX, pp. 555–592, 1 pl.
—— 1892. Éponges de la Mer Rouge. Mém. Soc. Zool. Fr. V, pp. 21–29, 1 pl.
—— 1897. Spongiaires de la Baie d'Amboine. Rev. suisse Zool. IV, pp. 421–487, 4 pls.
—— 1900. Étude monographique des Spongiaires de France. III: Monaxonida. Arch. zool. expér. VIII, pp. 1–331, 8 pls.
—— 1908. Spongiaires [in] Expéd. Antarctique française (1903–1905), pp. 1–37, 5 pls.
—— 1917. Spongiaires [in] 2me Expéd. Antarctique française (1908–1910), pp. 1–88, 6 pls.
—— 1918. Éponges de San Thomé. Arch. zool. expér. LVII, pp. 535–618, 28 figs.
—— 1920. *Tethya aurantium* (Pallas) et les Tethya de Lamarck. Bull. Mus. Hist. nat. Paris, pp. 640–646.
—— 1920. Spongiaires du Musée Zoologique de Strasbourg. Bull. Inst. océanogr. Monaco, 381, pp. 1–34, 5 figs.
—— 1921. Sur les Ciocalypta Bow. Ass. franç. avanc. Sci., pp. 687–692.
—— 1925. Étude de Spongiaires du Golfe de Naples. Arch. zool. expér. LXI, pp. 623–725, 1 pl., 27 figs.
—— 1929. *Spongionella* Bow. et *Cacospongia* Schm. Bull. Inst. océanogr. Monaco, 537, pp. 1–12, 3 figs.
—— 1929. Spongiaires de l'Atlantique et de la Mediterranée. Rés. Camp. sci. Monaco, LXXIV, 376 pp., 11 pls.
ULICZA, E. 1929. Die tetraxonen Schwämme Westindiens. Zool. Jahrb. Jena, Suppl. XVI, pp. 36–62, 1 pl., 76 figs.
VOSMAER, G. C. J. 1880. Sponges of the Leyden Museum. I: The Family of the Desmacidinae. Notes Leyden Mus. II, pp. 99–164.
—— 1887. Porifera [in] Bronn: Die Klassen und Ordnungen des Thierreichs, II, pp. 369–496.

VOSMAER, G. C. J. 1911. The Porifera of the "Siboga" Expedition. II: The Genus *Spirastrella*. "Siboga"-Expeditie, VI, A², pp. 1–69, 14 pls.

WHITELEGGE, T. 1902. Report on Sponges from the Coastal Beaches of New South Wales. Rec. Aust. Mus. IV, pp. 55–118, 6 pls.

—— 1906. Scientific Results of the Trawling Expedition of H.M.C.S. "Thetis." Part 9: Sponges. Mem. Aust. Mus. IV, pp. 453–484, 2 pls.

—— 1907. Scientific Results of the Trawling Expedition of H.M.C.S. "Thetis." Mem. Aust. Mus. IV, pp. 487–515, 2 pls.

WILSON, H. V. 1925. Siliceous and Horny Sponges collected by the U.S. Fisheries Steamer "Albatross" during the Philippine Expedition, 1907–10. Bull. U.S. Nat. Mus. Washington. 100, 532 pp., 59 pls.

WRIGHT, E. P. 1881. On a New Genus and Species of Sponge with supposed Heteromorphic Zooids. Trans. R. Irish Acad. XXVIII, pp. 13–20. 1 pl.

INDEX

DESCRIPTION OF PLATE I.

FIGS. 1–7.—*Adocia pumila* (Lendenfeld). Figs. 1, 2, 5, natural size; figs. 3, 4, 6, slightly less than natural size; fig. 7, × $\frac{2}{3}$.

FIGS. 8, 9.—*Ophlitaspongia eccentrica*, sp. n. Natural size.

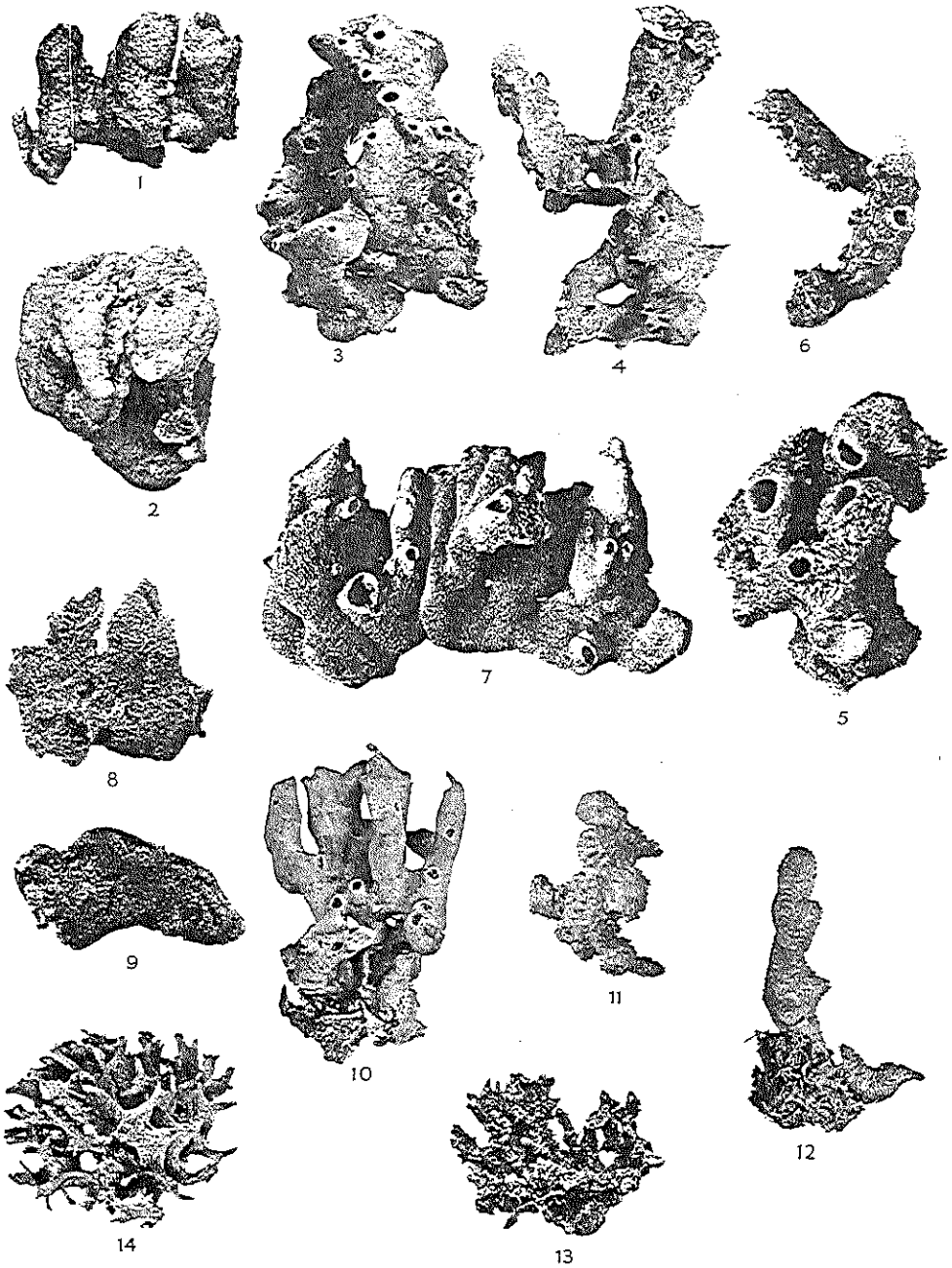
FIG. 10.—*Haliclona flabello-digitata*, sp. n. × $\frac{2}{3}$.

FIG. 11.—*Hircinia ramosa*, Keller. Natural size.

FIG. 12.—*Hircinia ramodigitata*, sp. n. Natural size.

FIG. 13.—*Echinochalina anomala*, Hallmann. Natural size.

FIG. 14.—*Haliclona reticulata*, Lendenfeld. × $\frac{2}{3}$.



Adlard & Son, Ltd., Impr.

DESCRIPTION OF PLATE II.

(Figures 3–10 natural size.)

FIG. 1.—*Halichondria phakellioides*, Dendy and Frederick. × $\frac{1}{2}$.

FIG. 2.—*Spongelia pallescens*, var. *elastica*, Schulze's specimen (B.M. 83.12.4.26). × $\frac{3}{5}$.

FIG. 3.—*Spongelia pallescens*, Schmidt, from the Naples Station (B.M. 25.11.1.360).

FIG. 4.—*Spongelia pallescens*, Schmidt, from the Adriatic (B.M. 67.7.26.9).

FIG. 5.—*Dysidea fragilis* (Montagu), from the English Channel (B.M. 25.11.1.1034).

FIG. 6.—*Dysidea fragilis* (Montagu), from Hastings (B.M. 81.5.5.31-3).

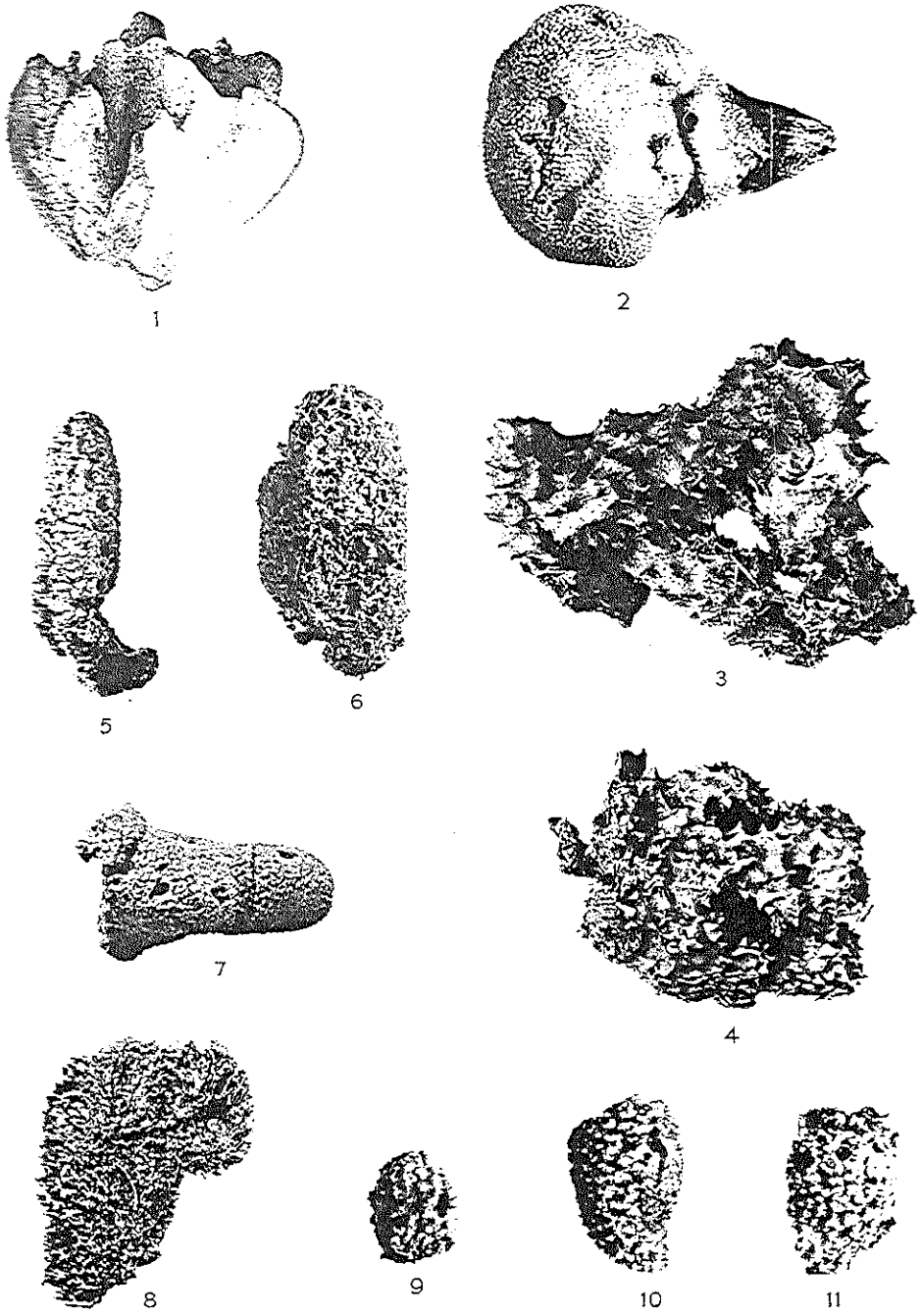
FIG. 7.—*Dysidea fragilis* (Montagu), from the "Porcupine" Collection, Stn. 4 (S.W. of Ireland: B.M. 87.7.28.12-15).

FIG. 8.—*Dysidea fragilis* (Montagu), from Sussex Coast (slightly macerated).

FIG. 9.—*Dysidea fragilis* (Montagu), from Dorset (B.M. 97.8.9.70-1).

FIG. 10.—*Dysidea fragilis*, (Montagu), from Poole (B.M. 89.7.26.7-12).

FIG. 11.—*Dysidea fragilis* (Montagu), from Norway (B.M. 10.1.1.598).



Adlard & Son, Ltd., Lo

by BURT
17
(Litvergraking pag 515)

TABLE SHOWING DISTRIBUTION OF SPECIES COLLECTED BY THE EXPEDITION ON THE GREAT BARRIER REEF.

Species.	Australia.				Malay area.	Indian Ocean, including Red Sea.	Further distribution.
	North coast.	East coast.	South coast.	West coast.			
ORDER CALCAREA	..	..	..	..	..	..	..
Family LEUCASCIDAE	..	..	..	..	..	..	..
Pericharax heteroraphis (Poléjaeff)	..	..	..	..	×	×	Tristan da Cunha.
Family SYCETTIDAE	..	..	..	..	..	..	..
Sycon gelatinosum (Blainville)	..	×	×	×	×	..	..
Family HETEROPIIDAE	..	..	..	..	..	..	..
Leuconia ramosa, sp. n.	..	..	..	..	..	..	..
ORDER TETRAXONIDA	..	..	..	..	..	..	..
SUB-ORDER HOMOSCLEROPHORA	..	..	..	..	..	..	..
Family PLAKINIDAE	..	..	..	..	..	..	..
Corticium candelabrum, Schmidt	..	..	..	..	×	..	Mediterranean.
Oscarella tenuis, Hentschel	..	..	×	×	..	..	..
SUB-ORDER ASTROSCLEROPHORA	..	..	..	..	..	..	..
Family STELLETTIDAE	..	..	..	..	..	..	..
Stelletta purpurea, Ridley	×	×	..	..	×	×	Antarctic; New Zealand.
S. clavosa, Ridley	×	..	..	×	×	×	..
Ancorina agglutinans (Thiele)	..	..	..	..	×	..	..
Jaspis stellifera (Carter)	×	..	×	..	..	..	..
Family CHONDROSIIDAE	..	..	..	..	..	..	..
Chondrilla nucula, Schmidt	×	×	..	..	×	×	New Zealand; Azores; W. Indies; Mediterranean.
C. australiensis, Carter	..	×	..	..	×	×	..
SUB-ORDER SIGMATOSCLEROPHORA	..	..	..	..	..	..	..
Family TETILLIDAE	..	..	..	..	..	..	..
Cinachyra australiensis (Carter)	..	×	×	..	×	×	Philippines.
Raphidotethya enigmatica, sp. n.	..	..	..	..	..	..	..
Family HAPLOSCLERIDAE	..	..	..	..	..	..	..
Haliclona camerata (Ridley)	..	..	..	..	×	×	..
H. reticulata (Lendenfeld)	..	×	..	..	..	× ?	..
H. clathrata (Dendy)	..	..	×	..	×	..	New Zealand.
H. exigua (Kirkpatrick)	..	..	..	..	×	..	..
H. pigmentifera (Dendy)	..	..	..	..	..	×	..
H. tenuispiculata, sp. n.	..	..	..	..	..	..	..
H. flabello-digitatus, sp. n.	..	..	..	..	..	..	..
Adocia toxius (Topsent)	..	..	..	..	×	×	..
A. minor (Dendy)	..	..	..	..	..	×	..
A. obtusa (Hentschel)	..	..	..	..	×	..	..
A. pumila (Lendenfeld)	×	..	..	..	×	×	..
A. sagittaria (Sollas)	..	..	..	..	×	..	..
A. fibulatus, var. *microsigma*, Dendy	..	..	..	..	..	×	..
Petrosia strongylata, Thiele	..	..	..	..	×	..	..
Callyspongia diffusa (Ridley)	..	..	..	..	×	..	..
C. subarmigera (Ridley)	×	×	..	..	×	..	..
C. fibrosa (Ridley and Dendy)	..	..	..	..	×	×	..
C. confoederata (Ridley)	×	×	..	×	×	..	..

Species.	Australia.				Malay area.	Indian Ocean, including Red Sea.	Further distribution.
	North coast.	East coast.	South coast.	West coast.			
ORDER TETRAXONIDA—*cont.*							
SUB-ORDER SIGMATOSCLEROPHORA—*cont.*							
Family HAPLOSCLERIDAE—*cont.*							
C. clathrata (Dendy)	..	..	..	..	..	×	..
C. ridleyi, sp. n.	..	×	..	..	..	..	..
Oceanapia fistulosa (Bowerbank)	×	..	..	×	×	×	Azores; Bahia.
O. renieroides, sp. n.	..	..	..	..	..	..	..
O. elastica (Keller)	..	..	..	..	×	×	..
Family DESMACIDONIDAE	..	..	..	..	..	..	..
Section ISODICTYEAE	..	..	..	..	..	..	..
Desmapsamma, gen. n., *anchorata* (Carter)	..	..	..	..	×	..	West Indies; Bahia.
Section MYCALEAE	..	..	..	..	..	..	..
Mycale grandis, Gray	..	..	..	..	×	..	..
M. sulevoidea (Sollas)	..	..	..	..	×	..	..
Section MYXILLEAE	..	..	..	..	..	..	..
Histoderma calcifera, sp. n.	..	..	..	..	..	..	..
Hamigera strongylata, sp. n.	..	..	..	..	..	..	..
Plumocolumella anchorata (Carter)	..	..	×	..	..	..	..
Strongylacidon inaequalis (Hentschel)	..	..	×	×	..	..	..
S. intermedia, sp. n.	..	..	..	..	..	..	..
Psammochela fibrosa (Ridley)	×	..	..	..	..	×	..
Chondropsis chaliniformis (Carter)	×	×	×	..	..	..	Antarctic.
C. carcinophila (Lendenfeld)	..	×	..	..	..	..	..
Iotrochota purpurea (Bowerbank)	..	..	..	..	×	×	..
I. coccinea (Carter)	..	..	×	..	..	..	..
Crella spinulata (Hentschel)	..	..	×	×	..	..	..
Hymedesmia mertoni, Hentschel	..	..	..	..	×	..	..
H. tenuissima (Dendy)	..	..	..	..	..	×	..
Paracornulum dubium (Hentschel)	..	..	..	..	×	..	..
Section CLATHRIEAE	..	..	..	..	..	..	..
Clathria aculeata, Ridley	×	..	..	..	..	..	..
C. rubens (Lendenfeld)	..	×	..	..	..	..	..
C. eccentrica, sp. n.	..	..	..	..	..	..	..
Tenacia frondifera (Bowerbank)	×	..	..	..	×	×	..
T. procera (Ridley)	×	..	..	..	..	×	..
T. paucispina (Lendenfeld)	..	×	..	..	..	..	..
T. coralliophila (Thiele)	..	..	..	..	×	..	..
Ophlitaspongia rimosa (Ridley)	..	..	..	..	..	×	..
O. eccentrica, sp. n.	..	..	..	..	..	..	..
Protophlitaspongia, gen. n., *oxeata*, sp. n.	..	..	..	..	..	..	..
Echinochalina intermedia (Whitelegge)	..	×	..	..	..	×	..
E. anomala, Hallmann	..	×	..	..	..	..	..
Coelocarteria, gen. n., *singaporense* (Carter)	..	..	..	..	×	..	..
Family AXINELLIDAE	..	..	..	..	..	..	..
Trachyopsis aplysinoides (Dendy)	..	..	..	..	..	×	..
T. halichondrioides, Dendy	..	..	..	..	..	×	..
Leucophloeus fenestratus, Ridley	×	..	..	..	×	..	..

Species.	Australia.				Malay area.	Indian Ocean, including Red Sea.	Further distribution.
	North coast.	East coast.	South coast.	West coast.			
ORDER TETRAXONIDA—*cont.*							
SUB-ORDER SIGMATOSCLEROPHORA—*cont.*							
Family AXINELLIDAE—*coni.*							
Ciocalypta penicillus (Bowerbank)	×	×	×	×	×	×	Eastern Atlantic, from N. Europe to S. Africa.
Collocalypta mertoni (Hentschel)	..	..	..	..	×	..	..
Acanthella cavernosa, Dendy	×	..	..	..	..	×	..
Pararhaphoxya, gen. n., *tenuiramosa*, sp. n.	..	..	..	..	..	..	..
Family CLAVULIDAE	..	..	..	..	..	..	..
Pseudosuberites andrewsi, Kirkpatrick	..	..	..	..	×	..	..
Laxosuberites proteus, Hentschel	..	×	×	..	..	×	..
Polymastia megasclera, sp. n.	..	..	..	..	..	..	..
Tethya robusta (Bowerbank)	×	×	×	×	×	×	..
T. japonica, Sollas	..	..	..	..	×	×	..
Tethyorrhaphis oxyaster, sp.n.	..	..	..	..	..	..	..
Timea stellata (Bowerbank)	..	..	..	..	..	..	Europe.
Spirastrella inconstans (Dendy)	..	..	..	..	..	×	..
S. aurivillii, Lindgren	..	..	..	..	×	..	..
S. semilunaris, Lindgren	..	..	..	..	×	..	..
ORDER KERATOSA	..	..	..	..	..	..	..
Family SPONGIIDAE	..	..	..	..	..	..	..
Phyllospongia dendyi, Lendenfeld	..	..	..	×	..	..	..
Carterispongia foliascens (Pallas)	×	×	×	×	×	×	New Zealand (?); Tropical Pacific (?).
C. vermicularis (Lendenfeld)	..	..	..	×	..	..	..
C. clathrata (Carter)	..	×	×	×	..	×	W. Indies.
Spongia officinalis, Linnaeus	?	?	?	?	×	×	W. Indies; Mediterranean.
S. nardorus (Lendenfeld)	×	..	×	..	..	..	..
Thorectopsamma, gen. n., *irregularis*, sp. n.	..	..	..	..	..	..	..
Hircinia irregularis (Polejaeff)	×	×	..	..	..	..	..
H. echinata, Keller	..	..	..	..	..	×	..
H. ramosa, Keller	..	..	..	..	..	×	..
H. pinna, Hentschel	..	..	..	..	×	..	..
H. ramodigitata, sp. n.	..	..	..	..	..	..	..
H. aruensis, Hentschel	..	..	..	..	×	..	..
H. dendroides (Polejaeff)	..	×	..	..	×	×	..
Dysidea fragilis (Montagu)	×	×	×	..	×	×	Europe.
D. reticulata (Thiele)	..	..	..	×	×	..	..
D. herbacea (Keller)	..	..	×	..	×	×	..
Family APLYSINIDÆ	..	..	..	..	..	..	..
Luffariella variabilis (Polejaeff)	..	..	..	..	×	..	..
Aplysina mollis, var. *aruensis*, Hentschel	..	..	..	..	×	..	..
Druinella purpurea (Carter)	×	..	..	×	..	×	..
D. ramosa, Thiele	..	..	..	..	×	..	..
Family APLYSILLIDAE	..	..	..	..	..	..	..
Aplysilla rosea (Barrois)	..	×	..	..	..	..	..
Dendrilla membranosa (Pallas)	×	..	..	..	×	×	Antarctic : S. America.
Basta flabelliformis (Pallas)	×	×	..	×	×	×	Philippines.