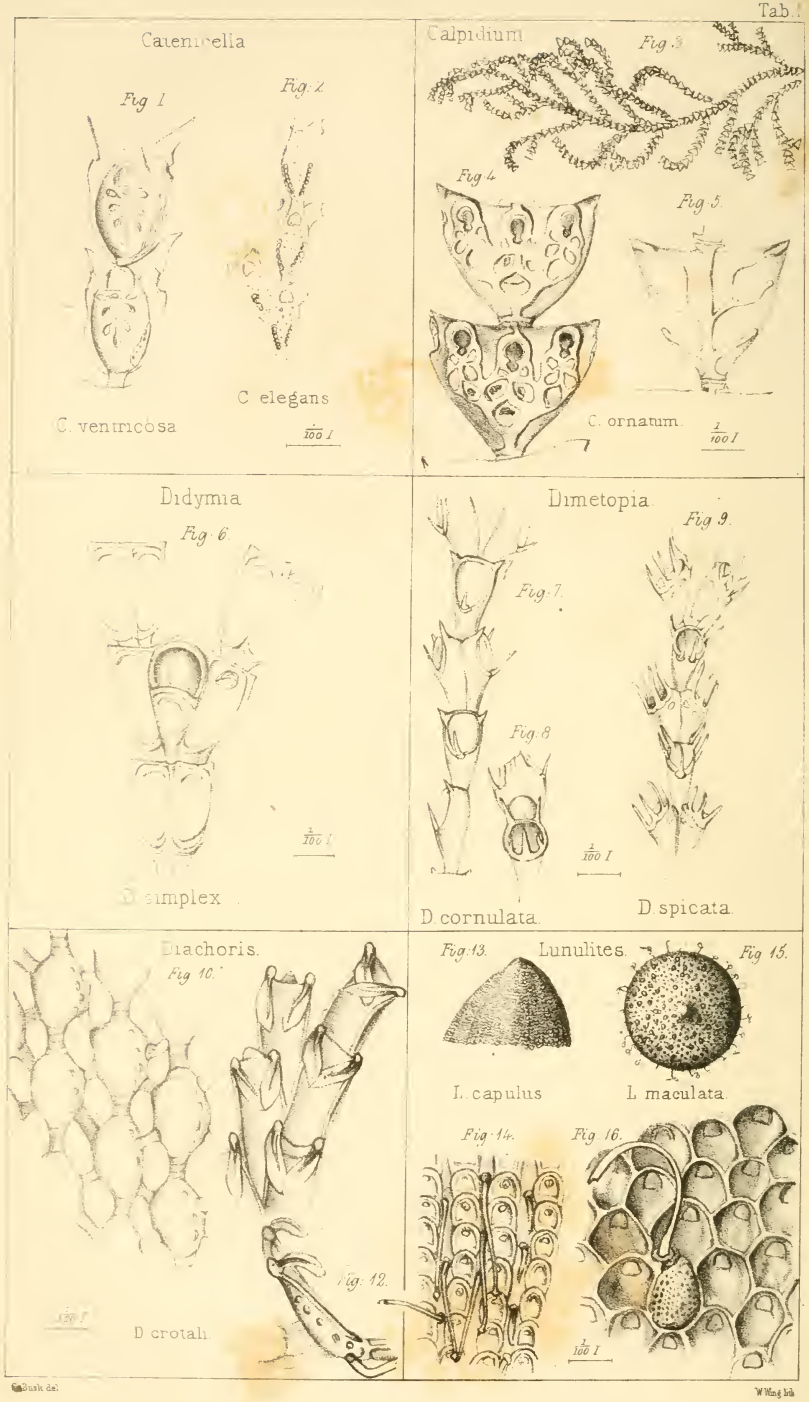

G. Busk del.

W. Wing lith.

T. & W. Boone, Publishers, London, 1851.

Pallmer del. & Walter, lith.

No. IV.

An Account of the Polyzoa, and Sertularian Zoophytes, *collected in the Voyage of the Rattlesnake, on the Coasts of Australia and the Louisiade Archipelago, &c.* *By* George Busk, F.R.S.

This collection includes about eighty-five species, distributed in twenty-nine genera, and may perhaps be regarded as the largest and most interesting of the kind ever brought to this country.

When it is stated that seventy-eight of the species are new or undescribed, the number will appear extraordinarily great, but when the comparatively neglected state of exotic Zoophytology is considered the wonder will be much diminished, and still further, as it may safely be assumed, that many of the species here given as new have been previously noticed, though so insufficiently described, as in the absence of figures not to admit of correct identification.

Making, however, a considerable deduction on this account, the remainder will still stamp the present collection with extreme value. As an instance, may be cited the genus *Catenicella*, of which this collection affords about fifteen species, and of which certainly not more than three have been previously noticed in any way, and of these no sufficient descriptions or figures are extant by which even that small number could be identified. The explanation of this is perhaps to be sought in the circumstance that the species of *Catenicella* are deep sea forms, and only to be obtained by dredging in deep water—very few being apparently found on the shores.

Though the number of new or supposed new species is so great, the number of new genera is comparatively small, not amounting to more than four. It has, however, been found necessary considerably to modify the characters of several other established genera, so as to include new species.

With respect to the geographical distribution of the species, my means of comparison have been pretty extensive. They have been derived from the examination of Mr. Darwin's and Dr. Hooker's collections, placed at my disposal by the kind liberality of Mr. Darwin,—a considerable collection of South African species mainly procured from Mr. Bowerbank—and from the Collection of British and exotic Zoophytes in the British Museum, for the freest opportunities of examining which I have to thank Mr. Gray. From these various sources, and others of less account, I have been able to examine species from a very considerable extent of the earth's surface—more especially in the Southern hemisphere, and to arrive perhaps at as fair a view of the geographical distribution of species as the present imperfect state of Zoophytology will allow.

POLYZOA.

The number of species of Polyzoa is about fifty-four—belonging to twenty-four genera. Of these genera it is believed that four will be found to be new, or hitherto undescribed, and it has been deemed requisite to modify the characters of several others upon the more extended survey of species afforded mainly by the present collection. The new genera here instituted are:

Calpidium	*Didymia*
Diachoris	*Dimetopia*

And the genera whose characters it has been found requisite to modify are:

Catenicella
Salicornaria
Cellularia
Scrupocellaria
Bicellaria
Canda
Emma
Acamarchis
Caberea.

Of the twenty-four genera, three, or perhaps four, appear to be peculiar to the Australian seas. These are:

Calpidium
Canda?
Didymia
Dimetopia.

All the rest, excepting two, Emma and Diachoris, appear to be distributed over the globe in both hemispheres. The above two are perhaps limited to the southern.

Of the fifty-three species, about thirty-three seem to be new, or to have been so imperfectly described as not to admit of precise identification, and five others have synonyms more or less doubtful applied to them.

Six species only are common to the seas of Europe, viz.:

Tubulipora phalangea?
Crisia denticulata
Eucratea chelata
Anguinaria spatulata
Acamarchis neritina
Retepora cellulosa.

Sixteen others are met with in other parts of the Southern hemisphere, viz.:

Catenicella elegans?
——— *ventricosa*
Eschara lichenoides, occurring in Algoa Bay;
Caberea Zelanica
Acamarchis tridentata, in Algoa Bay and New Zealand;
Caberea lata
Catenicella hastata
Catenicella cribraria
——— *cornuta*
Cellularia monotrypa
Bicellaria tuba, in New Zealand; and
Emma crystallina
——— *tricellata*, in New Zealand and Campbell's Island.

Thus of the fifty-four species, about thirty-four would

seem to be peculiar to the Australian seas. Ten of these belong to the genus Catenicella, and one to the closely-allied Calpidium, three to Didymia and Dimetopia, and one to Diachoris, of which genus two other species are found in the Straits of Magellan.

The method according to which the Polyzoa are arranged, is, in the primary divisions at least, pretty nearly identical with that indicated in the Synopsis of the Families and Genera of Polyzoa Infundibulata, given in Dr. Johnston's "British Zoophytes."*

A few words, however, will be necessary to explain more particularly the subsequent subdivisions here adopted.

The order, *Polyzoa infundibulata*, is divided into three suborders, coinciding very nearly with the Tubuliporina, Celleporina, and Vesicularina of the work above referred to, but as the characters of these suborders are derived from the conformation of the opening of the cell, I have thought it more convenient to name them accordingly. The first suborder, having a round, simple opening to the cell, is here termed the CYCLOSTOMATA; the second, with the opening of the cell filled up by a usually thin, membranous or calcareous velum, and with a crescentic mouth provided with a moveable lip, the CHEILOSTOMATA; and the third suborder, which might perhaps include the Halcyonellea of Ehrenberg, as well as the Vesiculariadæ, distinguished by the existence of a more or less well-marked fringe of setæ (sometimes only rudimentary) around the opening of the cell when the animal is protruded, the CTENOSTOMATA.

The following synoptical arrangement—which it must be remarked, includes only the genera occurring in the Rattlesnake collection—will serve to indicate the subsequent divisions.

* Vol. 1, p. 263, 2nd Edit.

Synoptical Arrangement of the Polyzoa included in the Rattlesnake Collection.

Suborder I. CYCLOSTOMATA (Tubuliporina).

Fam. 1. TUBULIPORIDÆ.

Gen. 1. Tubulipora.

Sp. 1. *T. phalangea?*

2. Pustulipora.

2. *P. australis*, n. sp.

3. Idmonea.

3. *I. radians.*

Fam. 2. CRISIADÆ.

4. Crisia.

4. *C. denticulata.*

5. *C. acropora*, n. sp.

Suborder II. CHEILOSTOMATA (Celleporina).

§. 1. UNISERIALARIA.

Fam. 1. CATENICELLIDÆ.

5. Catenicella.

a. fenestratæ.

6. *C. hastata*, n. sp.?

7. *C. amphora*, n. sp.

8. *C. margaritacea*, n. sp.

9. *C. ventricosa*, n. sp.

10. *C. plagiostoma*, n. sp.

11. *C. lorica*, n. sp.

12. *C. cribaria*, n. sp.

b. vittatæ.

13. *C. formosa*, n. sp.

14. *C. gibbosa*, n. sp.

15. *C. elegans*, n. sp.

16. *C. cornuta*, n. sp.

17. *C. umbonata*, n. sp.

c. inermes.

18. *C. carinata*, n. sp.

6. Calpidium, n. g.

19. *C. ornatum*, n. sp.

Fam. 2. EUCRATIADÆ.

7. Eucratea.

20. *E. chelata.*

8. Anguinaria.

21. *A. spatulata.*

§ 2. MULTISERIALARIA.

1. *Articulata.*

a. internodes elongated, multicellular.

Fam. 1. SALICORNARIADÆ.

9. Salicornaria.

22. *S. punctata*, n. sp.?

23. *S. bicornis*, n. sp.

24. *S. dichotoma*, n. sp.

25. *S. marginata*, n. sp.

Fam. 2. CELLULARIADÆ.

10. Cellularia.

26. *C. monotrypa*, n. sp.

11. Scrupocellaria.

27. *S. cervicornis*, n. sp.

28. *S. diadema*, n. sp.

29. *S. cyclostoma*, n. sp.

30. *S. ferox*, n. sp.

12. Canda.

31. *C. arachnoides.*

b. internodes short, 2—4 celled.

13. Emma.

32. *E. crystallina.*

33. *E. tricellata*, n. sp.

2. *Inarticulata.*

Fam. 3. BICELLARIADÆ.

14. Bicellaria.

34. *B. tuba,* n. sp.
35. *B. gracilis,* n. sp.
36. *B. grandis,* n. sp.
37. *B. flexilis,* n. sp.

15. Acamarchis.
38. *A. neritina.*
39. *A. tridentata.*

Fam. 4. CABEREADÆ.

16. Caberea.
40. *C. rudis,* n. sp.
41. *C. Zelanica.*
42. *C. lata,* n. sp.?

Fam. 5. FLUSTRADÆ.

17. Flustra.
43. *F. pyriformis ?*
44. *F. denticulata,* n. sp.

18. Retepora.
45. *R. cornea,* n. sp.?
46. *R. cellulosa.*
47. *R. ctenostoma,* n. sp.

19. Eschara.
48. *E. lichenoides.*

20. Diachoris, n. g.
49. *D. Crotali,* n. sp.

Fam. 6. CELLEPORIDÆ.

21. Cellepora.
50. *C. bilabiata,* n. sp.?

Fam. 7. GEMELLARIADÆ.

22. Didymia, n. g.
51. *D. simplex,* n. sp.

23. Dimetopia, n. g.
52. *D. spicata,* n. sp.
53. *D. cornuta,* n. sp.

Suborder III. CTENOSTOMATA. (Vesicularina, &c.)

Fam. 1. VESICULARIADÆ.

24. Amathia.
54. *A. biseriata.*

Suborder 1. CYCLOSTOMATA.

Fam. 1. TUBULIPORIDÆ.

1. Tubulipora, *Lamarck.*

1. *T. phalangea*, Couch.

Hab.—Bass Strait, 45 fathoms.

A small, imperfect specimen, which may be referred to the variety noticed in "British Zoophytes," and figured Pl. 46, fig. 3, 4.

2. Pustulipora, *Blainville.*

1. *P. australis*, n. sp.
   P. deflexa? Couch.

Branched dichotomously; branches short, incrassated, truncate. Cells wholly immersed, or about half free, numerous; surface minutely papillose, summits of papillæ of a dark brown or black colour.

Hab.—Bass Strait, 45 fathoms; and elsewhere in the Australian seas.

About half an inch high. The stem becomes thicker as it ascends, and divides into two equal short branches, each of which again subdivides into two short truncate branches, in a plane at right angles to the primary division. The cells in the upper part of the stem appear free for nearly half their length, and are gently curved outwards. The surface is covered with pretty regularly and quincuncially arranged minute papillæ, the apex of each of which is flattened or rounded, and of a dark brown or black colour. The mode of subdivision of the polyzoary, and the truncated ends of the branches, and the more numerous cells, suffice to distinguish this species from *P. proboscidea.* The cells in the figure of *P. deflexa* appear to be much more slender in proportion, and the branches in that species are not truncated, but attenuated at the extremity.

3. Idmonea, *Lamouroux.*

1. *I. radians,* M. Edwards. Ann. de Sc. N. tom. 9, p. 25, Pl. 12, fig. 4.

Retepora radians, Lamarck.

Hab.—Bass Strait, 45 fathoms.

One minute specimen, but very perfect, has been examined; but it is undoubtedly the one described and figured by M. Edwards, and noticed by Lamarck as inhabiting the seas of New Holland. M. Edwards' doubt therefore as to this locality is now removed.

Fam. 2. CRISIADÆ.

4. Crisia, *Lamouroux.*

1. *C. denticulata,* Fleming.

Hab.—Bass Strait, 45 fathoms.

Parasitic upon a species of Salicornaria. The only difference, if there be any, between this form and the British, consists in the rather greater projection or freedom of the extremities of the cells, which are curved towards the front.

2. *C. acropora,* n. sp.

Cells 9 to 13 in each internode; lateral branches given off between the 1st and 2nd, or between the 2nd and 3rd cells above a joint. A small conical tooth, sometimes bifid, above and behind the mouth.

Hab.—Bass Strait, 45 fathoms.

A small parasitic species, distinguished from *C. denticulata,* which it much resembles, by the less average number of cells in each internode, and the less number intervening between the origin of a branch and the joint below it, and by the small conical tooth or tubercle above and behind, or to the outer side of the mouth.

Suborder II. CHEILOSTOMATA.

§ 1. *Uniserialaria.* Cells disposed in a simple series.

Fam. 1. CATENICELLIDÆ. Cells connected by flexible joints.

5. CATENICELLA, M. Edwards, (Lamarck, An. s. Vert. t. ii, p. 181.)

Cells arising one from the upper and back part of another by a short corneous tube, and disposed in a linear series, all facing the same way, and forming dichotomously divided branches of a phytoid polyzoary; cells geminate at the bifurcation of the branches; each cell furnished with two lateral processes usually supporting an avicularium. Ovicells either subglobose and terminal, or galeriform and placed below the mouth of a cell in front.

This interesting and important genus may be regarded as characteristic, not only of the present collection, but perhaps also of the Australian seas, as far as the Polyzoa are concerned. Thirteen species are here described, and as it has been found extremely difficult in most cases to identify any of them with the very few hitherto noticed forms, the synonyms given must be regarded as at least extremely doubtful.

Each cell arises from the upper and back part of another, with the intervention of a short corneous tube which is prolonged from the interior of one cell to that of the one above. The cell is furnished on each side at the top with an usually well-developed avicularium, in some species of huge size, and in some very minute, or entirely aborted. This avicularian process in most cases supports above a hollow process, which is sometimes closed and more or less elongated, constituting a conical or acerose spine, sometimes open above and assuming the form of a shallow cup or receptacle. In some species both modifications of this portion of the lateral process are met with in the same specimen. This form of spine or cup—as the case may

be, is always distinctly separated by a septum from the cavity of the avicularium itself. Below the avicularium there is also in many cases a third distinct cavity which is usually widely open, the opening being covered in very frequently by a convex transparent membrane, and its bottom apparently perforated by several minute foramina—from this part of the lateral process there is in many species a prominent ala or keel prolonged to the bottom of the cell—which ala not unfrequently divides into two branches, which, again coalescing at the bottom of the cell, circumscribe a more or less oval space, the bottom of which is also perforated by minute foramina or apparent foramina, and which is often covered over by a transparent convex membrane. This membrane, however, as well as that which covers in the subavicularian space, is more usually broken off and wanting.

The inferior oval space above described is here termed the lateral area, and it is employed in the specific characters. It would thus be correct to say—that each cell is furnished with two lateral processes, each of which in the fully developed state consists of three distinct compartments,—one superior, a cup or spine: a middle one, which is the avicularium: and an inferior; and it would appear that one or more of these elementary compartments of the lateral process may be more developed than the next, or sometimes entirely aborted. The mouth of the cell is situated at the upper part in front, and is of the same conformation as in the rest of the Cheilostomatous sub-order. An important generic character consists in the gemination of the cell at each bifurcation.*

These characters are common to all the species included in the genus, which furthermore admits of being subdivided into two extremely natural sections or subgenera, (or perhaps into three). These subdivisions are named respectively the "fenestratæ," and the "vittatæ."

* Tab. I. fig. 1, 2.

In the fenestrate division, in the whole of which the cells are of larger size and stronger than in the other, the wall of the cell appears to be constituted of at least two distinct laminæ. The external lamina, on the front of the cell, is perforated by a certain number of holes, is wanting rather in a certain number of spaces, for which spaces the term "fenestræ" is employed. These apparent openings do not, therefore, penetrate into the cavity of the cell. But besides the fenestræ, there is, in some cases, a small central opening which does penetrate through the wall. In most cases the fenestræ are arranged in a crescentic, or rather horse-shoe shaped line, indicative, as it were, of the limits of a regular oval space, in the front wall of the cell, the upper part of which oval would be formed by the mouth, and the remainder filled up by the deposition of calcareous matter, as happens for instance in the older cells towards the bottom of the polyzoary in certain Cellulariæ, &c.

A further characteristic of the fenestrate Catenicellæ is the terminal position of the ovicells. These organs are clearly transformed cells, or cells dilated to considerably more than their natural bulk, and assuming a subglobose form. And what is worthy of remark, these terminal ovicells always have a sessile avicularium on the summit.

In the "Vittatæ" the cell is smaller, and usually more delicate and transparent. They probably want the outer lamina, or have it very thin, and consequently present no fenestrate spaces, and the front of the cell is beset (sometimes very sparingly) with more or less prominent, minute, acuminate "papillæ." On each side, sometimes on the anterior aspect, sometimes quite laterally, is a narrow elongated band or "vitta," as it is here designated, from which the distinctive sectional appellation is derived. This band or stripe varies in width and proportionate length and position in different species; it is slightly elevated, and marked with larger, or small circular discoid, or

acuminated eminences. This subdivision is further distinguished by the situation of the ovicells, which are not terminal, but occur at irregular intervals on cells in the course of the series. They are of the same galeate form as in many others of the Escharinæ, but are not as in them placed above the mouth of the cell, but below it in front: and in all cases the shape of the ovicell-bearing cell is much altered from the rest, and in all the vittate species the cell upon which the ovicell is produced arises from its predecessor, not with the intervention of a short tube, but is immediately sessile upon it, by a broad base.

a. Fenestratæ.

Cells large, fenestrate in front; ovicells terminal.

1. *C. hastata,* n. sp. ?

C. bicuspis? Gray. Dieffenbach's New Zealand, Vol. ii. p. 293.

Fenestræ, 7—9, disposed in a crescent, and with elongated fissures radiating towards them from the median line. Avicularia supporting a large pyramidal pointed hollow process, compressed, and perforated before and behind by five or six small circular pores.

Hab.—Bass Strait, 45 fathoms, dead shells.

Of a yellowish white colour, sometimes reddish. Forms fine bushy tufts, with long wavy branches, arising from a short common stem, and it attains a height of five or six inches. It appears sometimes to be parasitic upon other polyzoa, and is then much smaller. Its peculiar characteristics are the perforated and striated scutiform area on the front of the cell and the perforated, or apparently perforated pyramidal lateral processes above each avicularium; these processes are much developed, and give the cell the form of a broad inverted shear-head It seems to be an abundant species in Bass' Strait, and it occurs also in New Zealand. (Dr. Hooker's Collection.)

2. *C. amphora*, n. sp.

Cellaria catenulata? var. B. Lamarck. Anim. sans Vert. Vol. ii. p. 180, (2nd ed.).

Cells oval, sides rendered straight upwards by the broad avicularia which are prolonged upwards into an acute spinous angle, and support a shallow cup. Front of cell with nine pyriform fenestræ, with fissures proceeding from their pointed ends towards an oval central perforation. An elevated band, extending from the sides of the mouth to the upper angular processes of the avicularia. An elevated flattened band along the middle of the back, which at the top sends off a narrower lateral band to each avicularian spine.

Hab.—Bass Strait, 45 fathoms.

A fine species of a bright reddish brown, and in the younger cells very transparent. Forms small, irregularly branched bushes, four to six inches high and wide. It is peculiar by its extremely regular vase-like form of cell, which is given by the continuation upwards of the broad avicularia in nearly a straight line, and their prolongation into a sharp angular spine, on the inner side of which is a shallow cube-like cavity, whose sides are usually more horny than calcareous. The number of fenestræ appears to be very constant.

The length of the branches before their dividing, and their straightness, together with the colour of this species, render it not improbable that it is the form intended by Lamarck, (l. c.).

3. *C. margaritacea*, n. sp.

Cellaria vesiculosa? Lamarck.

Cells oval or sub-globular, much compressed; avicularia short and broad, supporting a deep cup-like cavity. Fenestræ 5, large. Lower margin of mouth notched in the middle; back of cell minutely sulcated; sulci short, interrupted, and irregular. A small lateral "area."

Hab.—Swan Island, Banks Strait.

A very beautiful species, the branches resembling strings of minute pearls. The pearly lustre (in the dry state) owing without doubt to the minute sulci on the backs of the cells. These sulci are not, however, consequent upon the drying, because they are equally apparent and constant when the specimen has been immersed in fluid. The species may almost at once be distinguished by the notch in the lower margin of the mouth, which notch represents the central suboval opening present in some other species.

4. *C. ventricosa,* n. sp. Tab. i. fig. 1.

Cells oval, compressed, rather wide below; avicularia wide, supporting sometimes a cup-like cavity, sometimes a closed broad conical spine. The prehensile part of the avicularium itself small, seated in a deep notch below the acuminate summit; lateral area large and well defined. Fenestræ 7, with fissures radiating to a rounded central opening. Anterior surface of cell studded with minute acuminate papillæ; posterior surface smooth, sometimes spotted.

Hab.—Bass Strait, 45 fathoms.

Colour dirty white or brown. Habit stiff, stem strong, straight, branches short and crowded—probably attains a height of four or five inches. The only other species with which it can be confounded is *C. amphora,* from which it differs in the greater size and more irregular form of the lateral processes, in the presence of the minute papillæ on the surface, and in the absence of the narrow longitudinal band on the back; instead of which the older cells in *C. ventricosa* exhibit a sort of broad scutum, almost covering the back of the cell and sending off two lateral bands on the sides of the cell, one passing below the avicularium and above the lateral area, and the other towards the acuminated apex of the avicularium. It also wants the raised bands which in *C.*,

amphora pass from the sides of the mouth to the apex of the avicularium in front. One large specimen presents a variety worthy of note—in this the backs of all the cells, except one here and there, exhibit (internally?) numerous irregular-sized leopard-like spots.

5. *C. plagiostoma,* n. sp.

Cells short-ovoid; avicularia very large and long, ascending from near the bottom of the cell into an acute spinous point, and supporting a deep cupped cavity; mouth placed obliquely; front of cell divided into fine large subtriangular fenestræ by four broad bands. Back of cell with a broad central band and two narrower bands branching from it on each side; surface of spaces left uncovered by the bands on the back beset with scattered, long setose spines.

Hab.—Bass Strait, 45 fathoms.

Colour brownish white; habit stiff, branches short. This species is at once recognisable by the peculiar oblique position of the mouth—the enormously developed avicularium usually only on one side of the cell, and by the sculpture of the cell—which appears as if it were swathed with broad tapes or bands. The wide spaces left between the bands in front clearly represent the true nature of the fenestræ of other species. It is the only species furnished with elongated setose spines.

6. *C. lorica,* n. sp.

Cellaria catenulata? Lamarck.

Cells elongated rhomboidal, truncated at each end. Fenestræ three, large, the lowest the largest, arranged in a triangle. Mouth very large; avicularia wide and strong; two lateral areæ on each side, well developed; surface in front with a few indistinct circular spots around the fenestræ, and behind marked with faint longitudinal striæ.

Hab.—Bass Strait, 45 fathoms.

Colour white, transparent. A fine widely branching species, in which the catenulate aspect is more evident to the eye than in almost any other. It is at once recognisable by the rhomboidal scutate form of the cell viewed anteriorly, and, when the back is also viewed, the resemblance of the two aspects to the back, and breast-plates of a coat of mail, is very striking. The structure of the lateral processes is more distinctly to be made out in this species than in any other. Each lateral process consists, 1st, of a deep cuplike cavity above; 2nd, a middle compartment, the *avicularium*; and 3rd, a third loculament below the avicularium, the wide opening of which is covered in by a convex transparent membrane. The bottom of this loculament appears to be perforated, and it is to be noticed also that there is a small central perforation in the septum separating it from the cavity of the avicularium. Towards the bottom of the cell, on each side, is a well developed lateral area of exactly the same conformation as the subavicularian loculament, and like it covered in by a convex transparent membrane. It might be supposed that these cavities were for the purpose of containing air, in order to render the otherwise heavy branches of the polyzoary buoyant. They, at all events, appear to be perfectly empty.

7. *C. cribraria*, n. sp.

Cells sub-globular, compressed, more or less alate. Avicularia large, without any superior appendage, and prolonged downwards into elevated lateral alæ. Anterior surface with numerous small round fenestræ, placed at equal distances apart, and evenly distributed over the surface, the circumferential fenestræ being larger than the rest. A minute central perforation of a crescentic form, the lower lip projecting, and the upper lip, lingulate in the middle, falling behind the lower.

Hab.—Bass Strait? This species also occurs in New Zealand.

Colour brown, loosely branched and several inches high. Distinguished readily by the cribriform aspect of the front of the cell, and by the curiously formed central orifice, and by the absence of any superior appendage to the avicularium.

b. Vittatæ. Cells furnished with a narrow elongated band or vitta on each side, without fenestræ. Ovicells not terminal, galeriform.

8. *C. formosa,* n. sp.

Cells oval; avicularia large, flat, or cupped above. Vittæ elliptical, rather anterior.

Hab.—Swan Island, Banks Strait.

Colour light plumbeous. Parasitic upon *C. margaritacea.* The cells are the largest of any in the Vittate division, and very regular and uniform in size and outline. The more distinctive characters are taken from the comparatively broad vittæ, and the flat or cupped upper surface of the avicularia, which are usually continued downwards into a prominent ridge or ala.

9. *C. gibbosa,* n. sp.

Cells pyriform, ventricose posteriorly, much attenuated at bottom. Avicularia small, placed in front close to the sides of the mouth, at the base of strong conical pointed processes which project in front, and are connected across the top of the cell by a prominent toothed ridge. Vittæ long linear, entirely lateral.

Hab.—Prince of Wales Channel, Torres Strait, 9 fathoms, mud.

Of a dark lead colour, when dry. Forms an elegantly branched bush about two inches high. The gibbous form of the cells, and the peculiar anterior position of the avicularia, at the base of the projecting lateral processes, at once distinguish it from all the other vittate species. The toothed (sometimes entire) ridge extending between the two lateral processes across the top of the cell and

overlapping the mouth like a pent-house is also a very peculiar feature.

10. *C. elegans,* n. sp. Tab. i. fig. 2.

Cells elongated ovoid; avicularia large and projecting, without any superior appendage; vittæ narrow, rather anterior.

Hab.—Bass Strait, 48 fathoms. Port Dalrymple, on stones at low water.

A delicate and beautiful parasitic species; the branches slender and spreading; colour white and very transparent. Cells regular and uniform in size and shape. A very similar if not identical species occurs in Algoa Bay, South Africa, the only difference between them being that the latter is rather larger and has the vittæ much longer; in the Australian forms these bands do not reach above the middle of the cell, whilst in the South African they extend as high as the mouth.

11. *C. cornuta.* n. sp.

Cells oval; avicularia in many cells wholly transformed into long pointed retrocedent spines, on one or both sides, in others into shorter spines or unaltered. Vittæ linear, extremely narrow, entirely lateral, and extending the whole length of the cell from the base of the avicularium.

Hab.—Bass Strait, 45 fathoms.

Colour yellowish white, growth small; parasitic upon *C. amphora.* As some difficulty might be experienced in the discrimination of this species from *C. elegans,* and another South African species (not the variety of *C. elegans* above noticed), it is requisite to remark that the long retrocedent spines when present are not placed upon or superadded to the avicularia, but that they seem to represent an aborted or transformed state of those organs. They vary much in length and size in different cells, and even in those of the same branch; as it frequently happens that

there is a spine, usually of diminutive size, on one side and a very large avicularium on the other, and sometimes (but rarely) an avicularium of more moderate size on both sides. But the character of the species by which it is more particularly distinguished consists in the presence on a great many cells, in one part or other of the polyzoary, of the two large and strong spines projecting *backwards*. This retrocession of the spines is alone a sufficient character to distinguish the present species from the South African form above alluded to (*C. taurina*, B.) And the length and lateral position of the vittæ would distinguish the unarmed cells from those of *C. elegans*.

12. *C. umbonata*, n. sp.

Cells more or less pyriform, alate, narrow below, bulging or ventricose upwards. Avicularia large and strong. Vittæ strap-shaped, anterior, extending from the level of the mouth to the bottom of the cell, with elevated acuminate papillæ or short spines. A broad compressed projecting process on the middle of the back.

Hab.—Bass Strait, 45 fathoms.

The cells in this species are small, inflated or ventricose, and as it were sub-globular above, becoming much attenuated below—but the cavity of the cell does not appear to extend into this contracted portion, in which is contained the connecting tube strengthened by calcareous matter—the inferior continuation of the lateral alæ, which descend from the base of the avicularium. Owing to the large size of the avicularia, the upper part of the cell is much widened, and the whole acquires somewhat of a triangular form, and has a peculiar rugose aspect, derived, in part also, from the large size and elevation of the acuminated papillæ, not only of the vittæ but on the surface of the cell itself. The central umbo or crest posteriorly is a marked feature.

c. Without vittæ or fenestræ.

13. C. *carinata*, n. sp.

Cells oval, narrowed at both ends; lateral processes, (without avicularia?) projecting horizontally outwards from the sides of the mouth about the middle of the cell. Mouth nearly central, with a small tooth on each side, and below it a triangular space with three strong conical eminences. The cell which bears the ovicell geminate.

Hab.—Bass Strait, 45 fathoms.

This remarkable form differs so widely in many respects from any of its congeners, as almost to deserve to be considered as the type of a distinct sub-genus. The lateral processes, which may be taken to represent the perfect avicularia of the other species, are, as far as can be ascertained from specimens that have been dried, without a moveable mandible, and are probably really so, because there is no corresponding beak. These processes are channelled in front, nearly from the base to the extremity; they arise by a broad base on each side of the mouth, and on the front of the cell, and from the conjoined bases is continued upwards and downwards, or to the top and bottom of the cell, a prominent flattened band. The expanded bases circumscribe an oval space, nearly in the centre of the front of the cell, the upper two-thirds of which space are occupied by the circular mouth, on each side of which is a small calcareous tooth, to which apparently are articulated the horns of the semilunar lateral cartilage. The lower third is filled up by a yellow, horny (?) membrane, upon which are placed three conical eminences, disposed in a triangular manner. The back of the cell is very convex, and has running along the middle of it an elevated crest or keel, which is acuminate in the middle. The ovicell is situated in front of the cell below the mouth, and below it are three considerable-sized areolated spots, disposed, like the three conical spines, in a triangle. The

cells upon which the ovicells are placed are always geminate, that is to say, have a smaller cell growing out from one side.

6. Calpidium, n. gen. Tab. i. fig. 3—5.

Char.—Cells with an avicularium on each side; with two or three distinct mouths, arising one from the upper part of another, in a linear series, all facing the same way, and forming dichotomously-divided branches; cells at the bifurcations single; ovicells—?

This very peculiar genus, remarkable as it is, seems hitherto to have escaped notice. It is distinguishable from Catenicella, in the first place, by the anomalous circumstance that each cell is furnished with two or more, usually three, distinct keyhole-shaped mouths, and is doubtless inhabited by three distinct individuals. Whether these are separated from each other by internal partitions is unknown, but the closest examination of cells rendered transparent by means of acid fails to discover such. In cells thus prepared, there are apparent, however, three distinct masses, reaching from the bottom of the cell to each orifice, and which are probably the remains either of the body or of the retractor muscles of the animals. Another point of difference from Catenicella is the non-gemination of the cell at the dichotomy of a branch. The avicularia, moreover, do not form lateral projections, but are sessile, or imbedded, as it were, in the sides of the cell immediately below the upper angles.

1. *C. ornatum*, n. sp. Tab. i. fig. 3—5.

Cells triangular-urn shaped, very broad above, with a straight border, much compressed; mouths, 2—3, keyhole shaped. Five fenestræ below each mouth; numerous branching bands on the back of the cell.

Hab.—Bass Strait, 45 fathoms.

This curious species is the only one belonging to the genus. The cells are very large, regular, and uniform,

resembling very closely an antique sculptured urn. Colour dark brown, and the walls so thick as to be nearly opaque. The polyzoary, which appears to attain a height of four or five inches, is bipinnate (with all the branches on one plane), the branches alternate, and given off with extreme regularity. The ultimate ramules are incurved. The whole forms a very elegant object. The central stem, or series of cells, differs in no respect as regards the size or disposition of the cells composing it, from the branches.

Fam. 2. EUCRATIADÆ.

7. Eucratea, *Lamouroux.*

1. *Eucratea chelata,* Lamouroux.

Hab.—Bass Strait, 45 fathoms.

In all respects identical with the British form. It also occurs at Port Adelaide.

8. Anguinaria. *Lamarck.*

1. *A. spatulata,* Lamarck.

Ætea anguina, Lamouroux.

Hab.—Bass Strait, and other localities.

This species (which appears to be pretty generally distributed over the globe) is identical with the European form. It is to be remarked, however, that a second species (*A. dilatata,* Busk. Ann. Nat. Hist. 2nd Ser. vol. 7, p. 81, pl. 9, fig. 14) is found in Torres Strait, but which does not occur in the Rattlesnake collection.

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§. 2. *Multiserialaria.* Cells disposed alternately in a double or multiple series.

1. *Articulata.* Polyzoary divided into distinct internodes by flexible articulations.

a. Internodes elongated, or composed of numerous cells.

Fam. 1. SALICORNARIADÆ. Cells disposed around an ideal axis.

9. Salicornaria, *Cuvier.*

a. Surface divided into more or less regular hexagonal spaces by elevated ridges.

1. *S. punctata.* n. sp.

Cellaria salicornioides? Audouin. Savigny, Egypt. Pl. 6. fig. 7.

Hexagonal areas with an acute angle above and below; bottom of area pyriform, surface covered with minute transparent granulations. Mouth of cell in the upper third, with a minute tooth on each side.

Hab.—Bass Strait, 45 fathoms. Off Cumberland Islands, 27 fathoms, fine grey mud.

Parasitic upon Sertularians and Polyzoa; branches straggling of irregular lengths.

2. *S. bicornis.* n. sp.

Areas with an obtuse angle above and below, sometimes rounded above; a minute projection on each side near the top. Bottom of area long-oval, smooth, sometimes with a perforation above the mouth. Mouth with a minute tooth on each side.

Hab.—Bass Strait, 45 fathoms.

Parasitic. Branches shorter and thicker than in the preceding species. In the shape of the area they are very much alike, but in *S. bicornis*, in some cells, and occasionally throughout the greater part of the internode, the area differs widely from the more usual form. It is much expanded, and presents a wide arch above. In this case there is usually a considerable-sized perforation above the mouth of the cell, as occurs not unfrequently also in *S.*

farciminoides in the younger cells, and which opening is probably normal, until it becomes filled up by the gradual deposition of calcareous matter. What more especially distinguishes the present from the preceding species are the minute projections on either side at the two upper lateral angles of the hexagonal area, and the smoothness of the surface of the cell. They are both perfectly distinct from *S. farciminoides*.

b. Surface not divided into distinct areas by raised ridges.

3. *S. dichotoma.* n. sp.

Mouth of cell elliptical, occupying two-thirds of its length. Two small perforations on each side immediately above the mouth, protected by a convex transparent hood, which has a rounded opening on its under surface.

Hab.—Prince of Wales Channel, Torres Strait, nine fathoms.

Forms small crowded tufts from one to two or three inches high; branches very regularly dichotomous.

4. *S. marginata.* n. sp.

Cell circumscribed by an acute raised border; opening oval, rather more than half the length of the cell. Cell attenuated below the opening.

Hab.—Prince of Wales Channel, Torres Strait, nine fathoms.

A small broken fragment only preserved; parasitic upon *Sertularia mutulata*, so that its habit cannot be satisfactorily determined. It is of a greenish colour, but this may be adventitious, although general and uniform throughout the specimen. This species differs from the above in being much larger, and in wanting the two perforations on each side above the mouth—in the less comparative size of the opening of the cell, and in the

remarkable elevation of the sharp margin surrounding the upper half of the cell. In the looser aggregation, and in the form of the cells, it shews the transition from *Salicornaria* to *Cellularia*.

Fam. 2. CELLULARIADÆ. Cells disposed in the same plane.

10. CELLULARIA, *Pallas*.

Char. (B.) Cells bi-triserial, oblong* or rhomboidal, contiguous. Opening of cell occupying at least half of the front. Margin thickened, sometimes spinous above. A short spine or a sessile avicularium on the upper and outer angle.

A. *inarmatæ*—without avicularium.

1. *C. monotrypa.* n. sp.

Cells oblong, narrowed below, with a single perforation, in the upper and outer part behind. Opening oval, margin smooth; a short spinous process at the upper and outer angle; a sharp short spine in the middle of the upper border of the middle cell, at a bifurcation. Ovicell? in form of a very shallow excavation in the upper part of the cell in front.

Hab.—Bass Strait, 45 fathoms.

The only species with which this can be confounded, is *C. Peachii*, (Busk. Annals. Nat. Hist. Vol. 7. 2nd Series, p. 82. Pl. VIII. fig. 1.)

The latter, however, is very much smaller, the cells narrower in proportion to their length, and the margin of the opening minutely verrucose. The cell has more than one posterior perforation; and the central cell at a bifurcation is rounded above and without a spinous process; lastly, the ovicell is much loftier and tesselated on the surface.

* This shape of the cells is given from the back view of them.

11. Scrupocellaria, *Van Beneden.*

Char. (modified.) Cells rhomboidal, with a sinuous depression on the outer and posterior aspect. Each furnished with a sessile avicularium at the upper and outer angle in front, and with a vibraculum placed in the sinus on the outer and lower part of the cell behind. Opening oval, or subrotund, spinous above. Ovicells galeriform.

This natural genus is characterized more particularly by the presence upon *each* cell of a sessile avicularium seated on, or in fact forming the upper and outer angle, and of a vibraculum placed on the back of the cell. The cells in some species are provided with a pedunculate operculum, by which it is intended to designate a process, which arising by a short tube from the anterior wall of the cell, immediately beyond the inner margin of the opening, projects forwards and bends over the front of the cell, expanding into a variously formed limb, and serving as protection to the mouth of the cell in front. The cavity of the tube by which the process arises, becomes, in the expanded portion, continuous with variously disposed grooves or channels, which terminate at the edges of the operculum. This organ affords excellent specific characters (not in this genus alone). Besides the sessile avicularia above noticed, many species of this genus also possess avicularia of another kind, and which are placed on the front of the cell below the opening and towards the inner side, or in other words, towards the middle line of the branch. In this genus, in all those species in which the second avicularium occurs, each individual cell is provided with one. This additional avicularium appears to be composed of a flexible material, and it is very easily broken off, so that in many instances, perhaps throughout an entire specimen the organ itself may be wanting, although its position is clearly evidenced by the existence of a rounded opening in the usual situation of the organ. It is necessary to distinguish this form of

flexible (if such it be) avicularium from the truly articulated and moveable avicularia, in the form of bird's heads, and which form does not occur in the genus Scrupocellaria.

a.—Operculatæ. Cells furnished with a pedunculate operculum.

1. *S. cervicornis,* n. sp.

Veins or channels in the oval operculum, branching so as to resemble the antlers of a stag. The marginal spine next above the pedunculated operculum, bifurcate.

Hab.—Off Cumberland Islands, 25 fathoms, fine grey mud.

A small, delicate, parasitic species, very transparent. The very peculiar markings on the operculum at once distinguish it. The upper margin of the mouth is furnished with five elongated spines, the innermost of which is forked at the extremity.

2. *S. diadema,* n. sp.

Cells elongate, external side nearly straight, vibraculum sublateral, very prominent. Limit of operculum entire, or obscurely bi-trilobed. A flexible avicularium in front. Ovicell usually with a single row of four or five openings immediately above its mouth.

Hab.—Moreton Bay.

b. Inoperculatæ. Cells without a pedunculate operculum.

3. *S. cyclostoma,* n. sp.

Opening of cell nearly or quite circular, margin much thickened, with three or four short indistinct spines above. Vibraculum sublateral. A flexible avicularium in front. Ovicells —?

Hab.—Bass Strait, 45 fathoms.

4. *S. ferox,* n. sp.

Opening of cell broad oval, pointed below; three short

indistinct spines above; vibraculum large, sinus deep. An enormous anterior avicularium, as wide as the cell. Ovicell lofty, with numerous punctures over the surface.

Hab.—Louisiade Archipelago. Bass Strait.

Distinguished from the former species by the enormous anterior avicularium, and the form of the opening. Another peculiarity of this species is the curious serrated appearance of the radical tubes.

12. Canda, Lamouroux.

Char. (B.) Cells rhomboidal, sinuated on the outer side for the lodgment of a vibraculum. No sessile avicularium on the upper and outer angle in front. An uncertain number of flexible avicularia, arranged along the middle of the branches, and in much less number than the cells.

This genus is at once distinguished from Scrupocellaria, to which it is otherwise closely allied, by the absence of the sessile avicularium on the upper and outer angle in front, and also by the circumstance, that although there are flexible anterior avicularia, they do not correspond in number with the cells, but seem to be disposed in a special tract along the middle of the branch or internode. The connexion of the branches by transverse tubular fibres is not a character of either generic or specific importance, though it is more striking in the only species hitherto known as belonging to this genus, than in any other. These transverse tubular fibres are, like the radical fibres in Scrupocellaria, always inserted, not into the body of a cell, but into a vibraculum. They are evidently of the nature of a byssus.

1. *C. arachnoides*, Lamouroux.

Cells biserial; opening oval, truncated above, and the upper margin recedent, with a spine on each side, the outer the longer surface of cell covered with transparent granulations.

Hab.—Bass Strait, 45 fathoms.

b. Internodes composed of two-four cells.

13. Emma, Gray. Dieffenbach's New Zealand, Vol. ii. p. 293.

Char. (B.) Cells in pairs or triplets. Opening more or less oblique, subtriangular, partially filled up by a granulated calcareous expansion. A sessile avicularium (not always present) on the outer side, below the level of the opening.

This genus appears to be a natural one, though very closely allied to Tricellaria (Fleming). The more important points of distinction consist in the conformation of the opening of the cell, and in the position of the avicularium when the latter organ is present. The lower half of what would otherwise be the oval opening of the cell is filled up by a thin plate of calcareous matter, granulated on the surface, and by which the actual opening is rendered more or less subtriangular, the mouth being placed just below the apex of the triangle. The margin of the opening is considerably raised, especially at the oval end, so that the opening appears to be situated in a deep depression. This character of opening, however, occurs also in a triserial species of Cellularia from Algoa Bay. The position of the avicularium entirely *below* the level of the opening on the outer side of the cell, is the peculiar characteristic of Emma as distinguished from Tricellaria, in which that organ when present is placed on the upper and outer angle as in Cellularia proper, and Scrupocellaria. It is worthy of notice that avicularia may be present on every cell in some specimens, and most usually, whilst in others of equal size there will be none at all apparent. So that the position of these organs in this genus, as well as in Tricellaria, is of more importance systematically than even their existence.

1. *E. crystallina*, Gray, l. c.

Cells in pairs; three spines on the outer edge, the central usually the longest and strongest.

Hab.—Bass Strait, 45 fathoms.

Parasitic upon Polyzoa, &c. circinate branched—branches irregular divaricate. The opening of the cell triangular, very obliquely placed.

2. *Emma tricellata*, n. sp.

Cells in triplets; three or four long spines on the upper and outer part; a small spine on the inner and lower part of the edge of the opening.

Hab.—Bass Strait.

Parasitic upon Catenicella, &c. Habit long straggling, very like the preceding species. The cells are more infundibuliform, and the avicularium, which, as in *E. crystallina* is not always present, is larger, but occupies the same position on the cell.

2. Polyzoary continuous throughout.

Fam. 3. BICELLARIADÆ. Frond wholly divided into narrow ligulate, dichotomous, bi or multiserial branches; no vibracula. Avicularia when present pedunculate.

14. Bicellaria, Blainville.

Char. (B.) Cells turbinate, distant. Opening directed more or less upwards. Mouth submarginal. Several curved spines, marginal or submarginal.

1. *B. tuba*, n. sp.

Opening round, looking nearly directly upwards; a digitiform hollow process below the outer border supporting 2—4 long incurved spines; 2—3 other long curved submarginal spines behind or above the opening, none below it in front—a solitary spine on the back a short way down the cell. Avicularia very long, trumpet-shaped, arising on the back of the cell.

Hab.—Bass Strait, 45 fathoms.

This species is at once recognisable by the remarkable form and unusual position of the avicularium, and also by the peculiar digitiform spiniferous process on the outer side of the opening.

2. *B. gracilis*, n. sp.

Cells elongated, slender, opening round or suboval, looking obliquely forwards and upwards; three marginal (sometimes slightly submarginal) spines above and behind the opening, and two much longer curved hair-like spines arising from the anterior and lower edge of the opening. Ovicells globose, subpedunculate, attached to the upper and inner part of the margin of the opening. Avicularia small, like bird's heads.

Hab.—Bass Strait.

A delicate slender species, not unlike *B. ciliata* or *avicularis* in habit. The two long spines arising from the anterior edge of the opening suffice to distinguish it from the former of these two species.

3. *B. grandis*, n. sp.

Cells much elongated outwards, horizontal or projecting portion oblong, rounded at the extremity; 2—5 long curved submarginal spines, externally a single dorsal spine about half way down the cell; opening oval, narrower outwards; very oblique mouth at the outer end. Avicularia—?

Hab.—Bass Strait, 45 fathoms.

Quite distinct from *B. ciliata* not only in its size, which is nearly three times as great, but in the form of the cell and the opening. The number of spines varies very much, and two or three of them, not unfrequently, arise from a common projecting process or base.

4. *B. flexilis*, n. sp.

Cells obliquely truncated above with a short spine on the outer angle; opening large, suboval, with an obtuse angle outwardly; margin slightly thickened, wholly unarmed.

Hab.—Off Cumberland Islands, 27 fathoms, fine grey mud.

Of a light grey colour: grows in large loose tufts, composed of long forked ascending branches. It is a very peculiar species, and some difficulty has been found in finding it a place. In the opening of the mouth, and the external short spine, it is a Cellaria; and in the colour and want of distinct articulation, it approaches Acamarchis; whilst in the form of the cell, and their mode of mutual connexion, it is a Bicellaria: it differs from all other species of that genus, however, in the absence of any long spines, and in general habit. Were it not referred to that genus, it would probably constitute the type of a distinct one. A curious little trident-like organ is visible in the narrow part of some cells.

15. Acamarchis, Lamouroux.

Char. (B.)—Cells elliptical,* closely contiguous; opening very large, margin simple, not thickened. Avicularia not always present, like birds' heads.

To which may be added, that the species are frequently coloured, red or bluish.

1. *A. neritina.* Lamouroux.

Hab.—Rio de Janiero. Broken Bay, N. S. Wales.

This species appears to be one of the most generally distributed of the Polyzoa; it occurs in nearly every latitude in both hemispheres.

(?) 2. *A. tridentata.* Krauss. Corall. d. Südsee, p. 3. fig. 2.

Hab.—Bass Strait (?)

* Viewed posteriorly.

This species is placed doubtfully in the Rattlesnake Collection. It occurs, however, in Van Diemen's Land and New Zealand (Dr. Hooker), and is abundant in South Africa.

Fam. 4. CABEREADÆ.

Polyzoarium entirely divided into ligulate dichotomous bi or multiserial branches; back nearly covered by large vibracula; avicularia sessile.

16. Caberea, Lamouroux.

Selbia, Gray. op. c. Vol. II. p. 292.

Cells bi-multiserial, in the latter case quincuncial. Posterior surface of branches concealed by large vibracula, which are placed obliquely in a double row, diverging in an upward direction from the middle line, where the vibracula of either row decussate with those of the other. Avicularia when present of the flexible kind, sessile on the front of the cell.

The remarkable feature of this genus resides in the vibracula, which here appear to attain their utmost development. Each vibraculum appears to belong not to a single cell as in *Scrupocellaria,* but to be common to, or applied to the backs of several. They are more or less pyriform or long oval in shape, and the two rows decussate with each other along the middle of the branch—giving in the narrower species, especially, much the aspect of an ear of barley, and in the wider of a straw plait. The walls of the vibracula are usually thin, and very transparent, so as to allow the outlines of the cells to be seen imperfectly through them. The upper and outer extremity of the vibraculum is bifid, and to the inner horn is articulated the seta, and from the notch between the two horns there is continued nearly, if not quite, to the inner extremity of the organ, and along its upper border, a shallow groove, in which is

lodged the seta when in a state of rest. In most species the seta is serrated with distant teeth on one side.

Where there are more than two rows of cells, the marginal cells differ in conformation from the central.

As in *Scrupocellaria*, the opening of the cell is sometimes protected by a pedunculate operculum. The genus, therefore, may, like that, admit of being divided into sections, distinguished respectively by the presence or absence of a pedunculate operculum.

a. Operculatæ.

1. *C. rudis*, n. sp.

Multiserial; opening of cells oval, margin much thickened, with a strong projecting upturned spine on each side in the central cells, and with three strong and long similar spines on the outer side, and a smaller one on the inner side in the marginal cells. Operculum spatulate, or pointed above, entire. Each cell of the central rows with two small avicularia in front, immediately below the mouth. Each marginal cell with a single large vibraculum in front below the mouth. Vibracula slender, very transparent. Setæ short, not serrated.

Hab.—Bass Strait.

Colour dirty white: forms a broad frondose polyzoarium $1\frac{1}{2}$ to 2 inches, or perhaps more, in height. The branches, all disposed in the same plane, are flat, thick, and about $\frac{1}{8}$th of an inch wide, composed of from four to six rows of comparatively small cells, which viewed behind appear lozenge or diamond shaped, and arranged quincunically. It is not always easy to observe with accuracy the outline of the vibracula, owing to the extreme tenuity of their walls, but the groove along the upper border is very distinct and most usually has the seta lying in it. The avicularia on the marginal cells are very large, but not uniform in size. Along each border of the branches runs a bundle of radical tubes, the number of which dimi-

nishes as the branch ascends, each terminating in a vibraculum.

2. *C. zelanica,* Busk.

Selbia zelanica, Gray. Dieffenbach's New Zealand, Vol. ii. p. 292.

Crisia Boryi, Audouin. (Savigny, Egypt, pl. 12, fig. 4.)

Biserial; opening of cell oval or elliptical, rounded at each end, crossed in front, and thus divided into two nearly equal parts by a transverse calcareous band, from the lower edge of which depends a pedunculate, falciform operculum. Cells frequently produced upwards into a large arcuate ovicell. Vibracula ovoid, setæ long, serrated.

Hab.—Off Cumberland Islands, 27 fathoms, fine grey mud.

Slender: sufficiently distinguished by the peculiar form of the operculum. This part is so indistinctly represented in Savigny's figures, as to render it impossible to determine with certainty whether his species is the present one or not. The posterior view is much more like, but that is insufficient of itself to afford a specific character. The back of the branches exactly resembles an ear of barley. This species occurs in New Zealand, and also in South Africa.

b. Inoperculatæ; opening of cell without an operculum.

3. *C. lata,* n. sp?

C. dichotoma?, Lamouroux.

Branches 4—7 serial; opening of cells in central rows, oval, sometimes square below; and the cell frequently produced into a shallow arcuate cavity. A short blunt spine on each side of the mouth. Marginal cells shallow, opening oval, margin much thickened, granulated: usually a short conical spine at the summit; a very minute sessile

avicularium behind the outer edge, superiorly. Vibracula very large: setæ serrated.

Hab.—Off Cumberland Islands, 27 fathoms fine grey mud.

Colour white or yellowish; forms close rounded tufts $2\frac{1}{2}$ to 3 inches in height and width, composed of uniform dichotomously divided branches, about $\frac{1}{8}$ of an inch wide, and which become wider towards their truncate extremities. The vibracula are very large, and though distinctly defined, are yet sufficiently transparent to allow a view of the lozenge shaped cells. The central rows of cells vary in number from two to five, and the cells composing them are arranged with extreme regularity. The marginal rows are placed in a plane posterior to the central, and as above noticed, the cells of which they are composed are widely different from the central.

The only other species with which the present can be confounded is *Caberea Hookeri* (*Cellularia Hookeri*, Fleming) a British form. The latter species appears to differ from *C. lata*, chiefly in its having a large tubular spine on each side of the mouth of the lateral cells, and in each of the central cells, or nearly so, being furnished with an anterior avicularium, below the opening and to one side. The lateral sessile avicularium on the marginal cells is also much larger.

Fam. 5. FLUSTRADÆ.

Polyzoarium expanded, continuous or encrusting. Cells disposed in straight series, which do not radiate from a centre.

17. Flustra, Linn.

a. Cells on one side only.

1. *F. pyriformis?*, Lamouroux.

Cells pyriform, or barrel-shaped, prominent, marked with transverse wrinkles. Ovicells lofty, keeled in front, with a strong central, and two lateral longitudinal ribs.

Hab.—Bass Strait, 45 fathoms.

Sometimes small and parasitic, upon Sertularians and Polyzoa—sometimes independent, then of large growth, forming dichotomously divided fronds, with strap-shaped truncate, unequal divisions.

b. Cells on both sides. (*Carbasea,* Gray.)

2. *F. denticulata,* n. sp.

Cells much elongated, narrow; sides parallel, ends square; an upturned spine on each side at the oval end; sides of cell denticulate, denticles very numerous, small, acute. Avicularia irregularly distributed on the surface of the frond.

Hab.—Bass Strait, 45 fathoms.

Frond divided into numerous strap-shaped, truncated segments, of various widths; it attains a height of several inches. In habit it is very like some forms of *F. truncata,* and there is a Mediterranean species (undescribed?) in which the cells are denticulate, much in the same way as in the present species, but otherwise quite distinct.

18. Retepora, *Lamarck.*

Char. (B.)—Polyzoarium foliaceous, calcareous, or horny, reticulate; cells only on one side.

1. *R. cornea,* n. sp.

R. ambigua? Lamarck.

Cells oval, not very regularly arranged, in a continuous, foliaceous, subcircular frond; reticulated with oval spaces, not as wide as the interspaces. Ovicells large, galeriform, immersed, smooth.

Hab.—Off Cumberland Islands, 27 fathoms, fine grey mud.

This remarkable species is so completely a Retepore in construction, that it seems impossible to separate it from that genus, merely from the circumstance that its composition is more horny than calcareous. The frond is more or less orbicular, or rather is composed of more or less

orbicular or reniform folds, one over another, and attached as it were to a common centre. The substance is very thin and transparent, and the interspaces are much broader than the elliptical spaces.

2. *R. cellulosa.*

Hab.—Bass Strait, 45 fathoms.

Not distinguishable from a Mediterranean specimen.

3. *R. ctenostoma,* n. sp.

Frond umbilicate, irregularly infundibuliform, spaces elongated, narrow, margins subdenticulate; interspaces as wide as the spaces. Mouth of cells tubular, projecting; with six or seven unequal acute expanding teeth.

Hab.—Bass Strait, 45 fathoms.

A very distinct and beautiful species. The frond is about half an inch wide, and though really umbilicate and subinfundibuliform, does not at first sight appear so, being much more expanded on one side of the centre than on the other.

19. Eschara, Ray.

1. *E. lichenoides,* M. Edwards. Mem. sur les Eschares. Ann. d. S. N. t. vi. p. 31. pl. 2. fig. 3.

Hab.—Australian Sea, probably Bass Strait. (It also occurs in Algoa Bay.)

20. Diachoris, n. gen. Tab. i. fig. 10—12.

Cells separate, each connected with six others by short tubes; disposed in a horizontal plane, and forming a continuous irregular frond; free, or partially adnate.

The mode of arrangement and interconnexion of the cells in this genus is remarkable, and highly interesting. It represents, in fact, a dissected Flustra or Membranipora. The cells are disposed in linear parallel series, and those of two contiguous series are alternate with respect to each

other. Each cell is connected with one at either end in the same linear series by a rather wide short tubular prolongation, and with two on each side in the contiguous series by narrower tubes, so that each cell, except in the marginal rows, is connected with six others. It is this mode of interconnexion of the cells that affords the diagnostic generic character. There is but one species in the present collection, but in Mr. Darwin's there are two others from the Straits of Magellan, as yet undescribed.

1. *D. Crotali*, n. sp. Tab. i. fig. 10—12.

Cells erect, open in front, perforated on the sides and bottom; a lanceolate appendage articulated to each upper angle. Ovicell conical, placed on the upper edge.

Hab.—Bass Strait, 45 fathoms.

The frond, though not strictly speaking adnate, as it seems to have no attachments, is usually spread loosely over other polyzoa. There is no appearance of a moveable mandible in the lanceolate appendages, but which, nevertheless, most probably represent avicularia. These organs are of a lanceolate form, with an elevated ridge or keel along the back, and slightly concave beneath. They project in front, slightly depending; and at the base of each is a rounded eminence.

Fam. 6. CELLEPORIDÆ.

Polyzoarium massive or crustaceous, composed of ovate cells in juxta-position; and arranged, more or less regularly, in linear series, radiating from a central point or line.

21. Cellepora, Otho Fabricius.

1. *Cellepora bilabiata*, n. sp.?

C. labiata?, Lamouroux.

Cells deeply immersed; mouths in some entire and unarmed; in others, with two acuminated conical lips;

immediately beneath the apex of the posterior lip a small sessile avicularium. Ovicells subglobular, with a scutiform area on the upper surface, marked with several lines on each side, radiating from a central line.

Hab.—Bass Strait.

Parasitic on several zoophytes. This species to the naked eye exactly resembles *C. pumicosa,* but on closer examination several important differences will be observable. The cells in *C. bilabiata* are less rounded and less distinct than in *C. pumicosa.* As in that species, some of the cells are furnished with an avicularium, and others unprovided with that appendage; and again, some cells support an ovicell, whilst others do not. The mouth of the unarmed cells in both species is more or less circular and plain, but in *C. bilabiata,* even in the unarmed cells, the mouth is occasionally distinctly bilabiate. In *C. pumicosa* the avicularium is placed subapically on a solitary posterior obtuse mucro, but in *C. bilabiata* there are two such processes longer and more pointed, one in front and the other behind the mouth; the avicularium, as in the former case, being placed immediately below the apex of the posterior mucro. The ovicells also differ very much. In *C. pumicosa* this organ presents several rather large circular spots or perforations?, whilst in *C. bilabiata* it exhibits a scutiform or horse shoe-shaped area, marked with several transverse lines on each side of a middle longitudinal line.

Fam. 7. GEMELLARIADÆ.

Cells opposite, in pairs.

22. Didymia, n. gen. Tab i. fig. 6.

Cells joined side by side; opening large, oval; mouth subapical, central. No avicularium. Ovicells contained within a cell, which is central at each bifurcation.

1. *Didymia simplex*, n. sp. Tab. i. fig. 6.

Cells oblong, narrowed below, broad and truncate, with an angle externally above. Back marked with transverse rugæ.

Hab.—Bass Strait, 45 fathoms.

A fine species, growing in loosely-branched phytoid fronds, to a height of several inches. In some (dried) specimens the branches are a little incurved, but not in all. The situation of the ovicell is peculiar. It is contained within the upper part of a cell placed between, or rather in front of the pair, from which the two branches at a bifurcation take their origin. The ovigerous cell differs widely in form from the others, being pyriform, and much attenuated below; and the orifice is below the middle. The upper compartment, in which the ovicell or sac itself is lodged, appears to be separated from the lower by a transverse diaphragm.

23. Dimetopia, n. gen. Tab. i. fig. 7—9.

Cells joined back to back; the mouths of each alternate pair looking in the same direction, and at right angles to the intermediate pair.

1. *D. spicata*, n. sp. Tab. i. fig. 9.

Cells infundibuliform. Margin of opening much thickened, with six equidistant, elongated pointed spines.

Hab.—Bass Strait, 45 fathoms.

White, transparent, forming thick tufts about $1\frac{1}{2}$ to 2 inches in height. The same species also occurs in New Zealand.

2. *D. cornuta*, n. sp. Tab. i. fig. 7, 8.

Cells suddenly contracted about the middle. Opening oval, wide above; margins slightly thickened with a short thick conical horn on each side above, and a long projecting spine (rarely two) in front below.

Hab.—Bass Strait, 45 fathoms.

Branches narrower than in the preceding species. Colour

yellowish. Tufts loose; ovicell small in proportion to the size of the cells. It is placed immediately above and behind the upper margin of the opening of the cell to which it belongs.

Suborder III. CTENOSOMATA.

Fam. 1. VESICULARIADÆ. Cells tubular, horny.

24. Amathia, Lamouroux.

1. *A. biseriata,* Krauss. Corall. der Südsee, p. 23. Fig. 1. *a. b. c.*

Hab.—Swan Island, Banks Strait.

The biserial arrangement of the cells is not a sufficient character, because in *Amathia cornuta* (Lamouroux), the cells are also biserial as well as in another South African species, very like the Australian form probably intended by Krauss, but apparently different from it. In the South African form the cells are shorter, narrower, and more cylindrical, and the branches are terminated by two lanceolate tags, which are not present in the Australian species, in which latter the cells also are wider, longer, and prismatic, or subhexagonal, with very thin walls.

SERTULARIAN ZOOPHYTES.

The number of species of Sertularian Zoophytes comprised in this collection amounts to thirty-one, belonging to five genera, all of which appear to be common to both the Northern and Southern hemispheres; and four are European types. The fifth, *Pasythea*, is stated by Lamouroux, to be found on Fucus natans and in the West

Indies; so that the present collection does not present any peculiar Australian generic form. It is far otherwise, however, with respect to the species. Of these three only are found in the European seas, viz.:

Sertularia operculata.
Campanularia dumosa.
„ *volubilis?*

Of which the first is a perfect cosmopolite, and the last is perhaps doubtful.

There are also, what is much more strange, not more than three species which I have been enabled to trace to any other locality, even in the Southern hemisphere. These are:—

Sertularia elongata.
„ *divaricata*, n. sp.
Plumularia Macgillivrai, n. sp.

The first occurring in New Zealand; the second on the south coast of Patagonia and in the Straits of Magellan; and the third (which, however, is not, strictly speaking, an Australian form, having been procured in the Louisiade Archipelago) in the Philippine Islands. With these six exceptions, the whole number of species would therefore, to a certain extent, appear to be characteristic of the Australian seas.

Of the thirty-one species, it appears strange that not less than twenty-five should here be described as new; and there can be no doubt many so described are included under the vague and uncertain descriptions of Lamarck and Lamouroux; but, in the absence of authentic specimens, or trustworthy figures, I have found it impossible to identify satisfactorily the species described by them, and have therefore thought it better to assign new names rather than to apply former ones, which would in all probability prove incorrect. It is hoped, at all events, that the descriptions here given will be found sufficient to prevent

any misconception of what is intended in the following catalogue.

The mode in which the species are arranged will be seen from the following synoptical arrangement :—

Synoptical Arrangement of the Genera and Species of Sertularian Zoophytes collected on the Voyage of the Rattlesnake.

Order. ANTHOZOA HYDROIDA.

Sub-order. SERTULARINA.

Fam. I. SERTULARIADÆ.

Gen. 1. Sertularia.

§ 1. Cells alternate (Sertularia.)

(*a*) Cells distichous.

1. *S. elongata.*
2. *S. divaricata*, n. sp.
3. *S. crisioides.*

(*b*) Cells secund.

4. *S. pristis.*

§ 2. Cells opposite (Dynamena)

(*a*) Cells distichous.

5. *S. subcarinata*, n. sp.
6. *S. patula*, n. sp.
7. *S. orthogonia*, n. sp.
8. *S. mutulata*, n. sp.
9. *S. operculata.*
10. *S. divergens*, n. sp.
11. *S. trigonostoma*, n. sp.
12. *S. digitalis.* n. sp.
13. *S. loculosa*, n. sp.
14. *S. unguiculata*, n. sp.
15. *S. tridentata*, n. sp.

2. Pasythea.

16. *P. hexodon*, n. sp.

3. Plumularia.

§ 1. Angiocarpeæ.

17. *P. Huxleyi*, n. sp.
18. *P. hians*, n. sp.
19. *P. delicatula*, n. sp.
20. *P. aurita*, n. sp.
21. *P. brevirostris*, n. sp.
22. *P. ramosa*, n. sp.
23. *P. divaricata*, n. sp.
24. *P. phœnicea*, n. sp.
25. *P. longicornis*, n. sp.
26. *P. Macgillivrayi*, n. sp.

§ 2. Gymnocarpeæ.

27. *P. effusa*, n. sp.
28. *P. campanula*, n. sp.

Fam. 2. CAMPANULARIADÆ.

4. Campanularia.

29. *C. volubilis* (?)
30. *C. dumosa*.

5. Laomedea.

31. *L. Torresii*, n. sp.

Order. ANTHOZOA HYDROIDA.

Suborder. SERTULARINA.

Fam. I. SERTULARIADÆ.

Gen. 1. Sertularia, *Linnæus*.

1. Cells alternate (Sertularia.)

a. Cells distichous.

1. *S. elongata*, Lamouroux.

Hab.—Swan Island, Banks Strait, thrown on the beach. Port Dalrymple, on stones at low water. (Also New Zealand.)

2. *S. divaricata*, n. sp.

Cells urceolate-subtubular, or very little contracted towards the mouth, often adnate to the rachis nearly their whole length; mouth looking upwards, with three large

acute teeth, two lateral, and one rather longer than the others, and slightly recurved, above. Ovicells — ?

Hab.—Bass Strait, 45 fathoms, dead shells.

Colour dirty yellowish white; polypidom branched, from a common stem; branches irregular, (?) straggling, pinnate and bipinnate, pinnæ and pinnules divaricate at right angles, alternate; rachis flexuose, or with an angle at the origin of each pinna. The cells are placed at wide distances apart; small and adnate very nearly to the top. The mouth circular, with three large teeth, the one above frequently obscured by adventitious substances, very acute, ascending, and a little recurved.—*Sertul. Gayi.* (Lamouroux. Exp. p. 12. pl. 66. fig. 89 has four teeth.)

This species occurs also on the south coast of Patagonia, and the Straits of Magellan; in the latter locality, however, the habit is much more robust.

3. *S. crisioides*, Lamouroux. (Dynamena.)

Cells adnate, conical, slightly curved, truncate at bottom, narrow at top; mouth vertical, external.

Hab.—Off Cumberland Islands, 27 fathoms.

Very like a Thuiaria, but the cells are not immersed, though very closely adnate, and the outer angle of the square base of each cell is in contact with the upper and back part of the one below it, so that a small triangular space or opening is left below each cell. The branches are very regularly alternate; and the polypidom is of a light brownish colour.

b. Cells secund.

4. *S. pristis*, (*B.*)

Idia pristis, Lamouroux.

Cells tubular, all contiguous or adnate to each other, and to the rachis, upper half curved laterally, lower half closely adnate, almost immersed in the rachis; mouth looking upwards, rounded, expanded, almost infundibuliform, border slightly scalloped towards the rachis, and projecting externally. Ovicell cyathiform, long narrow with circular

rugæ. Mouth as large as the diameter of the cup, margin very slightly everted.

Hab.—Prince of Wales Channel, Torres Strait, 9 fathoms. Off Cumberland Islands, in 27 fathoms, fine grey mud.

I see no reason why the present species should not come under Sertularia. It is peculiar from the position and extreme contiguity of the alternate cells. The ovicells arise from the back of the rachis towards the side. When viewed posteriorly, the cells are seen through the transparent rachis, and it might thus at first sight appear as if the rachis itself were cellular and not tubular, but such is not the case. The tube is wide and continuous from end to end.

2. Cells opposite—(sometimes alternate on the stem.) (*Dynamena.*)

a. Cells distichous.

5. *S. subcarinata,* n. sp.

Cells tubular, upper half divergent, ascending. Mouth looking upwards, circular, with an anterior and two lateral broad, expanding teeth. A narrow angular line or keel down the front of the cell. Ovicell— ?

Hab.—Bass Strait, 45 fathoms dead shells.

Colour white, transparent, growth small, straggling. Branches irregular, divaricate nearly at right angles, subalternate. The three expanding teeth and the anterior ridge or keel, besides its habit, distinguish it from a Tasmanian species with which alone can it be confounded. The cells are large.

6. *S. patula,* n. sp.

Cells tubular, upper third free, divergent ascending. Mouth perfectly round, looking upwards and outwards, margin entire everted. Ovicell—?

Hab.—Bass Strait, 45 fathoms, dead shells.

Colour whitish. A small parasitic species, with opposite branches.

7. *S. orthogonia,* n. sp.

Cells tubular, nearly half free, divergent laterally at a right angle. Mouth looking directly outwards, border entire, slightly everted. Ovicell—?

Hab.—Prince of Wales Channel, Torres Strait, parasitic upon *S. pristis.*

Very like the preceding in habit and size, of which it may possibly prove to be a variety. The cells, however, throughout the whole of the polypidom are of precisely the same character, in each form, and exhibit no intermediate steps. In the present species the cells are much longer, rather narrower, and the upper half is turned out abruptly at a right angle, whilst in the former they ascend at an angle of 45°, and the free portion is much shorter. The branches in both are opposite; the ovicells are unfortunately absent in each.

8. *S. mutulata,* n. sp.

Cells compressed or flattened, from side to side; sometimes angular, lower half adnate, upper half divergent, projecting like a bracket. Mouth looking directly upwards, narrow oblong, quadrangular. Ovicells aculeate, with strong widely set spines, pyriform depressed.

Hab.—Prince of Wales Channel, Torres Strait, 9 fathoms.

Colour light olive grey. Polypidom about three inches high, irregularly? branched, branches not opposite. The cells are distichous, and of a very peculiar form, but varying in some degree according to their situation. The younger (?) cells on the secondary branches are flat on the inferior or outer aspect, with two angles on each side, or are quadrangular; whilst the cells on the stems or older or fertile branches are usually rounded below, or on the outer side, and thus have only one angle on each side. The mouth varies in shape according to the cell; in the former case being a regular long rectangle, whilst in the latter it is rounded on the outer side. The ovicells are placed in a

single series on one side of the rachis, as in *S. digitalis,* but are widely different in form.

9. *S. operculata,* Linn.

Hab.—Swan Island, Banks Strait.

This species occurs in all parts of the world. It is to be carefully distinguished from *S. bispinosa,* Gray,—also an Australian and New Zealand species, but which does not occur in the present collection.

b. Cells (on the branches) secund, contiguous.

10. *S. divergens,* Lamouroux.

Cells urceolate, much contracted towards the mouth; upper half free, divergent, projecting laterally almost horizontally; mouth small elliptical, with the long axis looking directly outwards; two lateral teeth. Ovicell smooth, rounded, ovoid; oral margin not elevated.

Hab.—Swan Island, Banks Strait.

Colour light yellowish: parasitic upon a fucus. Height from $\frac{1}{4}$ to $\frac{1}{2}$ inch; simply pinnate, branches distant, regularly alternate. The stem is divided into internodes, from each of which arises a single branch. The cells on the stem are alternate.

b. Cells secund.

11. *S. trigonostoma,* n. sp.

Cells ovoid, gibbous, much contracted towards the mouth. Very small portion free, projecting forwards and outwards. Mouth looking outwards and forwards, triangular, with a short blunt tooth on the external angle. Ovicell—?

Hab.—Prince of Wales Channel, Torres Strait, 9 fathoms.

Colour very light yellowish. Polypidom simply pinnate, about two inches high: longest pinnæ about half an inch. Cells small adnate, projecting suddenly at top, and much contracted at the mouth. The mouth is of a triangular form, the longest side of the triangle being below. The cells are placed in pairs, but one is always a little higher

than the other (subalternate), and one pair is placed on each internode on the pinnæ. The stem is also indistinctly divided into internodes, from each of which a single pinna is given off alternately on opposite sides, and besides the pinnæ there are three cells on each internode, two on the side from which the pinna springs, and on the opposite side alternate in position to the other two.

12. *S. digitalis*, n. sp.

Cells digitiform, slightly curved to the front, mouth circular, looking directly upwards. Margin entire, expanded. Ovicells long-ovoid, muricate, spines numerous crowded, mouth prolonged, tubular.

Hab.—Prince of Wales Channel, Torres Strait, 9 fathoms.

Colour dark grey, almost black. Stem two to three inches high, rising either from a strong main trunk (?) or from a mass of intertwined radical tubes. Stems or branches pinnate: pinnæ or branches alternate, straight, divaricate. The cells forming a pair, are, on the branches, adnate to each other throughout their whole length. But on the stem the cells are distichous and wide apart. The ovicells are peculiar in their long flask-like form, and tubular mouth. They are placed all on one side of the rachis, generally in single file, but sometimes in pairs.

13. *S. loculosa*, n. sp.

D. distans?, Lamouroux.

Cells completely adnate to each other, each apparently divided into two compartments by a transverse constriction. Upper half turned horizontally outwards. Mouth roundish, irregular, contracted: looking outwards, and a little downwards. Ovicell— ?

Hab.—Bass Strait, 45 fathoms.

Colour deep brown; polypidom simple unbranched (?) about half an inch high, parasitic upon a broad leaved fucus. The cells are so closely conjoined as to form but one triangular body, which appears as if divided into five

loculaments by transverse constriction. The upper apparent constriction however seems merely to indicate the line of flexure of the upper part of the cell upon the lower. The form of the conjoined cells is not unlike Lamouroux's figure of *S.* (*D.*) *distans;* but the present is clearly not that species.

14. *S. unguiculata,* n. sp.

Cells urceolate, upper half free, projecting in front, and much contracted towards the mouth; elliptical, with the long axis horizontal, looking forwards aud a little outwards; two long lateral teeth, the outer the longer and usually incurved. Ovicell ovoid; mouth wide, with a much elevated, thickened border.

Hab.—Swan Island, Banks Strait, thrown on the beach.

Colour bright brown; polypidom pinnate; the stems arising from creeping radical tubes, very thickly intertwined around a long slender body. The stems are from one to four inches long, the pinnæ about $\frac{1}{4}$—$\frac{1}{2}$ inch, alternate. The rachis of the stem is divided into distinct internodes, from each of which are given off two pinnæ, and upon which are also placed usually six cells, three on either side. The pinnæ are also divided, but less distinctly, into internodes of various lengths. The pairs of cells on the *pinnæ* are all secund, and in contact with each other at their bases, though widely divergent above.

14. *S. tridentata,* n. sp.

Cells urceolate, ventricose below, contracted towards the mouth. Mouth looking forwards and outwards, circular, with three acute teeth, two lateral, longer than the third, which is above.

Hab.—Bass Strait, 45 fathoms.

Colour yellowish white. Polypidom simply pinnate, about $2\frac{1}{2}$ inches high; pinnæ in the middle $\frac{3}{4}$ of an inch. The cells are ventricose below, and almost flask-shaped.

The two lateral teeth are long, acute, and slightly everted; the upper third tooth is sharp, but not near as long as the others; the border of the mouth is as it were excavated below, so that the mouth is as nearly as possible vertical. Contrary to what is the case in *S. divergens,* but exactly as is represented in Savigny's figures of the so-called *S. disticha* (Egypt. pl. 14. fig. 2, 3.); and *S. distans* (Egypt. pl. 14. fig. 1, 3.) the lateral teeth are sloped or bevelled off from below upwards, and not from above downwards, as in *S. divergens* (Mihi.)

2. Pasythea, Lamoroux.

Cells in distinct sets, at some distance apart.

1. *P. hexodon,* n. sp.

Cells in sets of six,—three on each side; a single axillary cell in each dichotomous division of the polypidom. Ovicell pedunculate ovoid, adnate to the rachis, with a lateral opening.

Hab.—Off Cumberland Isles, 27 fathoms.

As this differs in the number of cells in each set, as well as in the form of the cells, and in the form and position of the ovicell, it appears irreconcileable with Lamouroux's *P. quadridentata.* According to the figure given of the latter the ovicell is not adnate, and is spirally grooved.

3. Plumularia, Lamarck.

a. Angiocarpeæ—ovicells enclosed in siliquose, costate receptacles.

1. *P. Huxleyi,* n. sp.

Plumularia—Huxley, Philos. Trans. Part II., 1849, p. 427. pl. 39. figs. 43 and 45.

Cells cup-shaped, shallow; mouth nearly vertical, subquadrangular, margin subcrenate, plicate; with a small acute central denticle in front, and a wide shallow notch behind. Rostrum twice as long as the cell, arising from

the rachis by a broad ventricose base, adnate the whole length of the cell, narrow upwards and slightly expanded again at the summit; lateral processes very short and wide, canalicular adnate. Costæ of ovarian receptacle numerous, each with a single branch near the bottom, and beset with small cup-like processes, and not connected by a membrane.

Hab.—Port Curtis. Off Cumberland Islands, in 27 fathoms fine grey mud.

Colour yellowish white. Polypidom about 6 inches high, rising with a single flexuose stem, which is naked at bottom, and afterwards gives off alternate branches, bifariously disposed at each angular fluxure. Branches simple, 2—3 inches long; pinnules about $\frac{1}{4}$ inch. The construction of the ovarian receptacle in the present section of the genus Plumularia is well exemplified in this species, owing to the comparative simplicity of the elements of which it is composed.

2. *P. hians*, n. sp.

Cell cup-shaped, deep, cylindrical; mouth nearly vertical; margin with three teeth on each side, the middle one the longest, acute, much expanded, the other more rounded; a wide notch posteriorly. Rostrum, arising from the rachis, as long as the cell, slender, tubular, adnate; lateral processes very small, ovarian receptacles—?

Hab.—Prince of Wales Channel, Torres Strait, in 9 fathoms.

Colour bright brown, rachis shining, very dark brown; polypidom about six inches high, simply pinnulate, pinnules about half an inch; thickly and regularly disposed, alternate.

3. *P. delicatula*, n. sp.

Cell cup-shaped, rounded, mouth at an angle of 45°; margin dentate, with two lateral teeth of equal size and a central one in front longer, all acute; entire posteriorly.

Rostrum a little longer than the cell, scarcely connected with the rachis, slender, and closely adpressed and adnate to the cell below, wide and projecting upwards; lateral processes large, rising above the margin of the cell, conical, tubular, or canalicular.

Hab.—Prince of Wales Channel, Torres Strait, in 9 fathoms.

Colour of rachis and pinnules, delicate yellowish white above; of rachis, light brown, inferiorly; polypidom about two inches high, rising in several straight simply pinnulated fronds from a common centre; pinnules ascending about $\frac{1}{4}$ inch.

4. *P. aurita*, n. sp.

Cells cup-shaped, tapering at bottom, constricted just below the top; mouth at an angle of 45°, circular; margin subcrenate, plicate, with three folds on each side, with a wide shallow notch in front and entire behind. Rostrum, slender, attenuated below, adnate up to the cell, summit contracted, tubular; lateral processes very long, expanding, rising far above the margin of the cell, conical, tubular.

Hab.—Off Cumberland Isles, 27 fathoms.

Colour bright brown; polypidom 2—3 inches high, consisting of straight pinnate fronds, pinnæ or branches not opposite, nor regularly alternate, divaricate at right-angles.

5. *P. brevirostris*, n. sp.

Cell sub-tubular, curved; mouth expanded with two equal acute teeth on each side, and a longer narrow and slightly incurved, central one in front. Rostrum small, conical, projecting, about half the length of the cell; lateral processes small, recurved at an angle, canalicular.

Hab.—Off Cumberland Isles, 27 fathoms.

Colour dirty white. In habit, and to the naked eye, very much like the last; its growth, however, appears to be longer and less regular. The difference in the cell is very great.

6. *P. ramosa*, n. sp.

Cells cup-shaped, deep, rounded at bottom; margin elevated on the sides, expanding, with four teeth on each side, the first and second in front much expanded, acute, incurved at the point; a long slender incurved central tooth in front; margin entire behind. Rostrum not continued to the rachis, adnate the whole length of the cell, wide and projecting, narrowed to the point, which is tubular, opening oblique, longer than the cell; lateral processes conical, short, tubular, closely adnate. Costæ of ovarian receptacle with short opposite tubular branches; *not* connected by a membrane.

Hab.—Swan Island, Banks Strait, thrown on the beach.

Colour greyish brown; polypidom 4—5 inches high, much branched, branches irregular, divaricate, rising in great numbers almost immediately from the mass of radical fibres. A beautiful species, and the ovarian receptacles very interesting.

7. *P. divaricata*, n. sp.

Cells cup-shaped, long, slightly contracted at bottom; mouth circular; margin sub-expanded, dentate, with three nearly equal upright teeth on each side, and a long, round pointed central tooth in front. Rostrum narrow at bottom, closely adnate, scarcely rising higher than the central tooth; lateral processes small, closely adnate.

Hab.—Bass Strait, 45 fathoms.

Colour dark brown, almost black when dry. In habit it is extremely like the preceding species, from which, however, it is quite distinct. The polypidom is five to six inches high, perhaps more; stem slender, branches long, divaricate at right angles, not opposite.

8. *P. phœnicea*, n. sp.

Cells cup-shaped, rounded, bent over in front, so that

the mouth is nearly vertical; margin with two folds, subcrenate, and with a broad, but pointed lateral lobe; entire posteriorly. Rostrum, arising solely from the cell, small, upper half free, projecting, tubular; lateral processes long, cylindrical, or tapering, free, projecting.

Hab.—Prince of Wales Channel, Torres Strait, in 9 fathoms.

Colour bright buff, many of the branches having a piebald aspect, or mottled with dark purple patches; when wetted these portions present a beautiful crimsom colour. Polypidom five to six inches high, rising with a strong, tapering, longitudinally grooved stem, which is sometimes sparingly branched, but more commonly simple. Stem and branches pinnate or bi-pinnate, the pinnæ and pinnules alternate. The latter are about $\frac{1}{4}$ inch in length.

9. *P. longicornis,* n. sp.

Cells urceolate, deep, upper half curved abruptly upon the lower, so that the mouth is vertical; margin subplicate, subcrenate, rising on each side into a broad angular lobe, entire behind, and quite free from the rachis. Rostrum, rising entirely from the cell, with a broad base, suddenly contracting into a long slender tube, which projects in front a long way from the cell; lateral processes very long, free, tubular, projecting suddenly forwards and a little upwards and outwards.

Hab.—Prince of Wales Channel, Torres Strait, 9 fathoms.

Colour pale buff. Polypidom five to six inches high, consisting of a strong straight, tapering stem, sometimes with a single ascending branch given off near the bottom; stem and branches pinnate; pinnæ $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long; alternate, and arranged with the utmost regularity, of uniform length, till near the summit, when they shorten rapidly, so as to give the polypidom a rounded truncate end. The pinnules are excessively fine and delicate, not

more than $\frac{1}{10}$ to $\frac{1}{12}$ inch long, and very closely set, so that the whole polypidom has the most exact resemblance to a beautiful silky quill feather.

10. *P. Macgillivrayi*, n. sp.

Cells campanulate, deep, rounded at bottom; margin subplicate, entire. Rostrum large, rising from the cell, adnate the whole length of, and as long as, the cell; the upper third constitutes a cup distinct from the lower portion; lateral processes adnate, wide, short, curved upwards, canalicular or tubular. Costæ of ovarian receptacle connected by a membranous expansion.

Hab.—Louisiade Archipelago, reefs at low water.

Colour bright brownish buff. Polypidom six to seven inches high, consisting of a strong central stem, giving off opposite branches, at regular intervals, and bifariously disposed. Pinnules about $\frac{1}{8}$ inch long, closely set.

b. Gymnocarpeæ—ovicels naked.

11. *P. effusa*, n. sp.

Cells urceolate; deeply emarginate posteriorly, entire in front, ventricose below; a small pedunculate infundibuliform process attached in front to the projecting portion of the rachis on a level with upper border of the cell. Ovicell—?

Hab.—Prince of Wales' Channel, Torres Strait.

Colour buff. Habit very peculiar. The polypidom rises to a height of seven or eight inches, with a long slender waving, but upright stem, which is naked inferiorly, and above gives off numerous straight or waving branches, again sub-dividing into other shorter straight ramules, about an inch long. The branches and branchlets are both pinnulated; the pinnules are not more than $\frac{1}{10}$ to $\frac{1}{12}$ inches long, extremely delicate and minute, so as in the dry state to be scarcely visible. The transition from the former section of the genus Plumularia to the present, is

well shewn, through *P. Macgillivrayi* and the present species.

12. *P. campanula*, n. sp.

Cells campanulate, border entire; lateral and anterior appendages canalicular. Branches alternate. Ovicells—?

Hab.—Bass Strait, 45 fathoms dead shells.

There appear to be two varieties of this species, or that different portions of the same polypidom may assume very different characters. The larger and probably more common form, is at first sight extremely like *P. Catharina*, but it will soon be noticed that the branches are alternate instead of opposite. The shape of the cells and their average size is precisely the same as in that species. The lateral and anterior appendages differ in form very considerably. In *P. Catharina* these organs are longer, more slender, infundibuliform, whilst in *P. campanula* they are shorter and thicker and the terminal cup is open on one side or canalicular. The ovicells might perhaps afford a more striking characteristic, but they are unfortunately wanting in all the specimens of *P. campanula*. The second variety is much slenderer, unbranched, the cells and their appendages smaller but of the same form, and the cells usually contain a mass of opaque black matter. This species is parasitic, and appears to attain a height of several inches.

FAM. IV.—CAMPANULARIADÆ.

4. Campanularia, Lamarck.

1. *C. volubilis*? Ellis.

Hab.—Prince of Wales Channel, Torres Strait.

As one or two ovicells, parasitic upon *Sertularia pristis*, are the only evidences of this species that have come under observation, some doubt as to identity of the species with the British form may be entertained.

2. *C. dumosa*, Pallas.

Hab.—Bass Strait.

Parasitic upon *Sertulariæ.* Rather more slender than the usual British form, but otherwise identical.

5. Laomedea, Lamouroux.

1. *Laomedea Torresii,* n. sp.

Cells campanulate, nearly sessile upon an incrassated collar projecting from the stem. Margin of mouth not thickened, with four shallow excavations.

Hab.—Prince of Wales Channel, Torres Strait.

Of a light brown colour, two or three inches high. At first sight it is very like *Laomedea antipathes,* Lamouroux, which occurs in New Zealand, but differs materially in its smaller size and in the four shallow emarginations of the mouth, which part in *L. antipathes* is entire and with the margin a little thickened.

Note.—Circumstances having prevented the insertion here of descriptions of new species of Lunulites (Tab. I. fig. 13—16), and a few other Zoophytes of the "Voyage of the Rattlesnake"—examined by Mr. Busk subsequently to the preceding paper having been placed in the printer's hands —I may mention that the descriptions in question will shortly be published elsewhere.—J. M'G.

END OF VOL. I.

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