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LVII.

REPORTS ON THE ZOOLOGICAL COLLECTIONS MADE IN
TORRES STRAITS BY PROFESSOR A. C. HADDON,
1888-1889.

HYDROIDA AND POLYZOA. By R. KIRKPATRICK (British
Museum). (PLATES XIV.-XVII.)

[COMMUNICATED BY PROFESSOR HADDON.]

[Read November 19, 1890.]

Most of the specimens were collected in the passages between the coral reefs, in depths of fifteen to twenty fathoms, off Murray Island (Station 14), and from Albany Passage in ten fathoms (Station 8). Only a few specimens were collected at the other stations mentioned in Professor Haddon's list.

The published accounts of collections of Hydroida and Polyzoa from Torres Straits are those of Busk, in the Appendix to Vol. I. of the "Voyage of the 'Rattlesnake,'" 1852; and of Busk and Allman, in the "Challenger" Reports on the Polyzoa and Hydroida respectively. Several species of Hydroida from this region are described in Kirchenpauer's writings.

Bale describes in his Catalogue of Australian Hydroid Zoophytes all the Hydroida that had been found in this region up to 1884. Descriptions of zoophytes from Australian seas are found in the works of Lamarek and Lamouroux, and doubtless many of the species described are from Torres Straits.

A large amount of material was dredged in Torres Straits by the "Chevert" expedition in 1875, and by the "Alert" expedition in 1881-2; but the Hydroida and Polyzoa have not yet been worked out.

Specimens of Hydroida and Polyzoa were collected at the following stations:—

Station 2.—Twenty miles N.N.W. of Warrior Island (Tud.),
5½ fms.; broken shells.

Station 3.—Channel between Saibai and New Guinea, 10 to 17 fms. mud, rolled stone, and dead shells.

Station 4.—Between Orman's Reef and Brothers Island (Gaba), 6 to 7 fms.

Station 8.—Albany Pass, Somerset, N. Queensland, 10 fms.

Station 14.—Channels between reefs, Murray Island (Mer.), 15 to 20 fms.

The specimens here described have been presented to the British Museum (Natural History) by Professor A. C. Haddon.

HYDROIDA.

[The numbers correspond to the numbers of the Stations.]

Gymnoblastea.

- | | | | |
|---|-----|---|--------|
| <i>Cladocoryne haddoni</i> , n. sp. | 14. | <i>Eudendrium infundibuliforme</i> , n. sp. | |
| <i>Coryne</i> vel <i>Syncoryne cylindrica</i> , | | | 2. |
| n. sp. | 8. | — „ <i>generalis</i> , Lendenfeld. | 2, 14. |

Calyptoblastea.

- | | | | |
|--|-------|---|--------|
| <i>Campanularia toresii</i> , Busk. | 14. | <i>Idia pristis</i> , Lamouroux. | 2, 14. |
| <i>Lafoëa costata</i> , Bale. | 14. | <i>Plumularia ramsayi</i> , Bale. | 14. |
| <i>Lictorella halecioides</i> , Allman. | 14. | <i>Monostaechas dichotoma</i> , Allman. | 4. |
| <i>Diplocyathus dichotomus</i> , Allman. | 14. | <i>Acanthella effusa</i> , Busk. | 14. |
| | | <i>Sciurella indivisa</i> , Allman. | 14. |
| <i>Sertularia trigonostoma</i> , Busk. | 14. | <i>Acanthocladium huxleyi</i> , Busk. | 2. |
| <i>Pusythea hexodon</i> , Busk. | 14. | <i>Lytocarpus phæniceus</i> , Busk. | 14. |
| <i>Diphasia scalariformis</i> , n. sp. | 2. | „ <i>philippinus</i> , Kirchenpauer. | 14. |
| „ <i>sub-carinata</i> , Busk. | 2, 4. | | |
| „ <i>digitalis</i> , Busk. | 2. | <i>Aglaophenia longicornis</i> , Busk. | 14. |
| <i>Syntheceium orthogonium</i> , Busk. | 14. | „ <i>macgillivrayi</i> , Busk. | 14. |
| <i>Thuiaria fenestrata</i> , Bale. | 14. | „ <i>brevirostris</i> , Busk. | 14. |
| „ <i>lata</i> , Bale. | 14. | <i>Halicornaria hians</i> , Busk. | 14. |

In addition to the above, the following are recorded from Torres Straits, but are not in Professor Haddon's Collection.

- | | |
|--|---------------------------------------|
| <i>Thyroscyphus simplex</i> , Allman. | <i>Thuiaria vineta</i> , Allman. |
| <i>Desmoscyphus obliquus</i> , Allman. | <i>Aglaophenia delicatula</i> , Busk. |

Total species of Hydroïda, recorded from Torres Straits, 32 :—

TUBULARINÆ, 4 species.		SERTULARINÆ, 11 species.
CAMPANULARINÆ, 5 species.		PLUMULARINÆ, 12 species.

The above list includes four new species, viz. :—

<i>Coryne</i> vel <i>Syncoryne cylindrica</i> , n. sp.	<i>Eudendrium infundibuliforme</i> , n. sp.
<i>Cladocoryne haddoni</i> , n. sp.	<i>Diphasia scalariformis</i> , n. sp.

Coryne vel *Syncoryne cylindrica*, n. sp.

(Pl. xiv., fig. 1.)

Hydrocaulus consisting of a creeping network of slender tubes, invested by a horny perisarc.

Hydranths sessile, stout, cylindrical, about .4 mm. in height, without horny perisarc; tentacles about 15 in number, clustered on the upper half of the hydranth, capitate, sub-sessile. Gonosome not present.

Habitat.—Growing with *Cellepora granulosa*. Albany Passage, 8 fms.

As it is uncertain whether reproduction is effected by means of fixed sporosacs or by free medusiform gonozooids, it is impossible to determine to which genus this species belongs.

The habitat of the specimen is very curious. A slender network was seen on the dorsal surface of a small fragment of *Cellepora granulosa*. On examining more carefully the upper surface of the Polyzoön, the heads of the Hydroid were seen in the angles between the zooecia. To satisfactorily examine the Hydroid, it was necessary to decalcify the *Cellepora*.

The absence of horny perisarc from even the base of the hydranths may be due to the peculiar habitat of the species.

Cladocoryne haddoni, n. sp.

(Pl. xiv., fig. 2.)

Hydrocaulus consisting of straight, simple stems, attaining a height of from 1 to 2 mm. and rising from a simple, creeping stolon; the stems with two annulations at the base, and increasing slightly in diameter, from below, upwards.

Hydranths bottle-shaped, with a double verticil of six to ten large compound capitate tentacles at the base, and three or four simple, sub-sessile ones near the orifice.

Large thread-cells present in the body of the hydranth, and numerous smaller ones in the tentacles.

Gonosome (?)

Habitat.—Growing on *Idia pristis*, Murray Island, 15 to 20 fms. (Station 14), Torres Straits.

This species closely resembles *Cladocoryne pelagica*, Allman,¹ found growing on the Gulf weed, and might be regarded as merely a variety of the latter. *Cladocoryne haddoni* is smaller, the greatest height of the stems being 2 mm., whereas *C. pelagica* attains a height of 5 mm.; the annulations of the perisarc are more numerous in *C. pelagica* than in *C. haddoni*; lastly, the thread cells (fig. 2 B), with regard to their size and shape, are probably characteristic. These organs, before extrusion, appear as large oval cells, measuring $\cdot 06 \times \cdot 02$ mm.; when extended, they present a long, slender, filiform portion, followed by a fusiform, barbed termination, which is generally lost. Occasionally the barbed part is in the middle of the thread. The bristles on the barbed end point away from the sac.

In Pl. xiv., fig. 2 B ($\times 375$, drawn by camera lucida), the sac is dotted, as it is invisible in the specimen, being buried in the tissue of the polyp.

The heads of the tentacles bristle with numerous very minute club-shaped threads, with the broad ends terminal.

A third species of *Cladocoryne* is *C. floccosa*, Rotch,² from Guernsey; it is about 12 mm. in height, and the compound tentacles are arranged somewhat irregularly on the body of the polypite.

Eudendrium infundibuliforme, n. sp.

(Pl. xiv., fig. 3).

Zoophyte pinnate; main stem dark brown, polysiphonic; branches simple; ultimate ramules alternate, contracted and

¹ Allman, Jour. Linn. Soc. vol. xii. p. 255, Pl. X. figs. 6, 7.

² Rotch, Ann. Mag. Nat. Hist. (Ser. 4), vii. 1871, p. 227.

wrinkled transversely at their origin, widening out towards their termination.

Polypites large, with a long peduncular portion between the end of the perisarc and the base of the tentacles, and with a large proboscis surrounded by about twenty tentacles.

Gonophores (?).

The solitary specimen is about one and a-half inches in height, and two inches in breadth. The characters of the perisarc are here sufficient to characterise the species. The diameter of the ultimate ramules at their origin is about .14 mm., and at their termination about .3 mm. Occasionally the peduncular part of a polypite bifurcates.

Habitat.—Twenty miles N.N.W. of Warrior Island; $5\frac{1}{2}$ fms. (Station 2).

Eudendrium generalis, Lendenfeld.

(Pl. xv., figs. 1, 2.)

Specimens of this species come from two localities, viz. twenty miles N.N.W. of Warrior Island, $5\frac{1}{2}$ fms. (Station 2), and from Murray Island, 15–20 fms. (Station 14). Dr. Lendenfeld¹ describes the male form of *E. generalis* as possessing four large globular spermatophores, and the female as possessing moniliform clusters of gonophores on irregular verticils of sexual tentacles.

Seeing that the external form of the male and female gonophores respectively is here stated to be the reverse of what usually obtains in this genus, it would have been desirable to give the evidence of detailed observation as to the sexes of *E. generalis*. In the absence of this, it may be permissible to doubt whether the supposed male gonophores were not female, and *vice versa*. Judging from Dr. Lendenfeld's specimen in the British Museum the moniliform clusters appear to have grown from the base of a hydranth, the body and tentacles of which have disappeared. The sacs are filled with small, nucleated, and apparently spermatogenic cells, and not with yolk granules. The masses of cells are situated between the ectoderm and endoderm, leaving a clear linear space bounded by endoderm along the centre of each linear

¹ Proc. Linn. Soc. N.S.W. vol. ix. Part 2, p. 351, Plate VI.

cluster of sacs. Although thread cells occur in and beneath the ectoderm, they do not form a cushion or battery on the summit of the spermatophore, as in *Eudendrium arbusculum*, Strethill Wright.

The specimens from Station 14, growing on *Sciurella indivisa* are the female forms of *E. generalis*. The female gonophores, from three to five, but usually four in number, grow from the base of the hydranth in the form of sub-sessile, oval bodies, 4 mm. in diameter.

The specimens from Station 2 are the male form. The spermatophores form verticils of moniliform sacs growing from the base of a hydranth. Some of the sexual hydranths remain, but atrophy, more or less complete, has overtaken others.

The specimens from Torres Straits, attaining a height of from 1 to $2\frac{1}{2}$ inches, are larger than those found at Port Jackson and Port Phillip. The diameter of the branches varies from .1 mm to .2 mm. The annulations of the perisarc are very feebly marked, usually amounting to a slight wrinkling at the base of the branches.

Eudendrium capillare, Alder, is a more slender growth, the diameter of the branches varying from .06 to .08 mm., and the ramification is more profuse.

Eudendrium arbusculum, Strethill Wright, forms a bushy tree of adnate stems.

Habitat.—Port Jackson (Brit. Mus. Coll. Lendenfeld); Port Phillip, Lendenfeld; Torres Straits, Haddon.

Lafoëa costata, Bale.

Many of the hydrothecæ are smooth, and without the ridges. The plane of the orifice is oblique to the long axis of the hydrotheca.

Habitat.—Growing on *Sciurella indivisa*, Murray Island; 15–20 fms.

Lictorella halecioides, Allman.

Lafoëa halecioides, Allman.—Trans. Zool. Soc. viii. 1874, p. 472.

Campanularia rufa, Bale.—Trans. Roy. Soc. Vict. xxiii. p. 91.

Lictorella halecioides, Allman.—Chall. Rep. Hydroida, II. p. 35.

The distribution of this species is interesting. Between Shetland and Faroe (cold area), 345 and 630 fms. (Allman, "Porcupine"); Holborn Island, 20 fms. (Bale); off Somerset, Cape York, 2-8 fms. (Allman, "Challenger"); Murray Island, 15-20 fms. (Haddon).

Diphasia scalariformis, n. sp.

(Pl. xv., fig. 3).

Hydrocaulus irregularly branched, forming tufts about 1.25 inches in height.

Hydrothecæ, in pairs, adnate to one side of the rachis, and to each other; upper outer half of hydrotheca expanding, alate, sinuous; surface of stem and hydrothecæ marked with longitudinal serrations and delicate horizontal lines.

Gonothecæ, in a single line along front rachis, adpressed to hydrothecæ, oval, sub-sessile, marked with strong curved spines on upper surface; under surface smooth.

Length of hydrothecæ, .4 mm.; width of a pair at widest part, .4 mm.

Habitat.—Twenty miles N.N.W. Warrior Island, 5½ fms.; growing on *Aglaophenia huxleyi*.

Sciurella indivisa, Allman.

Sciurella indivisa, Allman, "Challenger" Hydroida, I. p. 26, Pl. V.

Antennularia cylindrica, Bale. Cat. Zooph., p. 146, Pl. X. fig. 7.

At first the arrangement of the ramules is bipinnate, each half of the pinna being composed of ramules arranged "two-deep." Higher up the bipinnate arrangement is obscured, the ramules growing along three or four sides of the stem, as in *Antennularia*.

In the British Museum Collection is a specimen acquired from Dr. v. Lendenfeld, labelled "*Antennularia cylindrica*, Bale, Port Curtis Type," and there was therefore no difficulty in settling the synonymy.

Kirchenpauer¹ refers to a specimen of *Plumularia cylindrica*,

¹ Kirchenpauer, Plumularidæ. Abhand der Nat. Ver. Hamburg, p. 45, Taf. i. and iv. fig. 1, 1876.

Kirch., from Java, in which the lateral hydrocladia stand one in front of another. In this species the hydrothecæ are cylindrical and adnate; but the supra-calycine sarcothecæ arise below the edge of the calyeli; whereas in *Sciurella indivisa* they arise at the edge, and lie across the orifice.

Habitat.—Murray Island, 15 to 20 fms.; off Warrior Island $5\frac{1}{2}$ fms.

Note on *Antennularia cymodocea*, Busk.

While engaged in determining the species of Plumularidæ, it became desirable to settle the position of *Antennularia cymodocea*, Busk. By the kind permission of the late Mrs. Busk, I was enabled to examine two specimens (one of which is probably the type) from Algoa Bay. Mr. Busk describes¹: *Antennularia cymodocea*, "caulibus simplicibus; ramulis, biseriatis, utraque serie, alternantibus," South Africa, Australia. As Mr. Bale observes, such an arrangement is found only in *Nemertsia decussata*, Kirchenpauer. An examination of *A. cymodocea* shows that *Nemertsia decussata*, Kirchenpauer,² from the Cape of Good Hope, is synonymous with it. Unfortunately the Australian specimen could not be found.

In *A. cymodocea* the ramules of a pair are opposite, and the plane of each pair is at right angles to the planes of the pairs immediately above and below them.

The ramules are short, and composed of five or six joints, each bearing a cupped sarcotheca, and on the last joint a hydrotheca, adnate and dovetailed into the joint; a second hydrotheca is only exceptionally present.

Only one supra-calicular sarcotheca is present; the mesial one may or may not be present on the calicular internode.

Diameter of ramule, .08 mm.; length of calicle, .1 mm.; diameter of orifice, .1 mm.

Acanthella effusa, Busk.

(Pl. xiv., fig. 4.)

There are three dried specimens of this species, varying from 7 to 13 inches in height. The gonangia, which have not hitherto

¹ Report, British Association, 1850, p. 119.

² Abhand. der Nat. Vereins, Hamburg, vi. Taf. ii. iii. vii. fig. 24 a, b, c.

been found, are present. They form small sub-sessile, flattened, obliquely truncate bodies, with one of the two lateral borders longer and more convex than the other. They form a line along the stem, one at the base of each ramule.

Some of the lower branches in *A. effusa* are opposite.

Generally, there is only one supra-calyceine sarcotheca, but two sometimes occur.

Habitat.—Murray Island, 15 to 20 fms.

Aglaophenia brevirostris, Busk.

There are several specimens of this elegant species. The stems grow to a height of 1 to 1½ inches. The curved tubular hydrothecæ resemble those of *Aglaophenia vitiana*, Kirchenpauer. In the former the mesial sarcotheca is tubular, and opens at the summit by a circular pore; in the latter it is canalicular.

The ramules are alternate, with two flattened sarcothecæ at the base.

There are three teeth on each side of the hydrothecal orifice and a median anterior one.

The corbulæ are about 2 mm. in length, with a hydrotheca at the base of each rib.

Habitat.—Murray Island, 15 to 20 fms.

POLYZOA.

[The numbers correspond to the numbers of the Stations.]

<i>Catenicella elegans</i> , Busk.	8, 14.	<i>Bicellaria (Stirparia) haddoni</i> , n.
„ <i>gibbosa</i> , Busk.	8, 14.	sp. 8.
„ <i>taurina</i> , Busk.	14.	<i>Bugula johnstonæ</i> , Gray.
<i>Scrupocellaria cervicornis</i> , Busk.	14.	„ <i>dentata</i> , Lamouroux.
„ <i>diadema</i> , Busk.	14.	<i>Beania hirtissima</i> , Heller; form
<i>Caberea lata</i> , Busk.	14.	<i>cylindrica</i> , Hincks.
<i>Farcimia simplex</i> , Busk.	8.	<i>Euthyris obtecta</i> , Hincks.
„ <i>oculata</i> , Busk.	2, 8, 14.	<i>Flustra cribriformis</i> , Busk.
<i>Cellaria gracilis</i> , Busk.	14.	8, 14.
<i>Tubucellaria cereoides</i> , Ellis & Solander.	14.	„ <i>reticulum</i> , Hinks.
		<i>Membranipora coronata</i> , Hincks.

- Membranipora radificera*, Hincks ; *Lepralia ocellusa*, Busk. 8.
 var. *intermedia*, nov. var. 14. „ var. *areolata*, n. var. 14.
 „ (*amphiblestrum*) *cervicornis*, *Rhynchopora longirostris*, Hincks.
 Busk. 14. 14.
Cribrilina radiata, Moll. 14. *Retepora carinata*, Mac Gillivray.
Steganoporella magnilabris, Busk. 8, 14. 14.
 „ *monilifera*; form *munita*,
Thalamoporella rozieri, Audouin ; Mac Gillivray. 8, 14.
 „ form *gothica*, Hincks. 8, 14. „ *monilifera*; form *umbonata*,
 „ form *indica*, Hincks. 14. Mac Gillivray. 14.
Chorizopora vittata, Mac Gillivray. „ *phaenicea*, Busk. 14.
 14. „ *producta*, Busk. 14.
 „ *brongniartii*, Audouin ; *Mucronella bisinuata*, Smitt. 8.
 var. *spinosa*, nov. var. 14. „ *magnifica*, Busk. 14.
Microporella malusii, Audouin. 14. *Smittia spathulata*, Smitt. 14.
 „ *inversa*, Waters. 14. „ *levis*, n. sp. 14.
Adeonella intricaria, Busk. 2, 8. *Cellepora granulosa*, Haswell. 8.
 „ *platalea*, Busk. 8, 14. „ *fusca*, Busk. 14.
Schizoporella auriculata, Hassall. 14. „ *tridenticulata*, Busk. 8.
 „ *immersa*, Haswell. 14. „ *discoidea*, Busk. 14.
 „ *fenestrata*, Smitt. 14. „ „ „ var. *fru-*
 „ *venusta*, Norman. 14. *tetosa*, nov. var. 3, 8.
Haswellia australiensis, Haswell. *Stichoporinasimplex*, Koschinsky. 14.
 8, 14. *Bipora crassa*, Tenison-Woods. 14.
Lepralia mucronata, Smitt. 8. *Crisia denticulata*, M. Edwards. 14.
 „ *dorsipora*, Busk. 8, 14. *Idmonea radians*, Lamarek. 14.
 „ *lonchæa*, Busk. 14. *Lichenopora radiata*, Audouin. 14.
 „ *depressa*, Busk. 14. *Amathia tortuosa*, Tenison-Woods.
 „ *acanthina*, Quoy & Gaimard. 14.
 14.
 „ *filamentosa*, n. sp. 14. *Buskia setigera*, Hincks. 2.
Barentsia laxa, n. sp. 4.

In addition to the species above mentioned, the following have been previously recorded from Torres Straits (Long. 139° - 145° E.), but are not in Professor Haddon's collection :—

- Aetea dilatata*, Busk. *Idmonea eboracensis*, Busk.
Chlidonia cordieri, Audouin. *Amathia connexa*, Busk.
Retepora hirsuta, Busk. „ *semispiralis*, Kirchenpauer.
 „ *tubulata*, Busk. *Vesicularia papuensis*, Busk.
Adeonella pectinata, Busk. *Cylindroecium papuense*, Busk.
Cupularia guineensis, Busk.

Total species and varieties of Polyzoa from Torres Straits, 77 :—

CHLOSTOMATA, 66 species.		CTENOSTOMATA, 6 species.
CYCLOSTOMATA, 4 species.		PEDICELLINEA, 1 species.

Professor Haddon's collection contains four new species, and four new varieties, viz. :—

<i>Bicellaria (Stirparia) haddoni</i> , n. sp. 14.	<i>Chorizopora brongniartii</i> , Audouin; var. <i>spinosa</i> , nov. var. 14.
<i>Lepralia filamentosa</i> , n. sp. 14.	<i>Lepralia oclusa</i> , Busk; var. <i>areolata</i> , nov. var. 14.
<i>Smittia levis</i> , n. sp. 14.	<i>Cellepora discoidea</i> , Busk; var. <i>frutetosa</i> , nov. var. 3, 8.
<i>Barentsia laxa</i> , n. sp. 4.	
<i>Membranipora radificera</i> , Hincks; var. <i>intermedia</i> , nov. var. 14.	

With regard to the distribution of Polyzoa, the Torres Straits does not form a limited and defined region, but only the northern part of an intratropical area, extending along the coast of Queensland, within the Great Barrier Reef.

Eighteen of the species in the above list are also recorded by Mr. Haswell¹ from Holborn Island, ten degrees of latitude south of Torres Straits.

Stirparia haddoni, n. sp.

(Pl. xv., fig. 4.)

Zoarium forming celliferous caliculate tufts at the ends of jointed corneous stems; the tufts composed of dichotomous branches, with the zooecia opening on the outer surface. Zooecia biserial, alternate, sub-turbinate, facing towards the centre of the branches, and with the outer margins curved round so as almost to meet along the central line; aperture quadrate with concave lower border; area occupying about half the front of the cell; upper borders of zooecia sinuous, and ending in a spinous process at the upper outer angle.

No spines; no avicularia.

Ooecia (?)

¹ "Proc. Linn. Soc. N S. Wales," vol. v., p. 33, 1860.

Stem with internodes uniformly lessening in length and calibre.

Breadth of branches in front, .24 mm.

„ „ „ laterally, .3 mm.

Length of zoecium, .6 mm.

Breadth of zoecium (unrolled), .2 mm.

Habitat.—Albany Passage; 10 fms.; Station 8.

Professor Haddon's specimen consists of only one jointed stem, crowned by its tuft. Some of the lower joints of the stem project laterally; and from these other jointed stems probably branch off.

The joints and internodes of the stem, in their construction, combine lightness and flexibility with firmness and strength. Each internode consists of a horny scaffolding, leaving two long, oval (membranous) fenestræ; at the nodes the horny bands break up into numerous shorter fascicles. The fenestræ form a line on each side of the stem. Several muscular fasciculi can be seen in the topmost internode.

The transition from the internodes to the zoecia is well shown; and the origin of the scaffoldings on the stem becomes manifest. The highest single internode bifurcates, and each bifurcation again divides. The internodes more and more resemble zoecia, and the internodal fenestræ become the apertures of the zoecia.

The genus *Stirparia* has been objected to on the ground that it is not founded on zoecial characters; but the metamorphosis of zoecia to form stems may, perhaps, be considered as a zoecial and, therefore, generic characteristic. If not, *Stirparia* would form a sub-genus under *Bicellaria*.

The other species of *Stirparia* are—

Stirparia annulata, Maplestone, Victoria. [Victoria.

„ *glabra*, Hincks, . . . Bahia, Western Australia,

„ *exilis*, Mac Gillivray, Port Phillip.

In *Stirparia glabra* fenestræ are present in the internodes, which are alternately longer and shorter.

Bugula dentata, Lamouroux.

The zoarium is of a leaden-blue colour, and forms spirally arranged fronds. There is one well-developed spine at each upper

angle, and two quite rudimentary ones on the upper outer margin.

The beaks of the avicularia curve round at right angles, and the ends are broad and grooved, and not pointed.

Habitat.—Station 4; 6-7 fms.

Membranipora coronata, Hincks.—“Ann. Mag. Nat. Hist.” (5), vii. 1881, p. 147, Pl. x., fig. 1.

Membranipora hastilis, Kirkpatrick.—*Ibid.* (5), ix., 1882, p. 188.

I regret that Mr. Hincks' note, giving further particulars of the structure of *Membranipora coronata*, escaped my notice. There is no doubt that *Membranipora hastilis* is synonymous with *M. coronata*.

Habitat.—Ceylon; Singapore or Philippines; Macclesfield Bank, China Sea; Murray Island, Torres Straits.

Chorizopora brongniartii, Audouin, var. *spinosa*.

(Pl. xvi., fig. 4.)

The variation consists in the presence of two pairs of short glossy spines on each side of the orifice. The upper pair is bifurcated. The interzoecial network is largely developed. A slight peristomial ring is developed round some of the orifices of the cells. In every other respect this variety resembles the typical form of the species. *Chorizopora vittata*, Mac Gillivray, also occurs, growing on the same fragment of rock. The marking on the front wall of the zoecium is trifoliate.

Habitat.—Encrusting rock: Murray Island, 15-20 fms. (Station 14).

Membranipora radificera, Hincks, var. *intermedia*, nov. var.

(Pl. xvi., figs. 1, 2.)

Three small fragments of this variety occur, one of which is firmly attached to a piece of coral. The variation from the type consists chiefly in the development of the spines.

On one side of the orifice is a bifurcated spine, growing partly vertically, and partly arching over the area; on the opposite side

is a spine with a vertical branch bearing an avicularium with a long curved pointed mandible, and with a horizontal bifurcating branch arching over the area. At the oral end of the cell are two vertical bifurcated spines.

The radical tubes are present in this variety, but not in such abundance as in the typical form of the species. Some of the cells are quite destitute of processes giving origin to radical tubes.

The zoecia are packed close together, so that the probable original separation of the cells would never be suspected.

In a valuable collection of the Polyzoa of Port Phillip, presented to the Natural History Museum by Mr. Bracebridge Wilson, is a specimen of *Membranipora radificera*.¹ The radical tubes form a thick felt-work. In the same collection is a specimen of *Hiantopora ferox*, Mac Gillivray.² The variety of *M. radificera*, from Torres Straits, is evidently a form intermediate between *Membranipora radificera* and *Hiantopora ferox*. In the latter the spines have undergone further development; the horizontal portion on the avicularian side of the cell has grown over the whole area, and fused with the opposite cell margin.

The resemblance between *Cribrilina ferox* and *M. radificera*, with regard to the presence of radical tubes and the disjunct arrangement of the zoecia, was observed by Mr. Hincks.¹ The discovery of the intermediate form from Torres Straits was necessary in order to show the intimate relations between two such diverse forms as *M. radificera* and *C. ferox*. Viewed by itself it may have been justifiable to place the latter form in the genus *Cribrilina*, or to make a new genus, *Hiantopora*; but in view of its relationship to *M. radificera*, this can no longer be done, unless the slightly increased development of spines (in this particular instance) is to be considered a generic character.

The following arrangement is proposed:—

Membranipora radificera, Hincks.

Membranipora radificera, Hincks, var. *intermedia*, nov. var.

Membranipora radificera, Hincks, var. *ferox*.

¹ Hinck's "Ann. Mag. Nat. Hist." (5) VIII., 1881, p. 5 and 7., Pl. II., figs. 6, 6a, 6b.

² Mac Gillivray, "Cat. Mar. Pol. Vict.," p. 22; "Prod. Zool. Vict.," Decade X., p. 34, Pl. XXXVIII., fig. 8.; "Prod. Zool. Vict.," Decade XII., p. 69, Pl. CXVII., figs. 6-8.

The saving clause "in this particular instance" is used advisedly, since it is not possible to say, in other instances, whether any particular species of *Cribrilina* is related to any particular form of recent *Membranipora*.

It might be urged that if *Cribrilina (Hiantopora) ferox* is "brought back" to *Membranipora*, *Membranipora radicefera* should logically be relegated to *Beania*, since, in the disjunct arrangement of the zooecia, in the presence of radical tubes, and the elevation of the oral end of the zooecia, *M. radicefera* shows evident traces of its origin from a form possessing the characters of *Beania*.

In spite of these traces of its ancestry, *M. radicefera* now possesses *Membraniporidan* characters that cannot be claimed for *Beania*; and if *Cribrilina ferox*, Mac Gillivray, possessing *Cribrilinidan* characters, has thus appeared to belong to a higher group, the appearance of the closely related form *M. radicefera*, var. *intermedia*, necessitates the removal of the former to a lower group.

Distribution. — *M. radicefera*, Bass's Straits, Port Phillip Heads.

M. radicefera, var. *intermedia*, Murray Island, Torres Straits, 15–20 fms.

M. radicefera, var. *ferox*, Port Phillip Heads.

Fossil.—Aldinga, Mount Gambier, Bairnsdale (Waters).

Schizoporella auriculata, Hassall.

? *Schizoporella lata*, Mac Gillivray.

A minute circular avicularium is situated below the sinus of the orifice.

Oral spines, usually present in this species, do not occur on the specimen. The marks for muscular attachment on the opercula are more prominent in British specimens.

Habitat.—Murray Island, 15–20 fms.

Lepralia acanthina, Quoy & Gaimard.

(Pl. xvi., fig. 6.)

Flustre épineuse, *Flustra acanthina*, Quoy & Gaimard. Voyage de l'Uranie, 1824. "Zoologie," p. 605, Pl. LXXXIX., figs. 1, 2.

Flustra acanthina, Qu. & Gaim. Lamarck. "Anim. sans vertèbres," ed. 2, tom. ii., p. 226.

Membranipora spinosa, Busk. "Phil. Trans. Roy. Soc.," vol. clxviii. (extra), p. 195, Pl. X., fig. 3.

Amphiblestrum spinosum, Qu. & Gaim. (?) P. H. Mac Gillivray. "Cat. Mar. Pol. Vict.," p. 20.

Amphiblestrum ciliatum, Mac Gillivray. "Cat. Mar. Pol. Vict.," p. 20.

Lepralia judex, Kirkpatrick. "Ann. Mag. Nat. Hist." (6), i., 1888, p. 78.

Chaperia australis, Jullien. "Bull. Soc. Zool. France," vi., 1881, p. 163.

By an oversight the specific name, "acanthina," given to the species by Quoy & Gaimard, has been overlooked, "épineuse" having been translated "spinosa" by later authors.

Lamarck wrote "Cette espece nous parait appartenir au genre Membranipora."

Waters ("Challenger" Supplementary Report, Polyzoa," pp. 10, 11) objects to Jullien's genus, Chaperia, founded on the presence of calcareous muscle plates inside the orifice, on the score that these plates are found in other forms, which differ too widely in other respects to be included under one genus. The thick, well-developed operculum, present in this form, seems quite other than a Membraniporidan characteristic. The species is included provisionally under the genus Lepralia.

Habitat.—Victoria, New South Wales, South Patagonia, Kerguelen Land, New Zealand, Falkland Island, Murray Island.

Fossil.—Napier, New Zealand (Waters).

Lepralia occlusa, Busk, var. *areolata*, nov. var.

(Pl. xvi., fig. 7.)

The zoarium forms thick nodulated encrusting masses.

The zoecia are rhomboidal, and separated by raised lines; at first the front surface is uniformly punctured with round pores, and later becomes covered with a thick areolated crust, the oval areolæ generally radiating from a central umbonate area.

The lines bounding the zoecia form a prominent feature.

The oecium, in early stages, has a semi-elliptical membranous

area on its upper face; later the area becomes partly covered by a calcareous reticulum, and finally wholly calcified on the surface.

This variety is a distinct and very interesting one. In the typical form the zoarium is escharan, and the zooecia are long and oval, and the surface uniformly areolated. The opercula are similar in both.

Habitat.—Loosely adnate to rock: Murray Island, Torres Straits, 15–20 fms.

Lepralia filamentosa, n. sp.

(Pl. xvi., fig. 5.)

Zoarium free, dome-shaped, concavo-convex; zooecia in radiating lines, alternate.

Zooecia large, $\cdot 7 \times \cdot 5$ mm.; rectangular; upper surface uniformly punctured by large round pores.

Orifice quadrangular; rising from the proximal border a small, scroll-like mucro, from the outer convex surface of which rises a thick calcareous process branching out into membranous filaments; three similar spines rising directly from the postero-lateral margin of the orifice.

Dorsal surface of zooecia smooth, transparent, bound by raised lines.

Ooecia?

Operculum, $\cdot 24$ mm. in length $\times \cdot 26$ in width, with a slightly concave proximal border, and a thick rim round the rest of the margin.

Habitat.—Growing free: Murray Island, Torres Straits, 15–20 fms.

Smittia spathulata, Smitt.

(Pl. xvii., fig. 1.)

Escharella spathulata, Smitt.—“*Flor. Bry.*” II. p. 60.

Smittia reticulata, var. *spathulata*, P. Mac Gillivray. “*Trans. Roy. Soc. Vict.*” XIX., p. 135, Pl. III., fig. 14.

Smittia spathulata, Mac Gillivray. “*Cat. Mar. Pol. Vict.*” p. 27.

In his "Floridan Bryozoa" Smitt described an hemescharon form of *Smittia*, and proposed to name it *Escharella spathulata*; a similar form from Torres Straits, and in the British Museum Collection, is referred to.

In Professor Haddon's Collection several handsome masses of this species occur in the form of masses about $3\frac{1}{2}$ inches in area, by 2 to 3 inches in height, and composed of stout, hollow, tubular anastomosing branches.

Avicularia of several kinds abound; on one side of the orifice is one with a spathulate mandible. There are three oral denticles. The operculum is membranous, and generally shrivelled up. It scarcely takes the stain of picrocarmine. The trace of a pectinate ridge exists at the back of the orifice of some zoecia. Traces, also, of spines exist in the form of one to three minute pits at the back of the peristome.

The ovicell is frosted, with a semicircular punctured area in front, bounded by a ridge. In the earliest stage the ovicell is probably uniformly punctured.

Mucronella (Discopora) nitida, Verrill, has been given as a synonym of *Smittia spathulata*; but, judging from a specimen sent to the British Museum by the U. S. National Museum, the former species is quite distinct, and would be classed under *Schizoporella*. Professor Verrill's¹ figure is, however, certainly that of a species of *Smittia*.

Habitat.—Murray Island, 15–20 fms.

Smittia levis, n. sp.

(Pl. xvi., fig. 8.)

Zoarium encrusting, orange-coloured zoecia .2 mm. in breadth by .5 mm. in length. Front surface smooth, with large marginal areolæ; primary orifice oval; proximal margin with one large denticle, and two rudimentary lateral ones; distal margin with a well-developed horizontal pectinate ridge. On the centre of the front of each cell an avicularium with triangular mandible pointing downwards; oecium smooth, hyaline, depressed.

¹ Verrill. "American Journal of Science" (3), ix., 1875, p. 415, Pl. VII., fig. 3.
Verrill. "Proc. U. S. Nat. Mus." ii., 1879, p. 195.

Operculum .14 mm. in width by .1 mm. in length, with an articular process at each proximal angle.

Habitat.—Encrusting rock: Murray Island, 15–20 fms.

The chief specific characters of this form are the smooth surfaces of the zooecia (surrounded by areolæ) and of the oocia, the presence of a well-marked pectinate ridge, and the position of the avicularium in the centre of the front wall of each zooecium.

Cellepora discoidea, Busk, var. *frutetosa*, nov. var.

(Pl. xvii., fig. 3.)

Zoarium forming a bushy growth, composed of short, stout, solid, cylindrical, anastomosing branches.

Zooecia hyaline; orifice sub-orbicular, with three or four slender denticles on the proximal border; the rostrum short, with a small avicularium with a small semicircular or oval mandible, which latter grows longer on older cells.

Oocia smooth, hyaline, cucullate; operculum semicircular, with straight lower border; .16 × .1 mm.

Habitat.—Albany Passage, 10 fms.; Saibai Channel, 10–17 fms.; Thursday Island (Haswell).

The larger of the two specimens sent is from Albany Passage, and measures about 2 inches in height by 3 inches in breadth.

The surface of the branches is covered with numerous small round holes about 1.05 mm. in diameter; these are the orifices of a parasitic or commensal "Actinid," first observed by Mr. Haswell,¹ who saw the mesenteries. The tubes do not penetrate far, and have cæcal endings; often two or three communicate, and have a common cæcal termination.

Cellepora discoidea, var. *frutetosa*, may possibly be simply the adult form of *Cellepora discoidea*, Busk. There is a resemblance in the general form and appearance of the cells, in the shape of the orifice, presence of denticles, and in the size and shape of the operculum. The variation from the type consists in the smaller size of the rostra and rostral avicularia, and in the mode of growth.

¹ "Proc. Linn. Soc. N. S. Wales," vol. vii., p. 608, 1882.

Three small disc-shaped specimens of *Cellepora* occur, from Murray Island; these I have referred to *Cellepora discoidea*, Busk; though the rostra are not so strongly developed in the former as in the type specimen of the latter. The walls are thicker, and the upper half of the cell is more ventricose; indeed, though the mode of growth of the zoarium of these specimens is similar to that of the type, the cells vary almost more than those of *Cellepora discoidea*, var. *frutetosa*.

Cellepora granulosa, Haswell.

(Pl. xvii., fig. 2.)

The specimen from Albany Passage forms an extensive encrusting basal portion, whence arise broad, flattened, hollow branches from various parts, and these again divide.

In the British Museum Collection are some fragments of this species from Holborn Island, which have been named by Mr. Haswell. They appear to have been broken off from a specimen with narrower branches than those of the present specimen.

The zoecia are large; the aperture sub-quadrate. The oecium is cucullate, smooth, but granular in later stages. The mandibles of the rostral avicularia have their margins bent at an angle to the general surface. Operculum, $\cdot 3$ mm. in width by $\cdot 26$ in length.

Habitat.—Albany Passage, 8 fms.

Bipora crassa, Tenison-Woods.

(Pl. xvii., fig. 5.)

Sixteen specimens, varying from 5 to 10 mm. in diameter, occur, from Murray Island, 15 to 20 fms.

Figures and measurements of the chitinous appendages are given to further assist in identification.

Opercula, broadly pyriform, $\cdot 21$ mm. \times $\cdot 16$ mm.; mandibles of avicularia semicircular, $\cdot 1$ mm. \times $\cdot 06$ mm.

Habitat.—Cape Three Points, 70 to 80 fms.; Port Stephens N. S. W. (Tenison-Woods); Murray Island, 15 to 20 fms., Torres Straits (Haddon).

Stichoporina simplex, Koschinsky.

(Pl. xvii., fig. 4.)

Stichoporina simplex, Koschinsky, Bryozoen ält Tertiär Süd-Bayerns. *Paleontographica* (Zittel), xxxii. p. 64, Taf. VI. figs. 4-7.

Zoarium free, dome-shaped, concavo-convex, about 20 mm. in diameter, by 4 mm. in height.

Zooecia arranged in radiating lines; the cells vertical in position—the upper and lower surfaces of each varying from rhomboidal to hexagonal.

Orifice quadrangular, with a small articulating denticle on each side.

Above the orifice of each cell, an avicularium with a vibraculoid mandible.

Dorsal surface resembling a mosaic, the lower convex surface of each cell being visible.

Ooecia large, depressed, dome-shaped, finely punctured.

Opercula .26 mm. in length, by .20 in breadth. Opercula of ooecial cells .22 in length by .24 in breadth.

Habitat.—Murray Island, 15 to 20 fms.

Distribution.—Recent. Cape of Good Hope and Malacca (Belcher Collection, Brit. Mus. Coll.). Murray Island (Haddon).

Fossil.—Götzreuth, South Bavaria, Tertiary (Koschinsky); Brendola, Colle Berici, N. Italy, and Ronzo, Tyrol; Bartonian (A. W. Waters, M.S.).

I am indebted to Mr. A. W. Waters for pointing out that the specimens from Murray Island belong to Koschinsky's species.

The four specimens are broad and low; those in the Belcher Collection are much narrower in diameter, and more convex. In external form, a fossil specimen of Mr. Waters', from Brendola, more nearly resembles the latter.

Stoliczka¹ observes that *Stichoporina* differs from *Cupularia* and *Lunulites* in the irregular arrangement of the cells, which may be

¹ Stoliczka. *Sitzungb. Math. Nat. Akad. Wiss. Wien.* 1862. Bd. xlv. p. 92.

seen on the lower surface, and in the absence of intermediate cells. The inclusion of *S. simplex* within the genus *Stichopora* requires a modification of the definition of the genus, since the cells in this species are arranged in radiating series, with the interpolation of other series towards the periphery.

The fertile zoecia, with their ooecia, occupy an area about twice the size of the others; the operculum is broadened out, at the expense of the length, the pressing out of the lateral margins leaving the muscle marks more plainly visible (see figure).

Barentsia laxa, n. sp.

(Pl. xvii., fig. 6.)

Polypides arising from a jointed, creeping stolon.

Expanded basal portion of pedicels plain and unmarked; pedicels cylindrical and chitinous below, membranous above and attached to the polypide directly, and without the intervention of a fleshy peduncle.

Polypides large and gibbous.

Measurements.—Total length, 3 mm. Length of 'barrel' portion (including the superior conical part), .25 mm. Breadth of barrel, .16 mm. Polypide, .35 to .4 mm. in breadth; .4 to .5 mm. in height.

Habitat.—Station 4; growing over *Flustra cribriformis*.

The new species resembles, in several particulars, *Barentsia major*, Hincks,¹ from the St. Lawrence, but differs from the latter in manner of attachment of the polypide to the pedicle. *B. laxa* is without the fleshy stalk, which Mr. Hincks refers to as a distinct feature in his species.

Barentsia discreta, Busk, is considerably larger; the barrel is marked with broad annulations, and the pedicle is chitinous throughout, and marked with funnel-shaped pits.

¹ Hincks, Ann. Mag. Nat. Hist. (6) I. 1888, pp. 226, Pl. XV. fig. 2.

EXPLANATION OF PLATES.

PLATE XIV.

- FIG. 1. *Coryne vel Syncoryne cylindrica*, *n. sp.*, $\times 30$.
 FIG. 2. *Cladocoryne haddoni*, *n. sp.*, nat. size; 2A, $\times 50$; 2B, thread cell $\times 375$, the sac (dotted in the figure) was not, in this case, visible.
 FIG. 3. *Eudendrium infundibuliforme*, *n. sp.*, nat. size; 3A, $\times 10$; 3B, $\times 20$.
 FIG. 4. *Acanthella effusa*, *Busk*; gonotheca $\times 30$.

PLATE XV.

- FIG. 1. *Eudendrium generalis*, *Lendenfeld*; male specimen, nat. size; 1A, $\times 30$.
 FIG. 2. *Eudendrium generalis*, *Lendenfeld*; female, $\times 30$.
 FIG. 3. *Diphasia scalariformis*, *n. sp.*, nat. size; 3A, $\times 40$; 3B, $\times 50$.
 FIG. 4. *Bicellaria (Stirparia) haddoni*, *n. sp.*, $\times 1\frac{1}{2}$; 4A, front view of branch, $\times 40$; 4B, lateral view, $\times 40$; 4C, joint of stem, $\times 15$.

PLATE XVI.

- FIG. 1. *Membranipora radificera*, *Hincks*, $\times 30$.
 FIG. 2. *Membranipora radificera*, *var. intermedia*, *nov. var.*, $\times 30$.
 FIG. 3. *Membranipora radificera*, *var. ferox*, $\times 30$.
 FIG. 4. *Chorizopora brongniartii*, *Audouin*, *var. spinosa*, *nov. var.*, $\times 30$.
 FIG. 5. *Lepralia filamentosa*, *n. sp.*, $\times 30$; 5A, operculum, $\times 50$.
 FIG. 6. *Lepralia acanthina*, *Quoy & Gaimard*; operculum, $\times 50$.
 FIG. 7. *Lepralia oclusa*, *Busk*, *var. areolata*, *nov. var.*, nat. size; 7A, $\times 30$.
 FIG. 8. *Smittia levis*, *n. sp.*, $\times 50$; 8A, orifice, $\times 60$; 8B, operculum, $\times 60$; 8C, mandible, $\times 100$.

PLATE XVII.

FIG. 1. *Smittia spathulata*, *Smitt*, nat. size.

FIG. 2, 2A, 2B, *Cellepora granulosa*, *Haswell*, chitinous appendages, $\times 50$.

FIG. 3. *Cellapora discoidea*, *Busk*, var. *frutetosa*, *nov. var.*, nat. size; 3A, $\times 30$; 3B, orifice, $\times 100$; 3c, operculum, $\times 100$; 3D, mandible, $\times 100$.

FIG. 4. *Stichoporina simplex*, *Koschinsky*, nat. size; 4A, $\times 25$; 4B, 4c, opercula, $\times 60$; 4D, mandible, $\times 100$.

FIG. 5, 5A, *Bipora crassa*, *T.-Woods*, chitinous appendages, $\times 100$.

FIG. 6. *Barentsia laxa*, *n. sp.*, $\times 30$,







