

easily have, as some variation in their thickness is observable in the dried specimens.

Pools on reef-flat, Flying Fish Cove.

#### Genus *AGARICIA* Lamarck.

There is a fragment of what appears to be a flat incrusting disc with sharp free edges, the epitheca following about 1 cm. behind. The very young calicles are confluent in concentric rows but soon separate off, the smooth low rounded walls, finely striated by the septa, rapidly forming an irregular network over the surface; the calicles all look upwards, and are not tilted to look towards the growing edge. There are 4 cycles of septa—and if any columella, only in the deep calicles in the thicker parts of the stock. The section is very dense, the septa being thick and closely packed with traces of synapticular junctions.

Rock-pools under cliffs S. of Flying Fish Cove.

#### IV. *On the Sponges of Christmas Island.* By R. KIRKPATRICK.

The Sponges collected by Mr. Andrews were obtained from an area limited to the reefs of Flying Fish Cove. The majority of the specimens were found growing on the under surface of large coral blocks lying in pools left by the tide. The use of the dredge was impossible owing to the irregular rocky nature of the bottom.

Hitherto only one species (*Pachychalina spinosissima* Dendy, P. Z. S. 1887, p. 524) has been obtained from this locality. The present collection of 53 specimens, referable to 24 genera and 32 species, contains examples of 7 new species and 2 new varieties.

The Calcarea and Monoceratina are each only represented by two small specimens.

The Carnosa are represented by three species, the occurrence of *Chondrosia plebeja* Schmidt, recorded for the first time from the Indo-Pacific, being specially interesting.

The sponge-fauna of Christmas Island, so far as known at present, is very similar to that of Java.

A list of species, arranged according to the classification of Topsent, is given below.

#### Sub-Class CALCAREA.

1. *Clathrina primorilialis* (Haeckel).
2. *Leucandra* sp.

#### Sub-Class DESMOSPONGIDA.

##### Order CARNOSA.

3. *Chondrosia reniformis* Nardo.
4. *Chondrosia plebeja* O. Schmidt.
5. *Chondrilla nuda* Lendenfeld.

## Order TETRACTINELLIDA.

6. *Sidonops picteti* Topsent.
7. *Ecionema bacilliferum* (Carter).
8. *Stelletta simplicifurca* (Sollas).
9. *Tetilla bacca* (Selenka).
10. *Tetilla ternatensis* Kieschnick.

## Order MONAXONIDA.

## Suborder HADROMERINA.

## Section Clavulida.

11. *Spirastrella carnosa* Topsent.
12. *Spirastrella decumbens* Ridley, var. *robusta*, var. nov.
13. *Pseudosuberites andrewsi*, sp. n.

## Section Aciculida.

14. *Tethya ingalli* Bowerbank.
15. *Tethya seychellensis* (E. P. Wright).
16. *Tethya affinis*, sp. n.

## Suborder HALICHONDRINA.

## Family AXINELLIDÆ.

17. *Hymeniacion conulosum* (Topsent).

## Family PÆCLOSCLERIDÆ.

18. *Microciona dubia*, sp. n.
19. *Iotrochota baculifera* Ridley, var. *tumescens*, var. nov.
20. *Esperella pellucida* Ridley.
21. *Desmacella* sp.
22. *Stylotella irregularis*, sp. n.
23. *Stylotella*, sp.

## Family HAPLOSCLERIDÆ.

24. *Rhizochalina pellucida* Ridley.
25. *Rhizochalina sessilis*, sp. n.
26. *Gellius varius* (Bowerbank).
27. *Reniera innominata*, sp. n.
28. *Petrosia exigua*, sp. n.
29. *Halichondria solida* Ridley & Dendy.
30. *Halichondria solida*, var. *rugosa* Ridley & Dendy.

## Order MONOCERATINA.

31. *Spongia (Euspongia auct.)* sp.
32. *Spongilia* sp.

## CLATHRINA PRIMORDIALIS (Haeckel).

1872. *Asceita primordialis* var. *protogenes* Haeckel (6. ii. p. 16, Atlas, pl. ii. fig. 13).

1892. *Clathrina primordialis* Lendenfeld (8. p. 195).

The specimen consists of a small mass about 10 mm. in area by 5 mm. in height. No oscules are visible, but this is probably due to the contracted state of the sponge.

The spicules, which are equiangular and equiradial, are very small and slender, being smaller than in the typical Mediterranean form, and much smaller than in the Australian form named *Clathrina primordialis* var. *protogenes* by Carter (3. p. 510) and *C. protogenes* by Dendy (5. p. 58). The rays, which are 70  $\mu$  by 6  $\mu$ , taper gradually to a rather sharp point.

## LEUCANDREA sp.

The specimen forms a small oval mass 3  $\times$  2 mm. plugging up an oscule of *Tetilla ternatensis*. The outer surface bristles with the projecting ends of stout oxeotes which pass through the dense mass of tri-radiates; gastral quadri-radiates can here and there be made out in spaces in the interior.

*Spicules.* Oxeotes 1500  $\times$  70  $\mu$ ; tri-radiates, rays sharp-pointed, often wavy, 245  $\times$  8  $\mu$ ; quadri-radiates, tangential rays curved inwards towards the apical ray; tangential ray 105  $\times$  18  $\mu$ , apical ray 35  $\mu$  in length.

Canal-system: pores lead into incurrent spaces surrounding groups of large oval ciliated chambers 85  $\mu$  in diameter, and groups of the latter open into excurrent spaces.

The species is probably new; but since the specimen is very small and has been damaged in extraction, owing to its being partly involved in the tissues of the *Tetilla*, no specific name has been given.

## CHONDROSIA RENIFORMIS Nardo.

One typical specimen occurs; it is bluish black on the upper surface; pale brown below, where it is attached by a narrow ridge to the rock. The one rather large oscule has a membranous slightly serrated margin. The colour on section is dirty white. I have examined some fragments of the type specimen of *Chondrosia ramsayi* Lendenfeld, and agree with Topsent in regarding this species as a synonym of *C. reniformis*.

A noticeable feature in the Australian specimen is the abundance of pigment in the interior, giving the sponge a slaty colour on section.

*Distribution.* Mediterranean; Kattegat; Tadjurra, Gulf of Aden; Port Jackson; Amboina; Christmas Island; Galapagos Islands.

## CHONDROSIA PLEBEJA O. Schmidt.

1868. *Chondrosia plebeja* O. Schmidt (14. p. 1).

There are eight specimens, seven in alcohol and one in formol; Proc. Zool. Soc.—1900, No. IX.

their shape is subspherical, elongated or pyriform, and they vary in size from 1 to 5 c.c. in length or diameter, and in colour from yellow to dark brown. The alcohol specimens are much shrunken and corrugated, the surface being marked with polygonal or elongated depressions ("wabige vertiefungen," O. Schmidt) with pigmented stellate markings. The specimen in formol, which was unfortunately transferred to alcohol, was bluish-black and quite smooth.

On drying, the surface has a distinctly gritty appearance, caused by the shrinking of the dermal membrane on the foreign particles beneath.

The foreign bodies (fine sand-grains, sponge-spicules) form a fairly-well defined layer in the cortex and just beneath the dermal membrane; in one specimen spicules projected beyond the surface at right angles. There are no foreign bodies scattered in the interior of the body, differing in this respect from the specimens from Algiers described by O. Schmidt.

*Distribution.* Mediterranean; Atlantic; Christmas Island.

#### CHONDRILLA NUDA Lendenfeld.

1867. *Chondrilla nuda* Lendenfeld (9. p. 105, pl. x. figs. 69-71).

One small specimen of this species occurs in the form of a rounded bilobed mass 8 × 9 × 4 mm. in size, growing on *Chondrosia plebeja*.

The surface is bluish-black and smooth, and shows under a lens a faint whitish reticulate pattern. The larger lobe has two minute raised oscules .3 mm. in diameter. The cortical layer includes columns of large granular pigmented cells, as in the specimen from Zanzibar.

The spicules are slightly larger than in Lendenfeld's specimens. The oxyasters, 30 μ in diameter, possess 8 sharp spines usually slightly curved. The spherasters, 25 μ in diameter, possess 25-30 sharp-pointed pyramidal prickles. In the Zanzibar specimens the oxyasters are 22-30 μ, and the spherasters only 10-12 μ in diameter.

*Distribution.* Zanzibar; Christmas Island.

#### SIDONOPS PICTETI Topsent.

1897. *Sidonops picteti* Topsent (18. p. 431, pl. xviii. fig. 2).

1898. *Sidonops picteti* Lindgren (10. p. 349, pl. xviii. fig. 17, pl. xx. fig. 6).

There are four small specimens, the largest of which is 5 c.c. by 2 c.c. in area and 1.5 c.c. in thickness. Several small spherical buds about 2 mm. in diameter are lightly but closely attached by bundles of oxeote spicules. When a bud is detached, a shallow circular depression remains, the sterrastral crust here being thin and biconcave in section.

The slender cortical oxeas and the oscular palisade of spicules described by Lindgren are present.

*Distribution.* Amboina; Java; Christmas Island.

#### ECIONEMA BACILLIFERUM (Carter).

1887. *Stelletta bacillifera* Carter (4. p. 78, pl. vi. figs. 9-14).

1897. *Ancorina simplex* Lendenfeld (9. p. 96, pl. ix. figs. 12-34).

1898. *Ecionema bacilliferum* Lindgren (10. p. 335, pl. xvii. fig. 17; pl. xix. fig. 27).

1899. *Ecionema bacilliferum?* Lindgren (10 A. p. 88).

The largest of the four specimens in this collection is 4 × 5 c.c. in area and 1 c.c. in thickness, and forms a thick crust; in colour pale brown mottled with dark brown.

The type specimen from Mergui, being in the Calcutta Museum, is not available for comparison. The prototrienes are very rare in the Christmas Island specimens. The microstrongyles, which are 18 × 2 μ in size, are occasionally centrotylote. The fine cortical oxeas measure 180 × 4 μ.

The asters are tylote, and with roughened actines, the same characteristics being found in the asters of *Ancorina simplex*, of which species the Museum possesses a few slides prepared from the type specimens from Zanzibar.

*Distribution.* Mergui, Java, Christmas Island, Zanzibar; var. *robustum*: Port Phillip, Ports Elliot and Adelaide.

#### STELLETTA SIMPLICIFURCA (Sollas).

1886. *Myriastria simplicifurca* Sollas (16. p. 189).

1888. *Myriastria simplicifurca* Sollas (17. p. 114, pl. xii. figs. 29-33).

1898. *Stelletta simplicifurca* Lindgren (10. p. 332, pl. xviii. fig. 8).

Of the three specimens of this species, one is small (8 × 6 × 6 mm.) and oval; the other two are in the form of thick nodular lamellæ, the larger being 5 × 3 c.c. in area and from 1 to 2 c.c. in thickness.

	Small spec. Christmas I.	Largest spec. Christmas I.	Torres Straits. 'Challenger.'	Cochin China. Lindgren.
Orthotrienes. Rhabdus ...	1375 × 50	1825 × 52	2325 × 55	2700 × 84
Orthotrienes. Cladi .....	280	245	366	(54), ? 540
Anatrienes. Rhabdus ...	1820 × 22	1330 × 15	1860 × 29	3240 × 30
Anatrienes. Cladi .....	105	54	120	108
Anatrienes. Chordi .....	122	72	127	168
Anatrienes. Sagitta .....	88	48	90	84
Large oxea .....	1925 × 49	1330 × 24	2000 × 31	2900 × 60
Small oxea .....	102 × 6	210 × 3	252 × 3	252 × 4
Chiasters .....	12	12	12	12

The surface of the lamellæ presents a tessellated pattern, the

pores being in the grooves between the lamellæ; the pattern is not present on the thick rounded edges nor on the nodular excrescences. Several small oscules  $1 \times 5$  mm. are present.

The specimens described by Sollas and Lindgren are probably in an early stage of growth.

There are considerable variations in the dimensions of the spicules, as will be seen from the table (p. 131) giving the sizes in microns.

*Distribution.* China Sea; Torres Straits; Christmas Island.

#### TETILLA BACCA (Selenka).

1867. *Stelletta bacca* Selenka (15. p. 569, pl. xxxv. figs. 14-15).

1883. *Tethya merguensis*, Carter (2. p. 366, pl. xv. figs. 6-8).

1898. *Tetilla bacca* Lindgren (10. p. 328).

There are two specimens, the larger being 2.5 c.c.  $\times$  3.5 c.c. They are subspherical, but with a concave area below apparently resulting from radial fission. The larger specimen has 20 oval depressed pore-areas and 2 oscules, all being about  $4 \times 5$  mm. in area and 2.5 mm. in depth. The oscules are cloacas, in the floor of which several openings of excurrent canals are seen; the floor of the pore-areas is covered with membrane perforated by groups of pores. A section of the sponge, which is soft and cuts easily, shows bundles of spicules radiating from a central nucleus.

The spiculation is almost identical with that of a specimen from Java described by Lindgren. The length of the oxea is 3.5 mm., of the anatriænes 5.5 mm. and of the protriænes 5.2 mm.

*Distribution.* Samoa; Torres Straits; Amboina; Java; Mergui; Christmas Island.

#### TETILLA TERNATENSIS Kieschnick.

1896. *Tetilla ternatensis* Kieschnick (7. p. 527).

1898. *Tetilla ternatensis* Lindgren (10. p. 329, pl. xvii. fig. 14, pl. xix. fig. 25).

The one specimen is subspherical,  $2 \times 2 \times 3$  c.c. in size; the sponge is deeply fissured in several places. There are several oscules, the largest being 3 mm. in diameter and possessing a raised rim. As in Lindgren's specimen, the surface of the sponge is crowded with Diatoms.

The very rare protriænes are irregular, one of the arms being much longer than the other two, which may be reduced to mere knobs.

This species resembles *T. dactyloidea* Carter in certain respects, the radiating bundles of the latter being formed of oxea ( $1360 \times 6\mu$ ) midway in size between the large oxea and microxea of *T. ternatensis*.

#### TETHYA INGALLI Bowerbank.

1872. *Tethya ingalli* Bowerbank (1. p. 119, pl. v. figs. 11-17).

The single specimen is free, oval, 22 mm. in length, and 16 mm

in breadth and height. The surface is level, but shows a faintly marked tessellated pattern. The cortex is 2 mm. thick, and is uniformly and densely crowded with spherasters.

The spicule-measurements are given along with those of the type specimen from Fremantle for comparison.

	Strongyloxea.	Spherasters.	Choanosomal oxyasters.	Chiasters.
Christmas Island . . . . .	$1360 \times 24 \mu$	70 $\mu$	$18-24 \mu$	12 $\mu$
Fremantle . . . . .	$1470 \times 35 \mu$	70 $\mu$	36 $\mu$	12 $\mu$

*Tethya ingalli* shows a considerable range of variation, but, I think, would include the Christmas Island specimen in spite of its oval form and the smaller size of its spicules.

*Distribution.* Seychelles; Australia; Christmas Island; Java; Amboina.

#### TETHYA SEYCHELLENSIS (E. P. Wright).

1881. *Alema seychellensis* E. P. Wright (19. p. 13, pl. i.)

1888. *Tethya seychellensis* Sollas (17. p. 427, pl. xlv. figs. 1-6).

There are five small, free, nearly spherical specimens, all of which are gemmiferous. The outer two-thirds of the cortex is occupied by a zone of subcortical cavities.

*Spicules.* Megascleres—strongyloxea,  $1200 \times 18 \mu$ .

Microscleres—spherasters, 48  $\mu$ . Somal chiasters, 12  $\mu$ . Choanosomal asters, 30  $\mu$ , with well-defined centrum; actines roughened, bifurcate.

The "regular hexaster" type of the oxyasters is a characteristic of this species, distinguishing it from *T. ingalli* Bowerbank.

A comparative table of spicule-measurements (in microns) of specimens from various localities is given below.

	Type from Seychelles.	Samboangan. 'Challenger.'	Torres Straits. 'Challenger.'	Christmas Island.
Strongyloxea . . . . .	$1750 \times 30$	$1910 \times 23$	$1680 \times 26$	$1200 \times 18$
Spherasters . . . . .	70	95	64	48
Somal chiasters . . . . .	12	12	12	12
Choanosomal asters . . . . .	54	60	60	30

*Distribution.* Seychelles; Philippine Islands; Torres Straits; Christmas Island.

#### TETHYA AFFINIS, sp. n. (Plate XII. fig. 1; Plate XIII. figs. 3a-d.)

Sponge incrusting, and of irregularly conical shape; upper surface rough but level, with an obscure polygonal pattern formed by depressed conules with fimbriated edges, and with two small membranous oscular cones, the apertures being  $1 \times 5$  mm. in area.

Cortex 1.22 mm. in thickness, with a few narrow intercortical cavities arranged vertically in the outer two-thirds, the cortical spherasters occasionally occupying the whole thickness but usually

only the inner third, where they are divided into two zones by a shallow space.

*Spicules.* Megascleres—strongyloxea,  $1330 \times 35 \mu$ .

Microscleres—spherasters,  $60 \mu$ . Soma chiasters,  $15-18 \mu$ .  
Dermal chiasters,  $12 \mu$ .

The unique specimen measures  $2.5 \times 2$  c.c. in horizontal and  $2.5$  c.c. in vertical plane. The rough convex under surface appears to have been torn off from a rock.

The name given to the species denotes its close affinity to *T. japonica* Sollas; it differs from the latter (1) in its mode of growth, *T. japonica* being spherical and free, (2) in having the membranous oscular cones, and (3) in the slight difference in size between the dermal and soma chiasters.

#### SPIRASTRELLA CARNOSA Topsent.

1897. *Spirastrella carnosa* Topsent (18. p. 441).

The specimen is cauliflower-shaped, expanding upwards from a narrow base to a height of 2 c.c., the area of the upper surface being  $2.5 \times 1.5$  c.c. The upper surface is covered with low rounded papillæ.

The tylostyles,  $525 \times 18 \mu$ , usually have a trilobate head. The spirasters are extremely rare and very fine, being  $18 \times 1 \mu$ , with minute spines, and usually with four curves.

The specimen differs from the type from Amboina in having larger megascleres, these being only  $330 \times 6$  to  $8 \mu$  in the latter.

In Topsent's specimens, too, the surface is ridged ("froncé").

*Distribution.* Amboina; Christmas Island.

#### SPIRASTRELLA DECUMBENS Ridley, var. ROBUSTA, var. nov.

1887. *Spirastrella decumbens* var., Ridley and Dendy (13. p. 229, pl. xlv. fig. 12).

1898. *Spirastrella semilunaris* Lindgren (10. p. 323, pl. xix. fig. 23).

There are two specimens of this variety—one (1) forming a thin yellow crust on a shell, the other (2) in the form of small fleshy lobes growing on *Sidonops picteti*. Specimen (1) has a shallow patent oscule  $1.5$  mm. in diameter; the surface shows a delicate reticulate pattern formed by the pore-areas, the pores being circular and  $40 \mu$  in diameter; sieve-like groups of 5 to 10 pores lead into subdermal spaces.

A cavernous cortex from  $.5$  to  $1$  mm. in thickness occurs in the type specimens of the species from Torres Straits, described by Ridley (11. p. 470, pl. xliii. fig. c). The same structure is also present in the specimens from Amboina and Christmas Island. In all these specimens the minute semilunar spirasters ( $12 \mu$  in length) form the outermost dermal layer. Hence I have no doubt that Lindgren's species is a synonym: at the same time it is right to add that that author is in no way to blame, owing to the incomplete description of the type specimens, which are badly preserved.

The differences between the type specimen from Torres Straits on the one hand, and the specimens from Amboina, Java, and Christmas Island on the other, are constant, and render it necessary to regard the latter specimens as belonging to a well marked variety. In the type the tylostyles are longer and narrower, and the largest spirasters are smaller than in the new variety which I have named "*robusta*."

	Type.	Var. <i>robusta</i> .
Tylostyles .....	$507 \times 8 \mu$	$432 \times 12 \mu$
" head .....	$12 \mu$	$12 \mu$
" neck .....	$6 \mu$	$10 \mu$
Spirasters, smallest .....	$8-12 \mu$	$8-12 \mu$
" largest .....	$36 \mu$	$48 \mu$

*Distribution of S. decumbens:* Torres Straits; of *S. decumbens* var. *robusta*: Philippines, Java, Christmas Island, Red Sea.

PSEUDOSUBERITES ANDREWSI, sp. n. (Plate XII. figs. 2 a-b; Plate XIII. fig. 7.)

Sponge loosely incrusting or forming free thick lamellæ. Pale yellow in colour; surface smooth, and with canalicular markings beneath the dermis; soft in consistence and easily torn. Oscules, when present, small, circular ( $.75$  mm. in diameter), guarded by a silvery fringe or cone of tylole spicules with points centripetal.

Skeleton composed of primary lines of multispicular fibres radiating to the surface and giving off at various angles a few scattered single spicules.

Dermal skeleton very distinct and formed of tangentially arranged bundles of spicules joining to form a reticulum with tri- or quadrangular meshes.

*Spicules.* Tyloles  $350 \times 6 \mu$ , slightly curved in the basal third; head rounded,  $7.5 \mu$  in diameter, slightly knobbed at the summit or swollen laterally.

Of the three specimens, one is incrusting and with oscules, the others are free and without oscules; the former is  $5.5 \times 3$  c.c. in area, and  $.5$  c.c. in thickness; the latter are considerably thicker.

The genus at present includes, as stated by Topsent, two other species, *P. hyalina* (Ridley & Dendy) and *P. sulphureus* (Bowerbank). One of the small fragments of the type specimen of *P. hyalina* has an oscule with the palisade of spicules arranged as in the new species, but the tyloles are much larger in the former, measuring  $1100 \times 25 \mu$ .

#### HYMENIACIDON CONULOSUM (Topsent).

1897. *Stylotella conulosa* Topsent (18. p. 466).

1898. *Hymeniacion conulosum* Lindgren (10. p. 313, pl. xvii. fig. 13; pl. xix. fig. 19).

The single specimen is pyramidal, 3 c.c. in height, and with an incrusting base  $3 \times 1.5$  c.c.

The surface is partly even, and partly provided with small hispid tufts.

The skeleton is composed of main lines of multispicular fibre radiating from base to surface, with an irregular reticulum between formed by bundles of one or a few spicules given off from the main lines; the axial columns alone are present in the tufts.

The styles, which measure  $525 \times 12 \mu$ , are curved near the basal end.

The nearly related species *Stylorella polymastia* Lendenfeld, referred to by Topsent l. c. p. 466, is synonymous with *Hymeniacidon fenestratum* (Ridley).

The proper position for the above species appears to be in the Axinellidae. The skeleton is composed of axial lines of monactinal spicules, the reticulation being of secondary importance and absent from the tufts; some of the spicules show a double curve, characteristic of certain typical Axinellid sponges.

*Distribution.* Amboina; Java; Christmas Island.

*MICROCIONA DUBIA*, sp. n. (Plate XII. figs. 3, 3a; Plate XIII. figs. 2a-f.)

Sponge forming an almost free or loosely incrusting lamina with margins curled up, with foreign particles adherent to the under surface where the latter is free.

Colour yellow; upper surface smooth. Skeleton formed partly of columns, each composed of one stout subtylote spicule, and partly of plumose columns of more slender tylotes opening out from base to surface, where they almost form a distinct dermal layer; numerous short spined styli arranged vertically with bases on the basal layer of the sponge. Spongin absent.

*Spicules.* Megascleres—stout, slightly curved subtylotes  $32 \pm \times 7.5 \mu$ , head  $7.7 \mu$ , slightly spined, occasionally faceted.

Slender straight tylotes  $318-328 \mu \times 5.5 \mu$ , head  $7 \mu$  with basal end spinous.

Short spined styli  $48 \times 7.5 \mu$ , with sharp, often curved, spines on the basal three-fourths of the length of the spicule.

Microscleres—palmate isochelæ from 3 to  $12 \mu$ . Toxa large, slender,  $39 \times 1 \mu$ ; a shorter but thicker form (numerous),  $6 \times 1.5 \mu$ .

The size of the specimen is  $2.5$  c.c.  $\times 5$  c.c. in area, and  $1$  mm. in thickness. The unispiculate columns, which occur in parts of the sponge, recall the chief character of *Hymeniacidon*. Again, the spiculation closely resembles that of certain species of *Rhaphidophylus* (*R. filifer* Ridley & Dendy and *R. spiculosus* Dendy), but the absence of spongin excludes the new species from this genus. The specimen is probably mature, since there are several embryos near the base of the sponge.

*IOTROCHOTA BACULIFERA* Ridley, var. *TUMESCENS*, var. nov. (Plate XIII. fig. 1.)

Specimen forming an irregular flabellate and branching growth,  $6$  c.c.  $\times 1$  c.c. in area and  $.3$  c.c. in thickness.

*Spicules.* Styles averaging  $210 \times 10 \mu$ .

Strongyles  $220-250 \times 1 \mu$ , with from one to three fusiform

swellings along the body, one of the ends attenuated sometimes to a blunt point. Amphidiscs  $18 \mu$ .

The characteristic feature of the new variety lies in the strongyles with their peculiar swellings; these may, however, be dependent on some pathological cause such as the presence of a parasite, but I was unable to find any such organism. [In several descriptions of this species the dermal diactines are described as tylotes. In the type specimen from Port Darwin the ends of the strongyles are very slightly enlarged, a feature slightly exaggerated by the artist in the figures (11. p. 435, pl. xlii. fig. f); but there is no trace of terminal enlargement in the spicules of specimens from the Mascarenes, Madras, and Christmas Island.]

#### DESMACELLA sp.

A few small broken-up pieces of a very soft dark reddish-brown incrusting sponge, with a few crater-like oscules. The skeleton forms a unispiculate network, the meshes of which are triangular and quadrangular and made up of styles, oxea, and strongyles. A few long slender toxa and one or two sigmata, together with some slender raphides, are present. The skeleton is renieroid, and spongin entirely absent. The dimensions of the spicules are:—

Styles (not rare) slightly curved,  $150 \times 9 \mu$ ; strongyles (rare) straight,  $126 \times 6 \mu$ . Oxea (very abundant), curved,  $180 \times 7 \mu$ .

Microscleres—toxa  $48 \times 5 \mu$  (rare); sigmata  $24 \mu$  (very rare); raphides (rare),  $108 \times 1.5 \mu$ .

This species, which appears to be new, has not been named owing to the uncertainty as to whether all the above-mentioned microscleres seen in the preparations really belong to the sponge; several kinds of obviously foreign spicules were included.

*STYLOTELLA IRREGULARIS*, sp. n. (Plate XII. fig. 4; Plate XIII. figs. 6a-d.)

Sponge incrusting or forming free irregular lamellæ; colour pale brown; with several small circular oscules 2 to 3 mm. in diameter on the upper surface.

Skeleton forming a rectangular network, the meshes being for the most part unispiculate, but with a few slender primary lines of spiculo-fibre 2-4 spicules thick.

*Spicules.* Styles  $186 \times 9 \mu$ , smooth, straight or slightly curved.

Oxea  $204 \times 9 \mu$ , curved.

Strongyla  $150 \times 10 \mu$ , straight or slightly curved.

Slender oxea  $150 \times 4 \mu$ , occasionally with a central fusiform enlargement, rare and scattered in the tissues.

This species is very near *Petrosia contignata* Thiele, from ebes (*Zoologica*, Stuttgart, 1899, Heft 24, ii. p. 20), but differs mainly in possessing slender fusiform oxea; unfortunately the central swelling is not shown in Pl. XIII. fig. 6d.

#### STYLOTELLA sp.

Specimen incrusting,  $2 \times 1$  c.c. in area, and  $.25$  to  $.5$  c.c. in thickness; pale brown, very soft, with several oscules 1 mm. in diameter.

Skeleton consisting of slender vertical main lines, loosely joined by single spicules in horizontal plane excepting near the surface, where the main fibres are isolated.

*Spicules.* Styles  $132 \times 4 \mu$ , with a sharp bend at the centre.

Oxea  $144 \times 4 \mu$ , sharply curved at the centre, and gradually diminishing to sharp points.

The skeleton is like that of a *Petrosia*, but very loosely arranged.

The specimen is too fragmentary to serve as the type of a new species.

*RHIZOCHALINA PELLUCIDA* Ridley.

1884. *Rhizochalina pellucida* Ridley (11. p. 608, pl. liv. fig. j).

There are only three small fragments of fistules, the longest being 4 mm. in length and 1.5 mm. in diameter.

The spicules are slightly smaller than in the type specimen, being  $240 \times 9 \mu$  in the former, and  $260 \times 10 \mu$  in the latter, but the shape is the same.

*Distribution.* Providence Island, Mascarene Group; Christmas Island.

*RHIZOCHALINA SESSILIS*, sp. n. (Plate XII. fig. 5; Plate XIII. fig. 8.)

Sponge pyramidal or digitate, sessile, arising from an incrusting base; surface smooth; consistence firm but rather brittle; colour (in formol) white-crystalline; translucent.

Skeleton consisting of an axial or central open spiculo-fibrous network formed of broad loose strands about 10 spicules thick, surrounded by a cortical network of more slender strands at right angles to the central network, and of a dermal isodictyal network with strands 2-3 spicules thick, with unispiculate strands in the interstices.

*Spicules.* Oxea  $372 \times 14 \mu$ , curved at the centre and diminishing suddenly near the ends to sharp points. Microscleres 0.

There are several specimens and fragments, most of them being of flattened digitate form, the largest being 30 mm. in height, 8 mm. in breadth, and 3 mm. in thickness. The specimens preserved in alcohol are dark yellow at the surface, and bright yellow in the interior, the formol specimens being white.

The new species is very near *Peltina cusiphonia* Ridley (11. p. 414, pl. xli. fig. x), from Port Darwin, but differs in the shape of the sponge and in the size of the spicules. These two species come within the subfamily Phloeodyctinæ rather than within the Renierinæ.

*RENIERA INNOMINATA*, sp. n. (Plate XII. figs. 6, 6a; Plate XIII. figs. 5a-b.)

Sponge incrusting; colour pale brown with a faint reddish tinge; texture soft and elastic.

Skeleton forming a rather regular reticulum of unispiculate fibres with triangular (mostly) and quadrangular meshes with nodes cemented with spongin.

*Spicules.* Strongyles  $126 \times 8 \mu$ , slightly curved in the middle. Oxea  $108 \times 2.5 \mu$ , curved at the centre; also very slender oxea of the same length and shape, probably young forms of the thicker kind.

The specimen encrusts a *Melina*-shell, and is produced at one point into a short, stout, digitate process.

There is in the British Museum Collection an unnamed specimen (registered 82.10.17.246) of this species from Marie Louise Island, Amirante Group.

The species from Providence Island described by Ridley (11. p. 607, pl. liv. fig. i) as "*Reniera* sp. allied to *crateriformis*" has spicules of the same shape, but much larger ( $480 \times 28 \mu$ ), and the meshes of the reticulum are multispiculate.

*Distribution.* Amirante Isles; Christmas Island.

*PETROSIA EXIGUA*, sp. n. (Plate XII. fig. 7; Plate XIII. fig. 4.)

Sponge forming a hard, thick, nodulated crust. Colour pale grey; surface smooth, and in parts showing an irregular reticulate pattern formed by pore-areas.

Oscules 1 to 1.5 mm. in diameter, numerous, some level with surface, others with slightly raised margin.

Skeleton formed of slender main lines of fibres passing vertically to the surface and connected at right angles to this plane by closely packed single spicules, so as to form circular or obscurely polygonal tubes about 70 mm. in diameter, the skeletal tubes being much more apparent near the surface and very ill-defined deeper, where the skeleton becomes a dense, confused network. Special dermal skeleton absent.

*Spicules.* Oxea  $114 \times 5.5 \mu$ , curved at the centre, and diminishing to very sharp points.

The single specimen is  $4 \times 4$  c.c. in area, and 1.5 c.c. in thickness.

The salient character of this species lies in the very small size of the spicules, which are less than half the size of those of *Petrosia similis* Ridley & Dendy (13. p. 9, pl. ii. fig. 10, pl. iii. figs. 3 & 4), a species closely allied to it in other respects; the spicules are considerably smaller than those of any species with oxeote spicules from this region of the Indo-Pacific.

*HALICONDRIA SOLIDA* Ridley & Dendy.

1886-7. *Halichondria solida* Ridley & Dendy (12. p. 326, and 13. p. 4, pl. ii. fig. 5).

The specimen, which is white and with an even surface, differs slightly from the type in having the ends of the oxea sharp-pointed; the spicules ( $770 \times 22 \mu$ ) are curved at the centre.

*Distribution.* Amboina; Tahiti; Christmas Island.

*HALICONDRIA SOLIDA* var. *RUGOSA* Ridley & Dendy.

The specimen is dark brown and wrinkled in places, as in the type of the variety from Api. There are several oscules, from 1 to 4 mm. across, with conspicuous membranous sphincters. The

spicules are curved at the junction of the middle and outer third, the size being  $770 \times 18 \mu$ .

*Distribution.* Api, New Hebrides; Christmas Island.

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V. *List of the Foraminifera from the Boat-channel, Flying Fish Cove, Christmas Island, 11 fathoms.* By F. C. CHAPMAN, A.L.S., F.R.M.S.

1. *Biloculina ringens* (Lamarck). Very rare.
2. *Spiroloculina fragilissima* Brady. Very rare.
3. *Miliolina oblonga* (Montagu). Very rare.
4. " *seminulum* (L.) Frequent; small.
5. " *auberiana* (d'Orb). Rare; rather small.
6. " *parkeri* Brady. Very rare.
7. " *bicornis* (Walker & Jacob). Very rare.
8. " *rupertiana* Brady. Frequent; very fine.
9. " *insignis* Brady. Very rare.
10. *Hauerina ornutissima* (Karrer). Rare.
11. *Orbitolites complanata* Lamarck. Frequent.
12. " *marginalis* (Lam.). Very rare.
13. " *duplex* Carpenter. Rare.
14. *Textularia rugosa* (Reuss). Rare.
15. *Bolivina limbata* Brady. Very common.
16. *Spirillina limbata* Brady. Rare.
17. *Truncatulina rostrata* Brady. Common.
18. " *ungeriana* (d'Orb.). Very rare; small.
19. *Pulvinulina repanda* (Fichtel & Moll). Common.
20. *Calcarina hispida* Brady. Very rare.
21. *Gypsina vesicularis* (Parker & Jones). Rare.
22. *Polytremma miniaceum* (Pallas). Common.
23. *Polystomella macella* (Fichtel & Moll). Rare.
24. *Heterostegina depressa* d'Orb. Common.

#### VI. EXPLANATION OF THE PLATES.

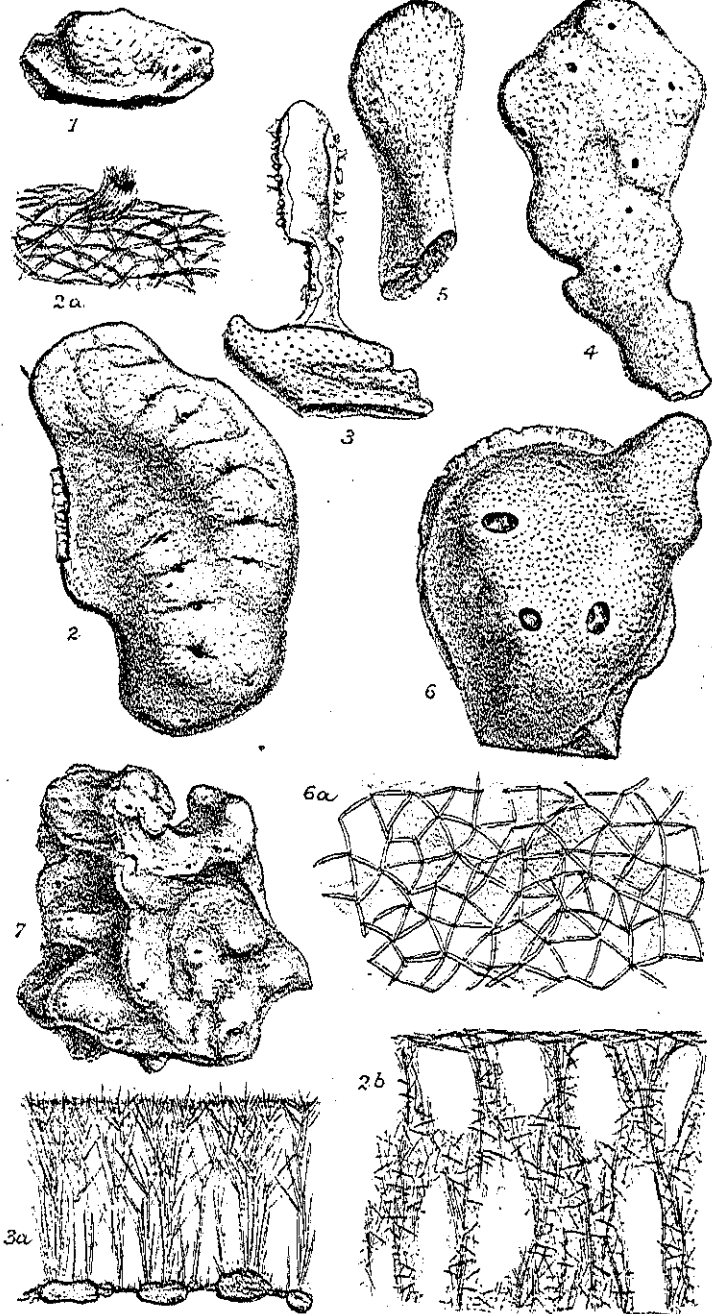
##### PLATE XII.—Sponges from Christmas Island.

- Fig. 1. *Tethya affinis* (p. 133), nat. size.  
 2. *Pseudosuberites andrewsi* (p. 135), nat. size. 2 a, oscule,  $\times 30$ ; 2 b, section,  $\times 30$ .  
 3. *Microciona dubia* (p. 136), nat. size. 3 a, section,  $\times 40$ .  
 4. *Stylotella irregularis* (p. 137), nat. size.  
 5. *Rhizochalina sessilis* (p. 138), nat. size.  
 6. *Reniera innominata* (p. 138), nat. size. 6 a, section,  $\times 30$ .  
 7. *Petrosia exigua* (p. 139), nat. size.

##### PLATE XIII.—Sponges from Christmas Island.

- Fig. 1. *Iotrochota baculifera tumescens* (p. 136), strongyles  $\times 300$ .  
 2. *Microciona dubia* (p. 136); a-d  $\times 300$ ; e-f  $\times 1600$ . a, thick sub-tylote; b, spined style; c, slender tylote; d, large toxon; e, palmate isochela, side view; e', ditto, front view; f, short toxon.  
 3. *Tethya affinis* (p. 133). a, strongyloxeum,  $\times 80$ ; b, spheraster,  $\times 400$ ; c, somal chiaster,  $\times 400$ ; d, dermal chiaster,  $\times 400$ .  
 4. *Petrosia exigua* (p. 139), oxeum,  $\times 300$ .  
 5. *Reniera innominata* (p. 138). a, strongyle,  $\times 300$ ; b, oxeum,  $\times 300$ .  
 6. *Stylotella irregularis* (p. 137); a-d,  $\times 300$ . a, oxeum; b, style; c, strongyle; d, slender oxeum.  
 7. *Pseudosuberites andrewsi* (p. 135); tylote,  $\times 300$ .  
 8. *Rhizochalina sessilis* (p. 138), oxeum,  $\times 150$ .

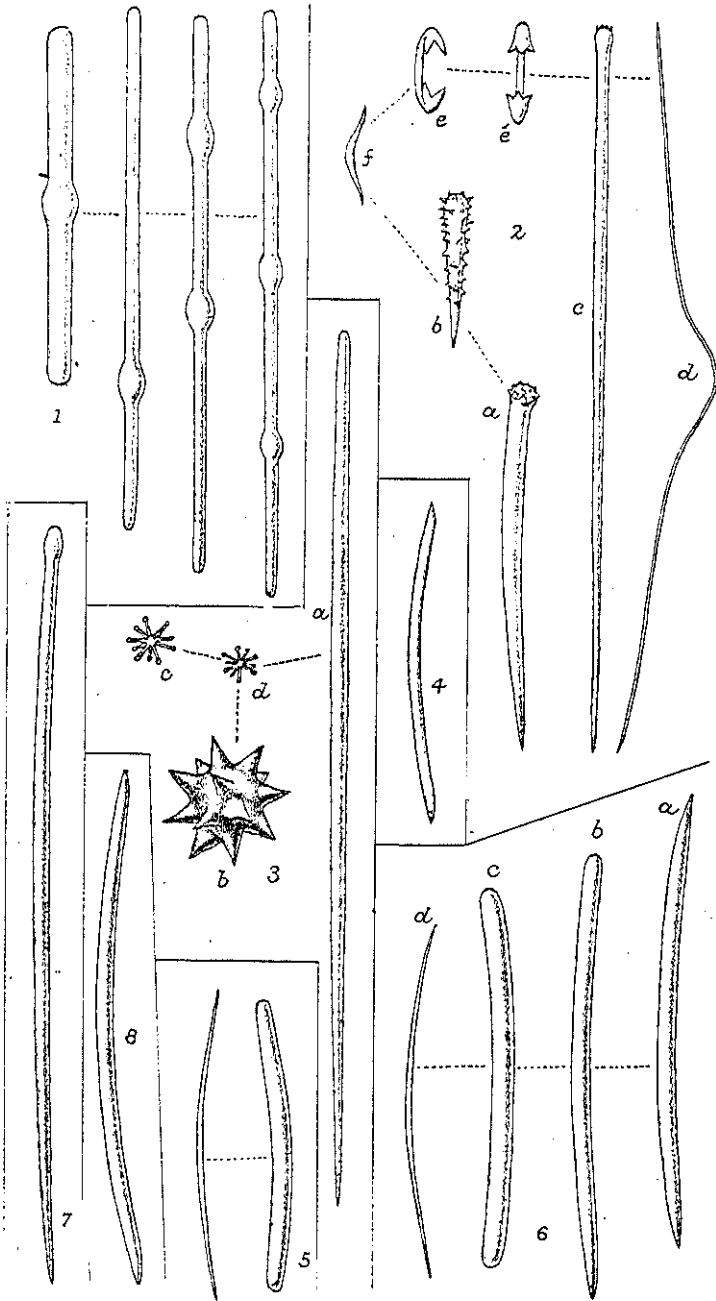




P. Hightley del. et lith.

Hanhart imp.

SPONGES FROM CHRISTMAS ISLAND.



P. Hghey del. et lith.

Hanhart imp.

SPONGES FROM CHRISTMAS ISLAND.