THE

VOYAGE OF H.M.S. CHALLENGER.

ZOOLOGY.

SUPPLEMENTARY REPORT on the POLYZOA[1] collected by H.M.S. Challenger during the years 1873–1876. By ARTHUR W. WATERS, F.L.S., F.G.S.

INTRODUCTION.

SHORTLY after the death of Mr. George Busk, who prepared the Report on the Challenger Polyzoa, I had, through the kindness of his daughter, Miss Busk, an opportunity of examining some of the duplicate specimens, and I desire to thank her for sending me those which, from published criticism,[2] were most interesting to me. I have also to thank Mr. John Murray, the Director of the Challenger publications, for allowing me to examine the whole of the duplicate material in Edinburgh. I communicated to Mr. Murray some valuable results arising from an examination of sections of the Challenger specimens prepared by a method similar to that employed in the examination of fossil Polyzoa, and at his request I have drawn up the following supplementary notes on the Challenger species.

During my visits to the British Museum I was allowed to make a prolonged examination of the type collections. I am much indebted to Mr. Kirkpatrick, who has charge of these, for his assistance in looking at the type specimens when doubts or difficulties have since arisen during my absence from England.

The time allowed me for the preparation of these notes has been limited by Mr. Murray, and this must be my excuse for any shortcomings. Sections of decalcified portions have been made, but owing to want of time this method has not been used so

[1] The term Polyzoa is used for sake of uniformity.

[2] *Quart. Journ. Geol. Soc.*, vol. xli. p. 281, &c.

much as I could have liked; for the same reason several genera, as *Bugula*, and the whole Ctenostomata, have not been critically examined, and complete comparison with allied species in my collection has not been possible. However, I have been enabled to add particulars of various structures and organs not previously noticed. There is little doubt that Mr. Busk would have noticed many of these had he not been in very failing health during most of the time he was engaged in the preparation of his Report, which prevented him making full use of all the modern methods.

It will be best to give a short resumé of the points of chief interest dealt with in this Report, and I should place at the head the fact of a common parenchym cord surrounding the zoœcia of *Retepora columnifera* (Pl. III. fig. 10). This cord is no doubt the equivalent of what Joliet[1] calls the endosarc, but which Vigelius[2] would simply call the parenchym, and about which much has been written by Reichert, Claparède, Nitsche, Smitt, and others. In the Chilostomata, however, it has only been known inside the zoœcial cell or its connections, usually occurring near the walls, and communicating with the endosarc of the neighbouring zoœcia through the rosette plates. The position of this internal endosarc is variable, and changes at different stages of growth, so that sometimes a considerable accumulation is seen inside the walls of growing parts, and at others it is very difficult to trace it. This zoœcial parenchym occurs in a second *Retepora*, and will probably be found in others, thus opening a considerable field of investigation, and the question naturally arises as to whether the older forms had a zoarial endosarc; also speculation may be made as to its relationship with the chitinous cord of *Rhabdopleura*, and of the Gymnolæmata.

In several *Reteporæ* and some other genera there is a gland-like sac attached at each side of the oral aperture (Pl. III. figs. 12, 13), and in the avicularian chamber of *Lepralia margaritifera* there are two double gland- or sac-like bodies, which may have the same function or origin as those in *Retepora*. The late Dr. Joliet described an organ in *Pedicellina* as "organe segmentaire," and thought it was homologous with the intertentacular organ of Farre, Hincks, and Smitt; from his short description I do not see the ground for this, but think it should be studied together with the organs just mentioned.

In papers referred to elsewhere I called attention to the genus *Adeonella*, containing forms in which characters of primary importance are different. Mr. Hincks[3] refers in some detail to this, and in the main points agrees with me, but thinks that I have placed in the restricted genus some species which should be removed; but now that I have had an opportunity of examining all, they seem to form a natural group with some characters of *Adeona* on the one side, and of *Schizoporella* on the other. Although there is much that is

[1] L'Histoire naturelle des Bryozoaires des Cotes de France, *Archives de Zool. expér.*, tom. vi.

[2] Die Bryozoen gesammelt während der dritten und vierten Polarfahrt des "Willem Barents," p. 23, &c.

[3] Critical Notes on the Polyzoa, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xix. p. 150.

not understood, it seems that all in the group have small zoœcia, a bridge over the aperture ultimately forming a peristomial pore, the proximal edge of the operculum either in the form of a sinus or a wide curve; the avicularian mandibles similar, and of a type that we may call Membraniporidan; long pore tubes forming the connection both to the exterior and to the neighbouring zoœcia, in much the same way as in *Porina coronata*.

Besides the zoœcial and peristomial pores already alluded to, the pore on the front of the zoœcium may open into a separate chamber (Pl. I. fig. 5). This I first noticed in *Onchopora sinclairii*, and confirmed it by means of decalcified sections, and then found the same occurred in a few cases of allied forms. This should be studied in living specimens as the signification is not entirely clear, and it would be well to know how far post-mortem changes alter the appearance.

The signification of the "foramina," or, as it should be called, the socket of the operculum, of *Cellaria*, is now explained for the first time, and sections have thrown an entirely new light upon the *Myriozoum immersum* of Busk, in which the Schizoporellidan oral aperture is nearly at right angles to the axis of the zoarium, and thus can never be seen except when dissected either by section or decalcification, so that what Mr. Busk described as the oral aperture was only a cross section of the peristomial tube.

The structure of the ovicell of *Schizoporella* (*Gephyrophora*) *polymorpha*, Busk, is as far as I am aware unique, and is very instructive.

Three species that I came across I have been unable to identify, and consider new; besides which, fourteen additional known species are recorded, and in a few cases additions are made to the habitat. Ovicells have been seen in twenty-two cases where they were unrecognised, and the form of these and other structures has sometimes made it apparent that the generic or specific position must be altered. In many cases, however, Busk's names are used without wishing to indicate that the forms in question have found their permanent place.

Much has lately been written about classification, and some very unfortunate and premature attempts have been made at remodelling; established genera have been rechristened, and generic names given where it has been doubtful if specific were required. However, when these heroic attempts are made without facts to bear them out, they are usually ignored, and so bring their own punishment. As to my own position, I have repeatedly stated that, as far as the Chilostomata are concerned, I consider an immense advance was made when the zoœcial characters were put in the first rank, and believe that we are upon the right track; but none of us can suppose that there will not be much to alter as new facts are brought to light. We must not be satisfied merely with the shape of the operculum, but we must give special attention to the way in which it is attached and articulated, also the connection through the rosette plates[1] must be more studied; fortunately many of these characters can be deciphered in dry specimens,

[1] See *Thalamoporella labatia*, p. 13.

thus making it possible to learn much about the anatomy of fossils. It has always seemed to me that too much importance is now attached to peristomial characters, and there are several genera which clearly require modification, so that shortly revision of groups may be made by competent observers, but I do not think important results will be obtained by an attack along the whole line.

The genus *Membranipora* is now one of the largest, and no doubt contains many forms which should be removed, but it does not seem that Mr. Busk has been successful in his attempt to dismember it, since *Foveolaria elliptica* and *Foveolaria tubigera* are placed together in a new genus, and distinctive characters seem difficult to find for the groups which Mr. Busk called *Amphiblestrum*, *Foveolaria*, and *Biflustra*. Also *Membranipora galeata*, Busk, *Membranipora cervicornis*, Busk, and *Membranipora* (*Amphiblestrum*) *cristata*, Busk, are evidently very closely allied, and show that any classification placing them in different genera must be artificial.

In the paper already referred to, several points raised in Mr. Busk's Report were considered, and others were dealt with in a paper On the Use of the Avicularian Mandible,[1] &c., where I showed that "the articular process at each end of the base" of the mandible in the family Adeoneæ is not confined to that family, as supposed, but also occurs in *Membranipora*, *Cribrilina*, *Flustra*, &c. The so-called "columella" in the mandibles of certain *Celleporæ* I also showed was not distinctive of one division of *Cellepora*, or of those in the Southern hemisphere, but occurs in several European ones, and to this columella muscles are attached. In the mandibles of one *Cellepora*, called *Cellepora celosia* (in MSS.) by Busk, I find there are two columellæ, and in some species of *Diachoris* there are also two. A slight correction as to the operculum of *Schizoporella circinata* (MacGillivray) was made when describing the fossil form.[2] The opercula and mandibles of a few more species are now figured, and these chitinous appendages, which I was the first to use, are constantly of the greatest diagnostic value.

In the Journal of the Linnean Society, vol. xx. p. 275, I have dealt at some length with *Hornera* (*Idmonea*) *fissurata*, and hope shortly to describe *Cellepora columnaris* more fully from a fine New South Wales specimen, and also, in some journal or periodical, to give a fresh figure of *Supercytis tubigera*, as the series on the left-hand side are double, instead of single, and the ovicell is flattened on the front and surrounded with zoœcia.[3] There are also some species not yet recoguised, and questions not completely studied, which have to be dealt with in subsequent papers.

Except where the contrary is indicated, it may be taken that I found the specific determination made, and, I presume, in every case by Mr. Busk.

[1] *Journ. Micr. Soc.*, ser. 2, vol. v. p. 774. [2] *Quart. Journ. Geol. Soc.*, vol. xliii. p. 64. pl. viii. fig. 41.

[3] When describing the New Zealand fossil, *Supercytis digitata*, B. (*Quart. Journ. Geol. Soc.*, vol. xliii. p. 345), I made an unfortunate mistake in considering it had been found in Victoria, instead of South Australia.

Mr. J. R. Y. Goldstein[1] has described *Alysidium inornata* and *Hornera subdubia* from the Challenger dredgings, but neither are referred to by Mr. Busk. As to the second, it has seemed to me that it may be *Hydrocorallina*.

The Chilostomata were described by Mr. Busk in Vol. X. of the Challenger Reports (Zool. Chall. Exp., part xxx., 1884), and the Cyclostomata in Vol. XVII. (Zool. Chall. Exp., part l., 1886).

It will, of course, be understood that I have had in many cases but small pieces from which to make out the structure, and I am sure that any one undertaking re-examination may still find many new facts in the Challenger collections.

[1] Some new species of Bryozoa from the Marion Islands (*Trans. Roy. Soc. of Victoria*, 1881).

LIST OF SPECIES REFERRED TO IN THIS REPORT.

NOTES ON THE DESCRIPTIONS OF THE SPECIES.

Catenaria bicornis, Busk (Pl. I. fig. 1).

Catenaria bicornis, Busk, Zool. Chall. Exp., part xxx. p. 14, pl. ii. fig. 2.

Below the oral aperture there is a median band of thicker deposit about the centre of the zoœcium, turning to each side and again dividing. The perforations are placed somewhat irregularly all along the band, and there does not seem to be any pore with a different function to the others, as the term central pore might lead us to expect. There is also an elongate slit at right angles to the end of each band (see figure). The zoœcia along the central line of the colony are about twice as long, and stouter than those branching off from it. This is slightly shown in Mr. Busk's figures, but is more marked in the specimen before me.

Scrupocellaria marsupiata, Jullien.

Scrupocellaria marsupiata, Jullien, Dragages du Travailleur, Bull. Soc. Zool. de France, tom. vii. p. 507 (sep. p. 10), pl. xiii. figs. 17, 20, 1882.
Menipea clausa, Busk, Zool. Chall. Exp., part xxx. p. 20, pl. iv. fig. 5.

Jullien finding a single dorsal vibraculum on the specimens he dredged, placed them under *Scrupocellaria*, and considers that this shows that *Menipea* and *Scrupocellaria* should be united. Not having Jullien's observation in my mind when looking through the British Museum specimens, no notes were taken relating to the dorsal surface, but I since wrote to Mr. Kirkpatrick calling his attention to Jullien's paper, and he answers that "on the dorsum of two cells of *Menipea clausa* are organs I take to be vibracula."

Habitat.—Station 70, 1675 fathoms. North-west of Spain, 2018 fathoms.

Urceolipora nana, MacGillivray.

Urceolipora nana, MacGillivray, Trans. Roy. Soc. Vict., p. 2 (sep.), 1880; Zool. of Vict., dec. xi. p. 19, pl. cv. figs. 5, 7.
Calymmophora lucida, Busk, Zool. Chall. Exp., part xxx. p. 83, pl. xxxii. fig. 3.

Specimens in my possession leave no doubt as to the identity of MacGillivray's and Busk's species. Calcining shows that the wall of the ovicell is much more solid than

any other part. There seems to be considerable zoœcial differences between *Urceolipora nana* and *Urceolipora dentata*, making it doubtful whether they should be placed together, especially as the aperture is in the one case with a sinus, and in the other without.

Habitat.—Victoria; New South Wales.

Ichthyaria oculata, Busk (Pl. I. fig. 4).

Ichthyaria oculata, Busk, Zool. Chall. Exp., part xxx. p. 46, pl. xiii. fig. 7.

The ovicell consists of two very distinct layers, and the inner one is calcareous, and has an ornamentation of radiating lines, each of which is formed of what may be called fine rulings. At the side of the zoarium in the lower part there is a bundle of fine chitinous tubes, and from these chitinous radicals are given off. There is sometimes a pore on the front, though not median, which will be a cameral pore, and the species should probably be placed with *Calwellia*. The dividing membrane extends up to the pore by the side of the aperture.

Flustra cribriformis, Busk (Pl. I. fig. 10).

Carbasea cribriformis, Busk, Zool. Chall. Exp., part xxx. p. 58, pl. xxxiv. fig. 8.

In a paper on some Australian Bryozoa[1] I pointed out that a fine specimen in my possession has no radical tubes, and in those examined from Station 186, 8 fathoms, I did not see any, but the specimens from Station 188, 28 fathoms, have them abundantly. This radical tube is very wide and annulated, giving off numerous fine tubes, and it is these secondary tubes which attach themselves to the grains of sand or small shells. These secondary tubes are usually simple but sometimes divide. There is a good specimen in the British Museum from an Australian locality without these radical tubes.

Monoporella (?) *capensis*, Busk (Pl. II. figs. 16, 17; Pl. III. fig. 25).

Amphiblestrum capense, Busk, Zool. Chall. Exp., part xxx. p. 67, pl. xxiii. fig. 3.
Monoporella capensis, Waters, Quart. Journ. Geol. Soc., vol. xliii. p. 49.

A specimen sent to me from Simon's Bay is very interesting, as it throws light upon what I called strengthening plates in *Membranipora spinosa*, Quoy and Gaimard.[2] These plates form lateral chambers for the opercular muscles.

Similar chambers occur in *Membranipora spinosa*, Quoy and Gaimard, *Membranipora annulus*, Manzoni, *Membranipora cervicornis*, MacGillivray, but not so marked in *Membranipora annulus* and *Membranipora cervicornis* as in the other two.

[1] *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xx. p. 93.
[2] See *Quart. Journ. Geol. Soc.*, vol. xliii. p. 48, pl. viii. fig. 32.

Dr. Jullien[1] makes a genus *Chaperia* based on this character. He then says he does not understand the object of these plates, and asks if they can be connected with the ovicells. In his recent paper[2] he says that the plates are for the insertion of the muscles on both faces.

Of fossil forms *Cellepora odontophora*, Hagenow, *Flustrellaria incrassata*, d'Orbigny, have somewhat similar plates, and probably when looked for they will be found in other genera, but it does not seem that it is advisable to make a genus based merely on the presence of these plates.

There are two large distal rosette plates near the opercular wall of the zoœcium, and numerous communication points are spread over these plates. I consider that the nature and position of these rosette plates is of the greatest value in systematic determination, but I do not find that they are always equally important generically, and, in fact, in *Membranipora spinosa* they are small and numerous along the middle of the wall, being exactly opposite in character to those of the present species, although, according to Jullien, they must both be united under *Chaperia* on account of the muscle plates.

Foveolaria (?) *elliptica*, Busk (Pl. III. fig. 19).

Foveolaria elliptica, Busk, Zool. Chall. Exp., part xxx. p. 68, pl. xxiii. fig. 5.

Perhaps this may have to be taken as the type of a genus *Foveolaria*, which would be largely represented in the cretaceous. The greater part of the opesia is closed by the operculum. There seems nothing to take hold of in the present definition of the genus since the zoarial form is various; then as to the aperture, it is also deeply imbedded in many of the Membraniporidæ; and again the sessile avicularium of *Foveolaria falcifera* is similar to that of *Membranipora flemingii*, *Membranipora minax*, &c., and the operculum of *Foveolaria tubigera* and *Foveolaria falcifera* is of the ordinary Membraniporidan type.

The avicularian mandible is similar to that of *Membranipora tenuirostris*, Hincks.[3]

Membranipora falcifera, Busk.

Foveolaria falcifera, Busk, Zool. Chall. Exp., part xxx. p. 69, pl. xv. fig. 6.

The avicularian mandible is similar to that of *Membranipora angulosa*, and the small chitinous piece at each side of the base also occurs here.[4] In *Foveolaria tubigera*, Busk (*loc. cit.*, p. 68), the form of the zoœcium and of the avicularian mandible is Membraniporidan (Pl. II. figs. 29, 30).

[1] Remarques sur quelques espèces de Bryoz. Cheil., *Bull. Soc. Zool. de France*, tom. vi. p. 1 (sep.), 1881.
[2] Bryozoaires, Mission du Cap Horn, *Bull. Soc. Zool. de France*, tom. ix. p. 61.
[3] See *Journ. Micr. Soc.*, ser. 2, vol. v., pl. xiv. fig. 41.
[4] See *Journ. Micr. Soc.*, ser. 2, vol. v., pl. xiv. fig. 42.

Membranipora dumerilii, Audouin.

A specimen, marked *Membranipora crassimarginata*, var. *incrustans*, has the zoœcia irregularly oval-shaped, with a small triangular avicularium above each zoœcium, resembling the figure I gave of *Membranipora dumerilii*,[1] but with the ovicells somewhat narrower. There do not seem to be any vicarious avicularia.

Habitat.—Station 135A, off Inaccessible Island, Tristan da Cunha, 75 fathoms.

Membranipora umbonata, Busk, var. nov. (Pl. I. fig. 21).

There is a specimen from Station 320, 600 fathoms, growing on *Ascidia meridionalis*, which, in the shape of the zoœcium, of the peculiar erect avicularium, and the two spines, corresponds with *Membranipora umbonata*; but the calcareous granulated surface and the small ovicell differ from the typical *Membranipora umbonata*.

A small specimen of *Membranipora*, named *Membranipora galeata*, var. *furcata*, from off Marion Island, does not seem in any particular to differ from *Membranipora cervicornis*.

Electra cylindracea, Busk (Pl. I. figs. 13, 14; Pl. III. fig. 23).

Electra cylindracea, Busk, Zool. Chall. Exp., part xxx. p. 78, pl. xxxiii. fig. 2.

I was unable to understand this species from the description and figure, and it is clear that the characters were not quite correctly appreciated. The large avicularia at the base of the zoœcia form a wide tubular chamber, from the walls of which grow hollow calcareous cervicorne spines. To some avicularia there are as many as twelve such spines, and Mr. Busk mistook these for "furcate chitinous processes," which he thought grew from the base of the avicularium. The "clavate curved spines or horns" are curved in two planes, so that it would be impossible to give a satisfactory figure. The same is true (as already expressed by Mr. Busk) for the surface of the zoœcia, which is very much involved in consequence of the numerous raised spines at various levels. I have nevertheless tried to give a figure, which, in supplementing those already published, may enable the structure to be understood. It is, however, not characteristic in one particular, as the zoœcia are not usually immediately above those of the inferior row, but alternate or rather verticillate.

There are rosette plates on the opercular side of the distal wall.

It does not now fully correspond with the description of the family Electrinidæ, whereas it certainly seems to fall into the family Membraniporidæ, whether we retain a genus *Electra* or not; but as it is now seen to belong to the same group of the Membrani-

[1] *Quart. Journ. Geol. Soc.*, vol. xliii. pl. vi. fig. 4.

poridæ as *Amphiblestrum cristatum*, it would appear best to retain both in *Membranipora* until generic characters can be found for the group. *Membranipora tripunctata*, Waters,[1] belongs to the same group.

Thalamoporella steganoporoides, Goldstein (Pl. I. fig. 15).

Vincularia steganoporoides, Goldstein, Proc. Roy. Soc. Victoria, p. 6 (sep.) pl. ii. fig. 5, 1881.
Vincularia gothica, Busk, Zool. Chall. Exp., part xxx. p. 72, pl. xxiii. fig. 1.

Two out of four Challenger specimens have a small triangular avicularium at one of the lower corners of the zoœcium. In some parts these avicularia are fairly abundant, in others rare. The central arch or lip is formed, as described by Busk, through the coalescence of the basal and two lateral growths, but even when fully matured parts are calcined sutures are seen between the three processes.

The *Vincularia gothica*, d'Orbigny, is much smaller than the Challenger form, and it would be impossible from the description and figure to say whether it represents *Vincularia labiata* or *Vincularia gothica* of Busk, even if it be identical with either. *Membranipora gothica*, Busk,[2] cannot be the same as the present species on account of the different type of avicularia, and there is also the *Cellepora gothica* of Hagenow, so that it will be safer at present to retain Goldstein's specific name.

Thalamoporella labiata, Busk (Pl. I. fig. 23; Pl. II. figs. 12–15, 33).

Vincularia labiata, Busk, Zool. Chall. Exp., part xxx. p. 73, woodcut, fig. 3.

Sections prepared show the rosette plates with a very large watchglass-shaped calcareous protection on the one side. In my description of *Chorizopora brongniartii*,[3] I mentioned that the connecting tubes terminate with a convex end in the upper part of the zoœcia, but concave on the lower. Since then Vigelius[4] has figured these "halbkugelförmige Ausbuchtungen" in *Flustra*, and Levinsen[5] also gives a diagram, confirming what I have written as to the value of the characters which these rosette plates furnish in specific determination.

Dr. Jullien[6] proposes a new name "origella" for all "les bourgeons de l'endocyste," and divides them into "origelles evolutives," represented by the growths from the various rosette plates, and into "origelles abortives," representing the surface pores, and other perforations, and would like to see classification largely based upon what he calls the origella.

[1] *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xx. p. 184, pl. v. figs. 12, 18, 19, 20.
[2] *Quart. Journ. Micr. Sci.*, vol. iv. p. 176, pl. vii. figs. 5, 6, 7.
[3] *Ann. and Mag. Nat. Hist.*, ser. 5, vol. iii. p. 35.
[4] Die Bryozoen gesammelt während der dritten und vierten Polarfahrt des "Willem Barents," p. 21, &c.
[5] Bryozoer fra Kara Havet, 1886.
[6] Bryozoaires, Mission du Cap Horn, *loc. cit.*, p. 12.

I cannot accept Dr. Jullien's name origella, as I consider that he uses it for two things physiologically quite distinct, for to the rosette plates pass thin protoplasmic threads, whereas the tube pores contain a fluid with corpuscles.

With regard to the importance of "origelles evolutives" represented by the rosette plates, I am at one with Dr. Jullien, and have mentioned and figured many, both recent and fossil in my various papers, and do not consider a species is completely described until they are given. It of course often happens, especially with palæontological work, that there is not material available or in a state of preservation to admit of complete description. I have, however, made preparations of many hundred species, and find that besides the number of plates on both the lateral and distal walls, the position and shape is of value. They may be surrounded by a ridge or band, and in the plate there may be one or many points of communication. In some cases they occur in a rather long tube leading from one zoœcium to another, as, for instance, in the distal rosette plates of *Porella cervicornis*, Ellis and Solander, but I have not before come upon any with such a large projecting cover as in *Vincularia labiata*. The character of these plates should be used with others, and not overrun, and by making us more sure of our species may indirectly help us with genera, and in some cases may be generically important, but not in all.

The lip rises up to the level of the operculum which rests upon it, thus forming a Microporidan aperture, and I should prefer to call it *Micropora*, but as I suppose Mr. Hincks would place it under *Thalamoporella*, I provisionally follow him.

Besides the lip, which projects upwards, the front wall of the zoœcium is directed downwards (Pl. II. fig. 33), thus contracting the zoœcium near the aperture; in *Steganoporella neozelanica* the front wall turns some distance down into the zoœcial chamber, which has been described as divided into two chambers, but in this last species the calcareous wall again turns up to the base of the oral aperture enclosing an empty space between the fold (Pl. II. fig. 32). In *Micropora impressa*, Moll., the spaces forming the so-called pores project into the zoœcial chamber, causing a contraction at each side, but no median contraction as in the other two (Pl. II. fig. 34).

Bifaxaria submucronata, Busk (Pl. I. fig. 6; Pl. III. fig. 18).

Bifaxaria submucronata, Busk, Zool. Chall. Exp., part xxx. p. 80, pl. xiii. fig. 1.

A specimen sent to me from Station 122, 350 fathoms, has immersed ovicells, occurring as simple enlargements of the zoœcia. In pieces calcined the zoœcia somewhat separate, and then it is seen that the avicularium is at the base of the zoarium with a corresponding notch in the peristome of the zoœcium below. Mr. Busk describes the zoœcia as subcarinate, but this is from a deceptive appearance caused by the contraction of the outer membrane in drying.

I use the name *Bifaxaria* merely to indicate the species examined, but do not think

the genus will stand as at present defined, for the difference between this and *Bifaxaria lævis* seems very great, while perhaps some of the species should be added to *Urceolipora*, MacGillivray.

Bifaxaria corrugata, Busk (Pl. I. figs. 7, 8).

Bifaxaria corrugata, Busk, Zool. Chall. Exp., part xxx. p. 80, pl. xiii. fig. 3; pl. xxiv. fig. 6.

The avicularia, which are larger than indicated by Busk, belong to the zoarium above, as may be distinctly seen when calcined, since the zoœcia then separate, with the avicularia remaining at the base. There are a few large pores on the surface of the zoarium. The ovicells occur in the two opposite zoœcia, and are formed by a swelling of the superjacent zoœcia; on the front of the ovicell there is near the upper part a small area surrounded by a rim.

Bifaxaria denticulata, Busk (Pl. II. fig. 31).

Bifaxaria denticulata, Busk, Zool. Chall. Exp., part xxx. p. 82, pl. xxiv. fig. 3.

When a section is examined, a concealed ovicell just above the operculum is revealed. Zoarium rooted by numerous chitinous tubes.

Genus *Cellaria*.

It would have been well if the name *Cellaria* had been dropped long ago, but it seems that we should now consider it as established, seeing that it has been used by Smitt, Hincks, and MacGillivray, and is, in fact, generally employed; and, as pointed out by Hincks, *Cellaria fistulosa* was made the type of Lamouroux.

Mr. Busk, however, having used *Salicornaria* in his earlier works, seems to have been unable to accept a change in his last. Jullien, in his recent paper, Bryozoaires, Mission du Cap Horn, argues against using the name *Salicornaria*, but this seems like slaying the slain, and instead proposes *Melicerita* of Milne-Edwards, a change with which I am unable to agree. Dr. Pergens,[1] on the other hand, unites with the genus *Cellaria* the genus *Tubucellaria*, but this differs entirely in the form of the aperture, also in the last having a suboral pore, and to me the two genera seem widely separated. In an earlier paper Dr. Pergens[2] calls some fossils, apparently with Membraniporidan character, *Cellaria*, but among others also cites *Cellaria schreibersii*, Rss., which however has a Schizoporellidan aperture.

The peculiar shape of the aperture of *Cellaria*, fitting on to the one or two pairs of teeth, seems to be a generic character of greatest value.

[1] Pliocäne Bry. von. Rhodos, *Ann. k. k. Nat. Hof. Mus.*, Bd. ii. p. 12, 1887.

[2] Les Bryozoaires du Syst. Montien, par Meunier et Pergens, 1886 (see Cellaria Vandenbroecki. pl. i. fig. 1).

Cellaria australis, MacGillivray (Pl. II. figs. 1–4).

Cellaria fistulosa, var. *australis*, MacGillivray, Zool. of Vict., dec. v. p. 48.
Cellaria australis, MacGillivray, Trans. Roy. Soc. Vict., vol. xxi. p. 93.
Salicornaria clavata, Busk, Zool. Chall. Exp., part xxx. p. 88, pl. xii. fig. 8.
Cellaria fistulosa, var. *australis*, Hincks, Ann. and Mag. Nat. Hist., ser. 5, vol. xiii. p. 368, pl. xiv. fig. 4.

This is a very distinctly marked species, with very characteristic opercula and mandibles, well described by MacGillivray, but Busk seems to have been unaware of his later and fuller descriptions, and only refers to the earlier one.

This, being a larger species than most of the *Cellariæ*, is more favourable for studying in cross section, and some sections prepared rewarded me by showing in the clearest manner the function of what Mr. Busk calls the "foramina" of the operculum. These, instead of being as Busk supposed conical projections, are hollow sockets into which the denticles of the proximal edge of the aperture articulate.

An operculum in transverse section is shown in fig. 2. What Busk calls the granulated band is much thicker than the rest of the operculum, whereas the upper part and the "foramina" are thin.

Having worked out the signification of the lower denticles, I naturally asked, what are we to understand by the upper denticles, which occur in a few species, as *Cellaria rigida*, MacGillivray, &c., but I have not been able as distinctly to follow out the working of these, though no doubt the "branched chitinous support" is connected with them. Thus we have correlated structures, and, seeing that various fossils have these two pairs of teeth, this is of considerable importance. In *Cellaria rigida* the proximal pair of teeth are at a higher level than the distal (see fig. 5). The shape of the cover to the ovicell would seem to be specifically important. From each zoœcial chamber of the *Cellaria* a long tube arises which expands into the chamber above, and from the middle of these tubes there is a connection, of course, through a rosette plate to the zoœcia on each side. In one of the Challenger specimens the connecting chitinous tubes of a new branch follow the lines of the border of the zoœcia transversely across the zoarium forming zigzag lines.

Cellaria rigida, MacGillivray (Pl. II. figs. 5–7).

Cellaria rigida, MacGillivray, Trans. Roy. Soc. Vict., vol. xxi. p. 92, pl. i. figs. 1, 2.; Zool. of Vict., dec. xi. p. 17, pl. 105, fig. 1.
Salicornaria simplex, Busk, Zool. Chall. Exp., part xxx. p. 88, pl. xxxiii. fig. 8.

I have already referred to the shape of the teeth and to the connection from cell to cell when discussing the last species.

Melicerita atlantica, Busk (Pl. II. fig. 18).

Melicerita atlantica, Busk, Zool. Chall. Exp., part xxx. p. 96, pl. xiv. fig. 1.

There is a thickening of the calcareous wall round the ovicellular opening. There is one large distal rosette plate near the base of the wall, and two large lateral rosette plates, thus giving connection to each of the neighbouring zoœcia. This seems to be allied to several cretaceous fossils.

Melicerita (?) *dubia*, Busk (Pl. II. fig. 19; Pl. III. figs. 24 and 35).

Melicerita dubia, Busk, Zool. Chall. Exp., part xxx. p. 97, pl. xxxiii. fig. 10.

I certainly do not consider that this is *Melicerita*, but as it is difficult to say at present where it should be placed, it may be better merely to discuss it under Busk's name, though the name cannot be permanently retained, seeing that *Pustulopora dubia*, Hag., is probably *Melicerita*.

In a specimen in Edinburgh there are no avicularia, and I was only able to find two in the British Museum specimen. The operculum, which is of a Membraniporidan character, with a projecting edging over the upper part, is situated in the membrane covering the zoœcium, and has not any direct connection with the calcareous wall. There is one rosette plate in the distal wall situated near the base, and one large lateral rosette plate.

This is an interesting specimen, as there are many fossils from the chalk of this type, but I have not yet been able to identify it with any. It is related to *Eschara cymodoce*, d'Orbigny,[1] but is larger; also to *Eschara drya*,[2] and to *Eschara cyclostoma*, Hagenow.[3]

Calwellia sinclairii, Busk (Pl. I. fig. 5).

Onchophora sinclairii, Busk, Zool. Chall. Exp., part xxx. p. 103, pl. x. fig. 4.

The "lunate pore" does not open into the zoœcial cavity, but into a separate chamber. This was first perceived in the spirit specimens without making any preparations, but microtome sections showed that the thin membranous wall starts from just above the pore. The chamber is empty, and I have not found any muscles in it, whereas there are numerous muscles attached to the membrane enclosing the tentacles and stomach.

The signification of this chamber is not clear, and can only be completely studied in living specimens with the tentacles expanded; but we have now three kinds of pores on the front of the zoœcia, viz., the peristomial, the suboral opening into the body cavity, and the present, which, until we understand its meaning, we may call a cameral pore.

[1] Pal. Fr., p. 156, pl. 674, figs. 10-13.
[2] *op. cit.*, p. 168, pl. 677, figs. 7-9.
[3] Bry. Maast. Kr., p. 75, pl. ix. figs. 7, 8; pl. xii. fig. 3.

A somewhat similar structure is described by Mr. Busk in *Siphonicytara*, and they should on this account be placed, at any rate, in the same family.

Urceolipora dentata, MacGillivray, has a similar structure, and so has *Calwellia bicornis*, so far as I can judge the latter from dried specimens, leading to the conclusion that the correlation of aperture, pores, and ovicell in these species, shows that too much importance has been attached to the form of growth.

As to *Flustra bombycina*, I am in doubt; but in the British Museum specimen there is a projecting tongue (fleshy ?) projecting partly over the pore.

Habitat.—Add Station 150, 150 fathoms.

Genus *Retepora*.

Since Mr. Busk's Report was written, a paper by MacGillivray, dealing with *Retepora*, has appeared in the Zool. of Victoria, decade x., and as both were in print about the same time, there is some overlapping; so that now several of the names used in the Report are changed, and probably others will be found to be only synonyms.

Reteporæ frequently require calcining to distinguish all the structure, and by this means round dorsal avicularia have been found on several species where they were said to be absent.

As far as I am aware, the embryology of *Retepora* has never been described, and as the genus is one presenting many peculiarities, an acquaintance with its earlier stages is much to be desired.

Mr. Kirkpatrick informs me that a specimen in the British Museum, named *Retepora græffei*, Kirchenpauer, is the *Retepora producta* of Busk. As this is probably from the Museum Godeffroy, it may be the type specimen, but as the description is insufficient the name must be dropped.

The gland-like sacks found at the two sides of the aperture in many *Reteporæ* are referred to when describing the avicularia of *Lepralia margaritifera*.

Retepora tesselata, Hincks, var. *imperati*, Busk (Pl. III. figs. 7, 8, 39).

Retepora imperati, Busk, Zool. Chall. Exp., part xxx. p. 110, pl. xxvi. fig. 9.

The operculum is quite similar to that of the typical *Retepora tesselata* from Australia, and I am in doubt as to whether they should be separated as varieties. In *Retepora imperati* the avicularian chamber is stouter than in *Retepora tesselata*, and there are none of the gigantic avicularia. In some parts of the zoarium the ovicell is almost entirely immersed. In both this and the typical *Retepora tesselata* there is a minute sinus in the oral aperture. There are numerous strong calcareous radical processes; but this is not at all uncommon in the *Reteporæ*, though *Retepora columnifera* of the Challenger seems to

have been separated on that account. These rooting processes are divided by vibices, and in each division thus formed there is usually a small triangular avicularium, and also a few large pores. In section this process is seen to be composed of large chambers, the avicularian muscles only occupying a small part. The structure of the radical process of *Retepora columnifera* is identical. I have not seen *Retepora imperati* from the Mediterranean, and if it had been common at Naples should have expected it to come into my hands.

Retepora gigantea, Busk (Pl. III. fig. 6).

Retepora gigantea, Busk, Zool. Chall. Exp., part xxx. p. 114, pl. xxvi. fig. 7.

The dorsal surface has numerous small semicircular avicularia, and there are also similar ones on the front.

Retepora lata, Busk (Pl. III. figs. 9, 40).

Retepora lata, Busk, Zool. Chall. Exp., part xxx. p. 115, pl. xxvii. fig. 1.

I have for some years possessed two large specimens of this from Algoa Bay, but could not decipher the structure, as calcareous growth seems to have taken place over the anterior surface, obliterating the characters. The opercula and mandibles at once prove it to be *Retepora lata;* besides which, the extremely small fenestræ are the same, and I have also been able to see an ovicell with the vertical fissure. Besides the anterior triangular avicularia, there are small oval ones; the dorsal surface is areolated, and sometimes throws out calcareous radical processes. Sections show that in the thick dorsal walls there are the numerous empty spaces mentioned (p. 21) as occurring commonly in *Retepora*.

Retepora porcellana, MacGillivray.

Retepora porcellana, MacGillivray, Trans. Roy. Soc. Vict., vol. ix., 1869, p. 140; *op. cit.*, vol. xix. p. 289, pl. ii. fig. 9; Zool. of Vict., dec. x. p. 15; pl. 94, fig. 8; pl. 95, figs. 1–6.
Retepora robusta, Hincks, Ann. and Mag. Nat. Hist., ser. 5, vol. i. p. 359, pl. xviii. figs. 9, 10.
Retepora crassa, Busk, Zool. Chall. Exp., part xxx. p. 115, pl. xxvi. fig. 10; pl. xxvii. fig. 3.

It would seem that the avicularia may be either oval or round, as in the Challenger specimens examined, Stations 161 and 162, 33 and 38 fathoms, they are oval; while in another specimen from Victoria they are usually round, and this is also the case in a fragment from off Green Point, New South Wales. There are usually two large pores or pits on the front of the zoœcium, near the proximal end.

Habitat.—Victoria; New South Wales.

Retepora atlantica, Busk.

Retepora atlantica, Busk, Zool. Chall. Exp., part xxx. p. 116, pl. xxviii. fig. 1.

This, which I should prefer to call *Retepora marsupiata*, Smitt, has the pore placed higher up than in *Retepora fissa*, so that the characteristic groove is wanting, but the two are closely allied, and it would be well to group *Retepora atlantica*, *Retepora marsupiata*, *Retepora fissa*, &c., round *Retepora fissa*, in the same way that MacGillivray has made various varieties of *Retepora monilifera*. Many of the *Reteporæ* are specifically separated on very slight grounds.

On the dorsal surface of *Retepora atlantica* there are numerous apiculate avicularia, usually one to each vibicated area, and besides there are numerous small round avicularia.

This is abundant in the washings of the dredge between Fayal and Pico.

Retepora monilifera, MacGillivray, form *munita*, Hincks.

Retepora monilifera, var. *munita*, Hincks, Ann. and Mag. Nat. Hist., ser. 5, vol. i. p. 361, pl. xix. fig. 5.

Retepora monilifera, form *munita*, MacGillivray, Trans. Roy. Soc. Vict., vol. xx. p. 108, pl. i. fig. 3; pl. ii. fig. 3; Zool. of Vict., dec. x. p. 22, pl. 96, figs. 4, 8.

Retepora victoriensis, Busk, Zool. Chall. Exp., part xxx. p. 117, pl. xxvii. fig. 7.

The specimen examined was from Station 162, 38 to 40 fathoms, but was evidently dead when dredged, and I have therefore not been able to make a detailed comparison.

Retepora monilifera, MacGillivray, form *umbonata*, MacGillivray.

Retepora monilifera, MacGillivray, form *umbonata*, MacGillivray, Zool. of Victoria, dec. x. p. 23, pl. 97, figs. 1–3.

Retepora hirsuta, Busk, Zool. Chall. Exp., part xxx. p. 119, pl. xxvi. fig. 4.

The Challenger specimen has the ovicell strongly umbonate, and the dorsal surface has vibices, usually with a line from a fenestra to each of those surrounding it.

Retepora contortuplicata, Busk.

Retepora contortuplicata, Busk, Zool. Chall. Exp., part xxx. p. 120, pl. xxvi. fig. 2.

On the dorsal surface small round avicularia are not common, but can be seen occasionally, and on the anterior surface, besides the triangular avicularia, there are small oval ones.

Retepora columnifera, Busk (Pl. III. figs. 10, 11).

Retepora columnifera, Busk, Zool. Chall. Exp., part xxx. p. 122, pl. xxvi. fig. 5.

This species receives its name from the "solid columnar dorsal processes" by means of which it is attached, but these calcareous attachment processes are by no means

uncommon in *Retepora*, and occur well marked in *Retepora imperati*, also in *Retepora lata*, *Retepora cellulosa*, &c., and probably depend upon the character of the ground where they have grown. In the specimen of *Retepora columnifera* which I have examined, there are chitinous tubes in the interior of these dorsal processes, looking at first as if they were produced by the *Retepora*, but they are the chitinous tubes of a *Caberea* or *Scrupocellaria*, and the *Retepora* has attached itself to the *Caberea*. By such means a *Retepora* might grow to considerable dimensions over ground that was unsuitable for direct attachment.

Surrounding the zoœcia at a slight distance from the surface, is a tube which is partly filled with a cellular cord. This[1] parenchymatous cord is common to the whole zoarium, but communicates with the zoœcia by means of threads near the oral aperture, and perhaps we shall find them elsewhere. This is seen in decalcified preparations; also in sections of the calcareous structure the hollow tube which contains it is very distinct near the anterior surface, but no indication is given on the surface of such a tubular structure; however, in *Retepora couchii* it can be seen in the "slightly raised tubular border" between the zoœcia, which I described in Ann. and Mag. Nat. Hist., ser. 5, vol. iii. p. 200. When describing *Retepora couchii* I decalcified specimens without finding the explanation, but perhaps I had unsuitable material, as I now can trace it. Although I have examined a considerable number of species without finding this common zoarial cord, yet I expect that it will be found in several *Reteporæ*. Jullien[2] says that *Retepora* and *Catenicella* are for him only words representing colonial forms and not generic forms, but both these genera shows important characters independent of the colonial form; with *Retepora* Hincks has pointed out several, and I have done the same with *Catenicella*, but for *Retepora* I would now point out another. The shell structure shows lines of deposition in a distinct way, which is peculiar to the genus, and besides the shell is not continuous but encloses hollow spaces or lacunæ. This is specially marked in *Retepora lata*, and is distinct in *Retepora cellulosa*; but in pointing out fresh characters, it must not be supposed that the present boundaries of a natural group may not have to be altered with extended knowledge.

Retepora avicularis, MacGillivray.

Retepora avicularis, MacGillivray, Trans. Roy. Soc. Vict., vol. xix. p. 288, pl. ii. fig. 6; Zool. of Vict., dec. x. p. 16, pl. 94, fig. 16; pl. 95, figs. 7–11.

Retepora jacksoniensis, Busk, Zool. Chall. Exp., part xxx. p. 125, pl. xxvii. fig. 4.

In the Challenger specimens the ovicell has not been noticed, but as the other characters correspond with *Retepora avicularis*, it would seem that it is identical with that species from Victoria.

Habitat.—Victoria; New South Wales. Fossil—Mount Gambier.

[1] The specimen examined was dry.

[2] Bryozoaires, Mission du Cap Horn, p. 5.

Retepora magellensis, Busk (Pl. III. fig. 5).

Retepora magellensis, Busk, Zool. Chall. Exp., part xxx. p. 126, pl. xxxvi. fig. 20.

There is on the zoœcium, about the middle, an avicularium with semicircular mandible, and on the dorsal surface there are also similar avicularia and divisional lines. These are distinctly seen when calcined, but otherwise may be overlooked, and no doubt this accounts for Mr. Busk's description "without vibices or dorsal avicularia." This corresponds in the zoœcial characters with *Retepora simplex* of the Challenger, but that name must be dropped, as Mr. Busk had already used it in his Crag Polyzoa. As *Retepora simplex* seems to be only a slender form, I should propose that it be distinguished as *Retepora magellensis*, var. *minima*. The variety *minima* has similar oral and surface avicularia, but the zoœcia are only about half as long as those of the variety *typica*.

Turritigera stellata, Busk (Pl. I. figs. 22, 25).

Turritigera stellata, Busk, Zool. Chall. Exp., part xxx. p. 130, pl. xxiv. fig. 1.

The end of the zoœcial tube is closed by a calcareous layer, reminding us of the closure of the *Cyclostomata*. In one case there is a prolongation of the zoœcium, formed by a plain narrow tube extending beyond the circle of avicularia, in another case sections show the calcareous closure to be double, but usually it is only single. When looking at the specimen in Edinburgh, I considered that the aperture was Schizoporellidan, but the piece brought away having no opercula, I have been unable to confirm the observation.

The inflation of some of the zoœcia, referred to by Mr. Busk, is an ovicell, as may be distinctly seen in sections.

Cribrilina latimarginata, Busk (Pl. I. figs. 11, 12).

Cribrilina latimarginata, Busk, Zool. Chall. Exp., part xxx. p. 131, pl. xxii. fig. 10.

A specimen from the Edinburgh duplicates has numerous large vibracula, and they are also well preserved in a specimen which I found at the British Museum among some duplicate material, and this is the only *Cribrilina* in which vicarious vibracula are known. When the vibracula are removed, a bar is seen extending half across the "large suborbicular opening." The vibraculum has a process at one side of the base, and this is situated below the bar, with one muscle attached to it and two powerful ones higher up. I have elsewhere alluded to the unsymmetrical shape of the base of the vibracula, and to this fundamental difference between avicularia and vibracula.

I do not find the flattened borders or bands as described by Busk, but, when calcined, a thick calcareous growth is seen surrounding the area, leaving small triangular hollows where the neighbouring zoœcia meet, or nearly meet, and a thick membrane covers the whole. The ovicell is not much raised, and has a triangular mark on the front. This is

materially different from *Celleporaria radiata*, Reuss, which I hope to refigure shortly from better specimens than were available for Professor Reuss.

Jullien[1] makes this the type of a new genus, *Jolietina*, but I cannot see that the grounds he gives at all justify the creation of another genus.

Diporula hastigera, Busk (Pl. III. figs. 28, 29).

Flustramorpha hastigera, Busk, Zool. Chall. Exp., part xxx. p. 136, pl. xxi. fig. 7.

This is very closely allied to *Diporula verrucosa*, Peach, of the Mediterranean and British seas, but instead of having the branches round they are compressed, and the operculum, though similar in shape, has the thick band round the border different. The avicularian mandible[2] corresponds in these two species; and I should see no reason to speak of this as vibraculoid, since it seems that the vibracula have the base of the seta unsymmetrical, with irregular projections for the attachment of muscles, thus allowing the vibracula motions in various planes. Believing in this fundamental difference between avicularia and vibracula, it does not seem that what Mr. Hincks[3] calls a vibraculoid appendage is anything more than a lengthened mandible, if we may judge from the figure of the lower zoœcium (fig. 3).

The zoarium is ramose, with compressed dichotomous branches, rising from an expanded calcareous base, and has no chitinous tubes. It is not clear what Mr. Busk intended to include under *Flustramorpha*, since in the diagnosis of the genera he says, "lobes bordered, and loosely interconnected by chitinous tubes," which certainly does not apply to this species; but higher up on the same page he thinks it may be advisable to include in one group those "with or without the flexible stem and marginal bundles of tubes."

As this cannot come under the genus as defined by Busk, and as *Diporula* was based upon characters of importance, I have left it under *Diporula*, although believing that it will ultimately be merged in *Microporella*. This is very abundant in some washings of the dredge between Fayal and Pico, 50 to 90 fathoms.

Microporella distoma, Busk.

Lepralia distoma, Busk, Quart. Jour. Micr. Sci., vol. vi. p. 127, pl. xviii. fig. 1.
Eschara distoma, Busk, *op. cit.*, vol. vii. p. 66, pl. xxii. figs. 10–12.
Adeonella distoma, Busk, Zool. Chall. Exp., part xxx. p. 187, woodcuts, figs. 56, 57.

Habitat.—Madeira, 268 to 322 fathoms. Station 75, 450 fathoms. Washings of dredge between Fayal and Pico, 50 to 90 fathoms. Capri, 150 fathoms (A. W. W. coll.); Golfe de Gascogne (*fide* Jullien).

[1] Les Costulides, *Bull. Soc. Zool. de France*, tom. ix. p 8.

[2] The opercula and mandibles of *Diporula verrucosa*, Peach, are figured in my papers on the use of the opercula and mandibles respectively.

[3] On the Polyzoan Avicularium, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. ix. p. 23.

Mucronella canalifera, Busk (Pl. III. fig. 44).

Mucronella canalifera, Busk, Zool. Chall. Exp., part xxx. p. 159, pl. xxii. fig. 2.

There are several specimens from washings between Fayal and Pico.

The rule seems to be eight oral spines, and the lower edge of the aperture is nearly straight with two minute lateral denticles, giving the aperture the same character as that of *Cellepora albirostris*. I do not see any Mucronellidan character, and peristomial ones have never seemed to me satisfactory for generic divisions. There seems to be a relationship to *Lepralia*.

Mucronella contorta, Busk (Pl. I. fig. 24; Pl. III. fig. 30).

Mucronella contorta, Busk, Zool. Chall. Exp., part xxx. p. 155, pl. xx. fig. 9.

In the specimen from Simon's Bay there are small round avicularia replacing many of the pores. In a specimen from Algoa Bay, in my collection, these round avicularia are still more numerous, in some cases there being as many as seven to a single zoœcium. There are three distal rosette plates, and there is a round calcareous process on each side of the aperture, projecting into the interior of the zoœcium, for the support of the operculum. In my Algoa Bay specimen there are very few of the large avicularia by the side of the aperture, but there is usually a small one on each side nearer to the operculum. The operculum is very characteristic, having a thick band crossing it transversely. The "mucro" of *Mucronella* occurs in very various ways, and I cannot see that the small projection, which we may call a lip in the present case, can be used as a generic character.

It seems that *Mucronella* may with advantage be dropped, and some, as the above, be placed with *Lepralia*, and the rest mostly show affinity with *Smittia*.

Bracebridgia geometrica, Reuss.

Biflustra geometrica, Reuss, Foram. Anth. und Bryozoen des deutschen Septarienthones, Denkschr. Akad. Wiss. Wien, Bd. xxv. p. 189, Taf. vi. fig. 16.
Porella emendata, Waters, Quart. Journ. Geol. Soc., vol. xxxvii. p. 336, pl. xvii. fig. 69.
Mucronella pyriformis, Busk, Zool. Chall. Exp., part xxx. p. 155, pl. xx. fig. 5.
Bracebridgia pyriformis, MacGillivray, Trans. Roy. Soc. Victoria, vol. xxii. p. 8 (sep.), pl. ii. figs. 6, 7; Zool. of Vict., dec. xvi. p. 219, pl. 158, figs. 6–8.

In the Challenger specimens the row of pores round the edge of the zoœcium can be seen, entirely corresponding with those figured in the fossil, and in size the Australian fossil and recent are identical, though in the Challenger specimens I did not find any of the small diagonal avicularia. In one case, however, there was an appearance suggesting a broken down one. Also in the recent specimens from Victoria these avicularia are very

rare, so that in the first one examined I did not at once see any, but, recognising it as my *Porella emendata*, it was again examined with this object, and two or three only were found on a large colony, but thus the determination was confirmed.

It seems also related to *Eschara polymorpha*, Reuss, *loc. cit.*, p. 182, Taf. viii. fig. 8.

Habitat.—Victoria (MacGillivray); Port Phillip (Busk); and Station 162, 38 fathoms. Fossil—Curdies Creek (Australia); Sölligen (Oligocene).

Smittia delicatula, Busk (Pl. III. fig. 26).

Mucronella delicatula, Busk, Zool. Chall. Exp., part xxx. p. 156, pl. xviii. fig. 2.

This is a very typical *Smittia*, which might be called *Smittia trispinosa*, Johnston, var. *delicatula*. Mr. Busk speaks of the mucro being within the border of the orifice, but it is the denticle (lyrula) to which he refers; and in *Smittia* this lyrula seems always to be in front of the operculum, so that this is no exception, as Mr. Busk seems to suppose. This must have led him to place it under *Mucronella*. The ovicell is large, wide, raised, with a large area marked off, in which there are large perforations, the rest being granular.

Smittia smittiana, Busk.

Smittia smittiana, Busk, Zool. Chall. Exp., part xxx. p. 151, pl. xvii. fig. 3.
Smittia stigmatophora, Busk, *op. cit.*, p. 154, pl. xxii. fig. 6.

In the British Museum specimen of *Smittia smittiana*, named by Mr. Busk, I should call the ovicell decidedly depressed not "prominent;" in the specimen named *Smittia stigmatophora* the ovicells are also depressed, and usually have a small area in front with perforations; and it seems as if the marking with the few large pores, which Mr. Busk figured and called a stigma, only occurs in the young and undeveloped ovicells.

One of the specimens in Edinburgh, named by Mr. Busk *Smittia smittiana*, is adnate on *Vincularia*, and a specimen of typical *Smittia smittiana* which I found on *Ascidia meridionalis*, from Station 320, 600 fathoms, is also entirely adnate, showing that the "unattached" character is not constant in the same locality.

I wrote to Mr. Kirkpatrick to tell him that from my notes made in the British Museum I was convinced that *Smittia smittiana* and *Smittia stigmatophora* were synonyms, and he entirely confirmed my view, and said that the *Smittia smittiana* is of a larger build than *Smittia stigmatophora*, and he found stigma-like ovicells in *Smittia smittiana*, but this I only look upon as a stage of growth.

Lepralia mucronata, Smitt.

Escharipora mucronata, Smitt, Floridan Bryozoa, p. 24, pl. v. figs. 113–115.
Mucronella mucronata, Waters, Quart. Journ. Geol. Soc., vol. xxxvii. p. 328, pl. xvii. fig. 66; vol. xxxviii. pp. 266, 507; vol. xxxix. p. 436; vol. xli. p. 293; vol. xliii. p. 55.
Lepralia celleporoides, Busk, Zool. Chall. Exp., part xxx. p. 142, pl. xvii. fig. 4.

In Smitt's species three pores are described, whereas there is only one in the Challenger specimens, but it is often trifoliate. I have pointed out that in the fossils there are sometimes three pores, sometimes five; and the avicularia is variable in size, being in some fossils very rare. The Challenger specimens have sometimes a slight mucro. The series should perhaps be divided into the varieties *unipora*, *tripora*, and *varipora*, but it seems that the recent and the fossils from the various Australian and New Zealand localities are all closely connected.

Lepralia occlusa, Busk (Pl. III. figs. 32–34).

Escharoides occlusa, Busk, Zool. Chall. Exp., part xxx. p. 150, pl. xxi. fig. 8.

This is one of those cases where the shape of the aperture is partly Schizoporellidan, partly Lepralian. There is an avicularium at the side of the aperture, but I should hardly consider that this forms a sinal orifice, the character on which the genus *Escharoides* is based. The ovicell has an area on the front with large openings, the rest is imperforate. The specimen examined was from off Samboangan.

Lepralia japonica, Busk.

Lepralia japonica, Busk, Zool. Chall. Exp., part xxx. p. 143, pl. xvii. fig. 5.

The ovicells are hardly at all raised above the surface of the zoœcium, but are readily distinguished, as the ovicell is perforated with numerous small pores, whereas the surface of the zoœcium has few large pores.

The structure of the ovicell shows that I was wrong in supposing that this was my *Monoporella crassatina*.

Lepralia margaritifera, Quoy and Gaimard (Pl. III. figs. 15, 16).

Flustra margaritifera, Quoy and Gaimard, Voy. de l'Uranie, p. 606, pl. 92, figs. 7, 8.
Lepralia margaritifera, Busk, Brit. Mus. Cat., p. 72, pl. ci. figs. 5, 6; Zool. Chall. Exp., part xxx. p. 145; Jullien, Bryozoaires, Mission du Cap Horn, p. 58, pl. ix. fig. 1.

This is the most interesting species that I have met with in the Challenger collection, on account of a very peculiar structure occurring in the avicularian chamber. As I only brought away a small fragment with the intention of comparing the "chitinous organs," the examination is not an exhaustive one.

In the suboral avicularian chamber, near to the mandibular end, there are two curious bodies partly embracing the muscular bands. The lower and wider one appears at first sight thin, as if it were a membranous wall separating the chamber, but sections leave no doubt in my mind of its being a sac, and the walls are formed of small nucleated cells. The smaller body rests upon this, and near the centre is tubular, spreading out at each end into a small gland-like body. In dissections or sections these two bodies usually adhere together and come away with the muscles.

Above there is a mass of "endorsac," which often assumes an annular form, and threads spread out in all directions, in some cases seeming to be attached to the larger of these sacs. The presence of this mass of endorsac is usual in the avicularia of the Chilostomata, but its taking an annular form seems to have been unnoticed.[1]

As to the function of the other two bodies the problem seems a puzzle, but I do not think that they must be considered alone, for in the zoœcia of many species there is at each side of the aperture a sac-like body, which in *Retepora cellulosa* (Pl. III. figs. 12, 13) attains a considerable size, and it also occurs in *Retepora tubulata*, *Retepora denticulata*, *Retepora jacksoniensis*, *Retepora producta*, *Rhynchopora bispinosa*, and I also found a similar, but much smaller, body in the zoœcia of *Lepralia margaritifera*, and they can be seen in *Cellepora coronopus*. Ostroumoff[2] figures sacs similar to those of *Retepora cellulosa* in *Lepralia pallasiana*, calling them glands, and Haddon figures two bodies in *Flustra carbasea*,[3] but no description is given; as Professor Haddon is on the other side of the world, no answer can be received to my question for some time. In this last case the bodies (*l.c.*) are not sac-like, but may nevertheless be homologous, as in *Cellepora pertusa* from the Red Sea there are in a similar position two narrow tubular vermiform bodies (Pl. III. fig. 14). Unfortunately, the spirit has evaporated from this specimen, which was bottled some years ago for further study.

Whether these bodies are in any way to be associated with the organs described by the late Dr. Joliet[4] as segmentary organs, is a question not unnaturally suggesting itself. The nature of these organs of Joliet is left by his paper and figures somewhat doubtful, but I do not follow him in his comparisons with the intertentacular organ of Farre, Hincks, and Smitt.

Jullien, who seems to have had good material available, only gives very large figures of the polypide without any detail, and these do not differ from the generality of Chilostomatous polypides. He does not, however, show either of the structures now described.

[1] It has always seemed to me that we must look for the explanation of the function of the avicularium to this mass of parenchym, or endorsac, for the avicularia remain in activity when the polypides have all disappeared, and in this way the tissues of the colony are indirectly in communication with the surrounding water, so that oxygenation takes place, and the colony is kept alive.

[2] Ostroumoff, *Archives Slaves de Biologie*, tom. i., pl. i. fig. 17. I can at the moment refer only to the plate in the Russian copy

[3] Budding in Polyzoa, *Micr. Journ.*, vol. xxiii. p. 516, pl. xxxviii. fig. 12, *l.c.*

[4] Organe Segmentaire des Bryozoaires endoprocte, *Archives de Zool. expér.*, tom. viii. pp. 497–512, pl. xxxix.

No doubt, now that our attention is called to these bodies, we shall find them in many other cases, though I have looked through many preparations showing the organic structure without detecting them.

Porella proboscidea, Hincks, seems closely related, but differs in having the oral avicularium prolonged in a tubular manner.

Lepralia lonchæa, Busk.

Lepralia lonchæa, Busk, Zool. Chall. Exp., part xxx. p. 146, woodcut, fig. 43.

The specimen in the British Museum has ovicells, which are large, somewhat decumbent, and the lower border of the peristome encloses a sort of shelf. Avicularia placed diagonally on the side of the peristome. The general character and the ovicell would indicate that it is the same as *Lepralia vestita* of Hincks, from Tahiti; but there seems to be a difference in the operculum, which prevents my uniting them without a more complete examination.

Lepralia castanea, Busk (Pl. III. figs. 36, 37).

Mucronella castanea, Busk, Zool. Chall. Exp., part xxx. p. 157, pl. xix. fig. 6.

In most specimens the projection of the lower border of the oral aperture is not as distinct as shown in Mr. Busk's figure. A lip of this kind occurs in several cases in *Lepralia*, and the operculum indicates that it should be placed with *Lepralia*. *Mucronella* is a genus which in my opinion should be abolished, and species have been placed under it with a distinct mucro, with an avicularian chamber, with a lip, or with an internal denticle, as *Smittia delicatula*. Some seem to belong to *Lepralia*, most to *Smittia*, but even if the genus *Mucronella* be retained this could not be placed there. Specimens from Station 122, 350 fathoms, have one or more large dorsal pores, from which proceed radical tubes. The dorsal structure is just the same as that of *Lepralia dorsipora*, as radical tubes in that case also proceed from the "large oval or reniform openings."

This may be related to *Lepralia vicina*, Reuss, Foss. Bry. Œst-Ung. Mioc., Taf. vii. fig. 10.

Aspidostoma gigantea, Busk (Pl. I. figs. 16–18; Pl. III. figs. 20, 21).

Aspidostoma giganteum, Busk, Zool. Chall. Exp., part xxx. p. 161, pl. xxxiii. fig. 3, and synonyms; Jullien, Bryozoaires, Mission du Cap Horn, p. 77, pl. vi.
Micropora cavata, Waters, Quart. Journ. Geol. Soc., vol. xxxix. p. 435.

In the Challenger specimens the "penthouse-like projection" is quite distinct on the two sides, and in many cases each divides and forms a solid cervicorne process.

The avicularia in the Challenger specimens are numerous, and occur as described by Hincks; there are a few ovicells, which cannot be called elongate, but short, depressed. The ovicells open so far away from the oral aperture that it seems very problematical how the ova enter into the ovicell. The operculum has a prolongation at each lower corner, fitting into the clefts below the oral aperture. These subopercular appendages expand at the end, and become thicker both above and below, furnishing strong supports for articular attachment.

The form of the aperture is much the same as that described by Koschinsky in his genus *Rhagasostoma*.[1]

Habitat.—Patagonia; Falkland Islands. Fossil—Victoria (Australia).

Hippothoa divaricata, Lamouroux.

Hippothoa divaricata, Hincks, Brit. Mar. Polyzoa, p. 288, pl. xliv. figs. 1–4; pl. i. fig. 2 which see for synonyms.

Hippothoa divaricata, Busk, Zool. Chall. Exp., part xxx. p. 4.

Specimens from washings from dredge between Fayal and Pico, 50 to 90 fathoms, are sometimes in linear series, sometimes crowded, without showing any caudal prolongation; surface granular, with the lower lip much raised, often forming an umbo, sometimes with a peristome all round the aperture. The umbonate ovicell is not as wide as the zoœcium.

This seems to most nearly correspond with var. *abstersa*, Busk, from the Crag.

Schizoporella tenuis, Busk.

Schizoporella tenuis, Busk, Zool. Chall. Exp., part xxx. p. 165, pl. xx. fig. 10.

In the British Museum specimen from Simon's Bay there are large globose ovicells, just the same as in *Schizoporella nivea*, and, unless there has been some mistake in labelling, I am convinced that these two forms should be united under one name.

Schizoporella polymorpha, Busk (Pl. II. figs. 21–24).

Gephyrophora polymorpha, Busk, Zool. Chall. Exp., part xxx. p. 167, pl. xxxiv. fig. 2.

This does not seem to be the *Schizoporella biturrita*, Hincks (*Schizoporella tuberosa*, Reuss), as both Mr. Hincks and I thought from the description. In the Challenger specimens there is a concealed globular ovicell only attached at the ovicellular opening, and situated above the operculum. The wall of this ovicell is thin, but calcareous, and its form can be very well seen in prepared sections. Mr. Busk evidently refers to this when speaking of two compartments into which he divides the cavity of the zoœcium,

[1] Bryozoenfauna der aelt. Tertiär des sud Bayerns, p. 29, *Palæontographica*, vol. xxxii.

but it would seem that he must have examined some broken down specimens. I propose to call this a concealed ovicell, retaining the expression immersed for those which give an external indication of their presence.

The bridge between the two lateral avicularia rises up into a kind of mucro, turning, however, at right angles to the axis of the zoarium, and projecting but little over the aperture. In the specimen examined there is a semitransparent membrane covering the whole surface.

Schizoporella challengeria, n. n. (Pl. II. figs. 25–28).

Myriozoum immersum, Busk, Zool. Chall. Exp., part xxx. p. 170, pl. xxv. fig. 4.

A specimen from Station 320, 600 fathoms, shows that Mr. Busk never saw the oral aperture, and in fact it never can be seen except on a broken surface or in section, since it is placed nearly at right angles to the axis of the zoarium, instead of being parallel as usual. What Mr. Busk took for the oral aperture and figured (4 *c*) is only the lower part of the secondary orifice, and the tube leading to the avicularium projects into this immersed peristome, causing the appearance which misled Mr. Busk. This I show in section in fig. 27. Another point of very great interest is the discovery of a concealed ovicell opening into the peristomial tube (see fig. 25). Only a small fragment, however, was available for making a section, and this point should be further studied in young growing branches, but I think my interpretation will be found correct. It should, however, be noticed that the cavity is below the peristome, and not above. As *Onchopora immersa*, Haswell, would seem to be *Schizoporella*, it is requisite to change the name.

Schizoporella vitrea, MacGillivray (Pl. III. figs. 31, 46).

Lepralia vitrea, MacGillivray, Zool. of Vict., dec. iv. p. 32, pl. 38, fig. 4.
Lepralia incisa, Busk, Zool. Chall. Exp., part xxx. p. 145, woodcut, fig. 42.

There is already *Lepralia incisa*, Reuss, but the Challenger form is no doubt the *Schizoporella vitrea* of MacGillivray. In some parts of the colony the zoœcia are oblong with straight sides, in others the zoœcia may be called oval. In well-preserved parts the surface appears covered with white spots, and in the centre of each is the pore. The avicularia are acute, and not "oval." The ovicell is round, raised, but partly immersed in the zoœcium above, and with a granular surface.

Habitat.—Station 135A, off Inaccessible Island, 75 fathoms; Williamstown (Victoria).

Myriozoum marionense, Busk.

Myriozoum marionense, Busk, Zool. Chall. Exp., part xxx. p. 171, pl. xxiii. fig. 6.

Through Miss Busk's kindness, I have been able to examine specimens from three localities, and see that they are in no way similar to my *Porina* (*?*) *inversa*, as I at one

time thought. In all the specimens that I have seen the avicularia are well within the peristome, and I have not seen one in which they are erect as in Mr. Busk's figure (6 *c*).

Myriozoum truncatum has the connection from cell to cell through numerous tubes like the pore tubes on the outside of the zoarium. This would seem to be a characteristic of *Myriozoum*, and differs so much from the usual growth of Chilostomata, that I have often thought a suborder should be made for it on this account, but finding the same structure in *Porina coronata* (*Haswellia australiense* in Challenger Report) militates against that view.

Haswellia (?) *auriculata*, Busk (Pl. III. fig. 38).

Haswellia auriculata, Busk, Zool. Chall. Exp., part xxx. p. 173, pl. xxiv. fig. 10.
Porina grandipora, Waters, Quart. Journ. Geol. Soc., vol. xliii. p. 59, pl. vii. fig. 23.

In a specimen from Station 135A, 75 fathoms, the central portion of the operculum is granulated, and the muscular attachments are lower down and nearer to the centre than in *Porina coronata*. Near the base at each side there is a round thin spot, no doubt fitting on to a denticle, as explained for the opercular "foramina" of *Cellaria*. The ovicells are immersed with a thin circular area in front, but I have not seen the raised narrow fillet as figured by Mr. Busk, and in the older cells the ovicells would be overlooked if not previously noticed in the younger. I am unable to find any trace of a suboral pore, but no doubt a bridge sometimes forms a "pore." This would seem to be *Schizoporella*, but as there is already *Schizoporella auriculata*, the name will have to be changed. As, however, the operculum with the thin spot varies somewhat from most *Schizoporella*, I have provisionally retained Busk's generic name.

Since the above was written, the comparison of some specimens from New Zealand, which Miss Jelly gave me as recent *Porina* (?) *grandipora*, shows that although somewhat smaller, and the bridge much more developed than in the Challenger specimens, they are undoubtedly identical. The operculum of the New Zealand specimens, though slightly smaller, has the characters quite similar.

From washings of the dredge between Fayal and Pico there are numerous fragments of an erect cylindrical form, about 1 mm. in diameter, with few zoœcia irregularly placed. The surface is smooth and the peristome projects at each side, carrying a raised triangular avicularium. In a slender specimen a bridge is formed over the aperture, and then the zoœcial appearance is just the same as in the specimens from New Zealand. In the operculum there is a difference, as the muscular attachments are placed very high, with two dots lower down, and the proximal border forms a very obtuse angle. This form, which may be called var. *fayalensis*, also occurs off Capri.

Habitat.—Add, New Zealand. Fossil—Napier (New Zealand).

Porina coronata, Reuss, var. *labrosa*, Reuss.

Cellaria labrosa, Reuss, Foss. Polyp. Wien Tert., p. 63, pl. vii. fig. 35.
Hastellia australiensis, Busk, Zool. Chall. Exp., part xxx. p. 172, pl. xxiv. fig. 9.

In a specimen sent to me by Mr. Haswell, from Holborn Island, the entire peristome projects, whereas in the Challenger specimen it is only the proximal lip which projects. The same is the case in fossil *Cellaria labrosa* which I collected from the Val di Lonte, in the Vicentine, and from Brendola, in the Colle Berici, Northern Italy, both of Bartonian age. I hope shortly to refer more fully to these in a revision of the Italian Miocene Bryozoa, upon which I am now at work. Finding the same varieties and variations of mode of growth in the Australian seas and in the Miocene beds has largely influenced me in uniting as synonyms *Porina gracilis*, *Porina coronata*, and *Myriozoum australiense*, and has even influenced my views as to the range of other species. The opercula of the Challenger specimen have the muscular attachments in the same position as those both from Holborn Island and typical *Porina gracilis*, in all cases being about the same size.

The ovicells have not been described, but in my Holborn Island specimen the zoarium at some whorls becomes thicker, and when sections are made the ovicell is found above the peristome (Pl. II. fig. 8). These must be considered immersed ovicells, as some indication of their position is given externally. This is the same position and form as in typical *Porina gracilis*.

A further character common to both is the tubular connection from zoœcium to zoœcium. These tubes are uniform, and resemble those leading to the exterior, and in consequence there are no definite rosette plates such as we find in most Chilostomata. This is much the same structure as in *Myriozoum truncatum*, and I have elsewhere expressed the belief that this may possibly turn out to be an important classificatory character.

It will thus be seen that typical *Porina coronata* and *Porina gracilis* have three most important characters similar and very marked.

Adeonella polymorpha, Busk (Pl. II. figs. 9–11, 40).

Adeonella polymorpha, Busk, Zool. Chall. Exp., part xxx. p. 183, pl. xxi. figs. 1*a*, 2*a*, 3, 3*a* (not figs. 1, 2).

The young cells are elongate, with pores on the surface, often appearing as if in four rows; the arch is then formed with, in most cases, a small avicularium at each side of the bridge. In the oœcial cells the peristomial pore is frequently divided by a bar in front, but this is not often the case in the other cells. In this and several other particulars *Adeonella polymorpha* and *Adeonella intricaria* are similar. The older cells mostly have an elongate avicularium on a more or less raised mound.

The bridge is formed in front of the operculum, starting from each side, with the arches meeting in the middle, thus forming the pore in the peristome. The bridge and pore are formed in this same way in the group, which I maintain should be alone considered as *Adeonella*, and includes *Adeonella polymorpha*, *Adeonella platalea*, *Adeonella intricaria*, *Adeonella atlantica*, *Adeonella pectinata*, *Adeonella polystomella*—all of which I have now seen. In these cases the bridge is formed irrespective of the avicularia, whereas in *Gephyrophora polymorpha* the arch carries the large lateral avicularia. In *Adeonella polystomella*, Reuss, the arch is not as solid, and the oral sinus can be seen below, but the real structure of the bridge is similar.

None of this group have the lower margin of the oral aperture straight. This I have alluded to before, but Mr. Hincks (*op. cit.*, p. 152) says that *Adeonella intricaria* and *Adeonella pectinata* are described as having the lower margin of the orifice straight; this, however, only refers to the peristomial orifice. It should be noticed that the figures of the opercula of *Adeonella intricaria* are given upside down in the Challenger Report, as may be seen from the scale and the mandibles, but when looked at the right way they show that the lower margin is round. *Adeonella polystomella* and *Adeonella regularis* have a distinct oral sinus, but in the other cases the edge is a wide curve.

It should not be overlooked that the zoœcia of this group are all very small, and are about the same size in all the species.

Adeonella intricaria, Busk (Pl. II. fig. 39).

Adeonella intricaria, Busk, Zool. Chall. Exp., part xxx. p. 185, woodcuts, figs. 51–53, pl. xxi. fig. 2.

In the specimen sent to me from Station 190, the young cells have pores spread generally over the surface in the same way as in *Adeonella atlantica*, but they are not quite so numerous, and are larger. The small avicularium on the one side of the bridge is very seldom found on the ordinary cells, but usually occurs on the larger or oœcial cells. It is also in these larger cells that the sublabial pore becomes divided by a bar across the pore. As I have already pointed out, the opercula are figured by Busk upside down. The woodcut shows that it has been in part reversed.

In the mature, but not overgrown, cells the oral aperture can often be seen under the bridge in the same way as in *Adeonella polystomella*.

Adeonella atlantica, Busk (Pl. II. figs. 20, 37).

Adeonella atlantica, Busk, Zool. Chall. Exp., part xxx. p. 186, pl. xx. fig. 7; pl. xxi. fig. 1*b*.

The pore is placed so low down, that from an external examination it would be supposed that it opened into the zoœcial cavity, and several preparations were made

before this point was cleared up; but the one figured shows quite distinctly that the pore opens into the peristomial tube immediately above the operculum. The younger cells are without pore or avicularium, but the older ones are usually provided with two avicularia. The young cells of this, of *Adeonella intricaria*, and of *Adeonella polymorpha* are very similar as regards the surface pores.

When the zoarium is examined from the side, the zoœcia of the back and front series are seen to be opposite.

Specimen examined from Station 135c, 110 fathoms.

Adeonella (?) regularis, Busk (Pl. II. fig. 35).

Adeonella regularis, Busk, Zool. Chall. Exp., part xxx. p. 186, woodcut, fig. 55, pl. xx. fig. 2.

This differs from the other *Adeonellæ* in having very large zoœcia, and the bridge across the aperture is much more slender—in fact, it should now be called a bar. Besides the avicularia described as "above the mouth," there is very frequently one at the base of the bar, directed towards the aperture. A bar across the aperture occurs in the fossil (*Escharipora*) *ornatissima*, Stoliczka,[1] and also in (*Eschara*) *syringopora*, Reuss. (This bar was not described by Reuss, but I have it in well-preserved specimens from the Miocene of Italy.)

The oral aperture has a narrow sinus, and the tongue of the operculum is very marked, not being quite in the same plane as the disk of the operculum, but is not separated as in *Schizoporella cecilii*, Audouin. I have not found any mandibles with the trident-shaped basis figured by Busk.

The general appearance reminds us of *Gephyrophora polymorpha*, and it is by no means easy to know where it should be placed, and my judgment would be to call it *Schizoporella*.

Cellepora pustulata, Busk (Pl. III. fig. 1).

Cellepora pustulata, Busk, Zool. Chall. Exp., part xxx. p. 200, pl. xxviii. fig. 8.

The ovicell is small and recumbent, and on the front, near the opening, has a thin semicircular area. A similar small semicircular mark occurs on the ovicells of many *Celleporæ*, among others, on *Cellepora ansata*, Busk; *Cellepora catonensis*, Busk; *Cellepora bicornis*, Busk. The operculum does not close the ovicell, and shows that the oral aperture is emarginate, and not clithridiate.

[1] Olig Bry. von Latdorf, *Sitzungsb. d. k. preuss. Akad. d. Wiss.*, Bd. xlv. p. 86, Taf. ii. fig. 7.

Cellepora megasoma, MacGillivray.

? Lepralia megasoma, MacGillivray, Zool. of Vict., dec. iv. p. 33, pl. 38, fig. 5.
Cellepora megasoma, MacGillivray, Trans. Roy. Soc. Vict., vol. xxi. p. 115, pl. iii. fig. 5; Zool. of Vict., dec. xv. p. 183, pl. 148, fig. 1.
Cellepora cylindriformis, Busk, Zool. Chall. Exp., part xxx. p. 201, pl. xxx. fig. 9; pl. xxxvi. fig. 9.

An unnamed specimen from Station 142, which I brought from Edinburgh, is the *Cellepora cylindriformis* of Busk, and at first incrusts a piece of seaweed, and then grows free in a cylindrical form.

Habitat.—Station 142, 150 fathoms; and Port Phillip Heads (MacGillivray).

Cellepora pumicosa, Busk (*non* L.), var. *eatonensis*, Busk.

Cellepora eatonensis, Busk, Zool. Chall. Exp., part xxx. p. 201, pl. xxix. figs. 4, 6, 8; pl. xxxvi. figs. 3, 4, 5.

This differs but slightly from the European *Cellepora pumicosa*; the avicularium is round instead of triangular. The ovicell is globular, in older cells immersed, and has the small semicircular mark already alluded to.

Named specimens from Station 315, 12 fathoms, and unnamed ones from Station 149, 20 fathoms, examined.

Cellepora bicornis, Busk.

Cellepora bicornis, Busk, Zool. Chall. Exp., part xxx. p. 202, pl. xxx. figs. 1, 12; pl. xxxvi. figs. 13, 15.

This I found on *Cellaria* from Station 151, 75 fathoms. Both in this and in specimens from Marion Island, in the Challenger Office, the ovicell has a small semicircular flattened area. It is probable that some of the other Challenger *Celleporæ* will be found to be identical with this, and perhaps that it has already been described by MacGillivray.

Cellepora conica, Busk.

Cellepora conica, Busk, Zool. Chall. Exp., part xxx. p. 203, pl. xxviii. fig. 10; pl. xxxvi. figs. 1, 2.

Upon making preparations of the chitinous elements of a small cylindrical piece brought from Edinburgh, which Mr. Busk had named *Cellepora simonensis*, the correspondence with the very characteristic elements of *Cellepora conica* was apparent, and it was clear that *Cellepora conica* may also grow as a solid cylindrical branching form. This shows how artificial are the divisions instituted by Mr. Busk, based on the form of the zoarium, and misled even Mr. Busk himself. The orifice is somewhat

depressed, with usually a small raised avicularium at each side, and sometimes another one above the aperture. There are numerous vicarious spatulate avicularia, and the numerous globose ovicells are punctured; in the young cells they are much raised, but in the older ones immersed. Mr. Busk thinks that this may be the *Cellepora avicularis* of Smitt, but the shape of the oral aperture is quite different, as may be seen in Smitt's Floridan Bryozoa, pl. ix. fig. 197, and in my Bryozoa of Naples, pl. xiv. fig. 8.

Habitat.—Simon's Bay, Cape of Good Hope.

Cellepora armata, Hincks, var. *erecta*, nov. (Pl. III. figs. 4, 41–43).

The zoœcial characters are the same as in the European forms, which, however, are adnate, whereas the Challenger one is cylindrical. There is a distinct sinus in the aperture, and by the side are situated long tubular processes, with a triangular avicularium at the end.

Cellepora hastigera has similar long rostral avicularia, but the shape of the aperture is of a different type.

Habitat.—Station 308, 175 fathoms.

In *Cellepora honolulensis*, Busk,[1] and *Cellepora mamillata*, var. *atlantica*, Busk,[2] the ovicell is only an open hood. *Cellepora bilabiata*, Busk,[3] has radiating pores round the border of the area of the ovicell.

Palmicellaria skenei, Ellis and Solander.

Millepora skenei, Ellis and Solander, Zoophytes, p. 135.
Palmicellaria skenei, Hincks, Brit. Mar. Poly., p. 379, pl. lii. figs. 1–4, which see for synonyms, and add *Cellepora tridens*, Kirchenpauer, Untersuchungs-Fahrt. der Pommerania, p. 188, figs. *a* and *b*.

The specimen from Station 49 may be considered as the var. *tridens* of Kirchenpauer. The name was used independently by Mr. Busk. There are three avicularia rising above the aperture, and sometimes a fourth. The mandibles are similar to the typical *Palmicellaria skenei*, but are much smaller.

Habitat.—Station 49, 85 fathoms.

Cupularia canariensis, Busk (Pl. III. fig. 2).

Cupularia canariensis, Busk, Quart. Journ. Micr. Soc., vol. vii. p. 66, pl. xxiii. figs. 6–9.
For synonyms see Waters, Bryozoa from New South Wales, Ann. and Mag. Nat. Hist., ser. 5, vol. xx. p. 201.

An unnamed specimen from off Bahia, 10 to 80 fathoms, has the zoarium orbicular,

[1] *Zool. Chall. Exp.*, part xxx. p. 195. [2] *loc. cit.*, p. 199. [3] *loc. cit.*, p. 203.

depressed, about 6 mm. in diameter. Area oval, with the sides sloping steeply down, but not forming a lamina. The membranous portion of the front wall projects, with the opercular aperture at the end; and the opercular opening exhibits very different shapes, according to the position, but usually like fig. 2, though I have found some like the aperture of *Cupularia monotrema*, as figured by Mr. Busk.[1] The vibracular opening has on one side a distinct auricular projection. Dorsal surface with concentric sulci with cross divisions, and usually one large pore in the centre of the area thus formed, but in parts of the zoarium there are several pores in one of these areas. The membrane covering the dorsal surface does not show any trace of these pores. This is a somewhat surprising fact, as in the Chilostomata generally the position of the pore tubes is distinctly shown on the covering membrane.

The resemblance to *Cupularia monotrema*, as described by Busk from the same locality, is evident, but *Cupularia canariensis* has no avicularia. The examination of *Cupularia monotrema* does not seem to have been sufficient for us to be quite sure as to its position. I therefore wrote to Mr. Kirkpatrick, after examination of the specimen brought from Edinburgh, telling him what I had noticed; and in reply he says—"Calcination of a fragment of *Cupularia monotrema* reveals its specific identity with *Cupularia canariensis*. The avicularian cells (the only point of difference between the two species) have orifices similarly shaped to those of the vibracula, and the mandibles are vibraculoid. In shape of zoœcium, of lamina, dorsal surface, and in character of operculum, the two species resemble each other."

Mr. Busk says that the distinction between *Cupularia canariensis* and *Cupularia guineensis* is sufficiently obvious; but I must confess to not understanding upon what characters they are separated, and still adhere to the opinion elsewhere expressed, that they are synonymous.

Habitat.—Off Bahia, 10 to 80 fathoms; Canaries; Madeira; Florida; New Guinea; Torres Strait; Philippine Islands, North-East Australia; Coast of Liberia 38 metres (specimen sent by Jullien). Fossil—Miocene and Pliocene of Europe; Aldinga, South Australia.

Selenaria maculata, Busk (Pl. III. fig. 3).

Selenaria maculata, Busk, Cat. Mar. Polyzoa, p. 101, pl. cxvii.; Waters, Quart. Journ. Geol. Soc., vol. xxxix. p. 440, pl. xii. figs. 7, 9, 12; *ib.*, vol. xli. p. 309; Ann. and Mag. Nat. Hist., ser. 5, vol. xx. p. 201; Haswell, Polyzoa from the Queensland Coast, p. 42.

I found three unnamed species from off Port Jackson, 30 to 35 fathoms. In the central cells the lower half of the oral aperture is closed by a calcareous cover.

The membrane covering the front of the zoœcium has "trabeculæ" surrounding the

[1] *Zool. Chall. Exp.*, part xxx., pl. xiv. fig. 5.

operculum, and in this character resembles *Cellaria*. The vibraculum has an articular caput, and has various projections for the attachment of muscles, but the shape will best be understood from the figure.

The dorsal surface shows the pores stellate, or, perhaps more correctly, there are tubercles round the pores, giving a stellate appearance.

Habitat.—Port Jackson, 30 to 35 fathoms; Holborn Island and Barnard Island, Australia. Fossil—Victoria and South Australia.

Farciminaria biseriata, n. sp. (Pl. I. figs. 2, 3).

This I found from Station 122 growing on *Bifaxaria corrugata*, and afterwards another small specimen growing on *Kinetoskias*. The zoarium is erect, attached by horny tubes, and in the larger specimen the zoœcia are distinctly in pairs and opposite, whereas in the smaller one they must be called alternate, with the zoœcia facing in two directions; the sides of the zoœcia are much raised above the flat central part, which is in the same plane as the operculum. The surface is distinctly granulated, with the granulations very marked at the edges. The oral aperture is rounded above and straight below, with a calcareous bar at the base, formed by a thickening of the wall, and on this bar there are two minute knobs or denticles.

The horny tubes usually arise from the front of the zoœcium, but the position is not constant.

It is difficult to see where this should be placed, and the description of *Farciminaria* would require enlarging to receive it, as there is more calcareous matter in it than is usual, and the arrangement of the zoœcia is different; but these are not characters of sufficient importance to justify a new genus, and I therefore place it provisionally with *Farciminaria*.

Habitat.—Station 122, lat. 9° 5′ S., long. 34° 50′ W.; 350 fathoms. Red mud.

Flustra separata, n. sp. (Pl. I. fig. 9).

The zoarium appears to be broadly lobate, and the two layers are only attached at the border of the zoarium, so that if the outside zoœcia are cut through the whole separates like two sheets of paper.

The zoœcia are oval without any spines, and they are sometimes replaced by large vicarious avicularia, closed by large spatulate mandibles, having two strong chitinous ridges starting from near the distal end, and curving out to the proximal corners.

There are on the distal wall 5 to 6 small rosette plates.

In some cells a small digitiform process hangs down inside from near the aperture, and expands at the end in three or four globular projections. This is seen to be the

remains of a former polypide, and the position so high up is peculiar. There are no ovicells in the specimen examined.

Habitat.—Station 49, lat. 43° 3′ N., long. 63° 39′ W.; 85 fathoms. Gravel, stones.

Porina proboscidea, n. sp. (Pl. I. figs. 19, 20).

The zoarium is formed of cylindrical branches nearly in one plane, and bifurcating at a small angle, with zoœcia only opening on the one side of the zoarium. The zoœcia are often much prolonged, and widen out at the extremity, and frequently there are on this projecting zoœcial tube either ridges or spinous processes. Below the middle of the zoœcium there is a suboral pore with a tubular projection.

There are small round or nearly round avicularia, both on the anterior and posterior surfaces, and these are usually on the same transverse line as the suboral pore. There are also non-avicularian pits. The ovicell usually occurs near a bifurcation, almost entirely immersed with large pores on the surface.

The appearance of the zoarium reminds us of *Filisparsa*, whereas the zoœcial characters are very similar to those of *Porina coronata*, and I believe this is the first time that *Porina* has been met with having the zoœcia only on the one face.

The projecting zoœcia reminding us of *Entalophora proboscidea*, suggested the same specific name which appropriately describes the projecting zoœcia.

Habitat.—Station 23, off St. Thomas, 450 fathoms. Pteropod ooze.

I do not know where to place a small specimen from Station 320 (Pl. III. fig. 47). The zoarium is slender, cylindrical, branched, attached by means of a bundle of radical fibres. Zoœcia completely immersed, and the aperture also immersed, with a small triangular avicularium at the proximal edge. Surface with elongate pores. This in growth and general character is the same as *Bifaxaria abyssicola*, but has no large avicularia, and the zoœcia are on all sides of the zoarium, though more abundant on what we may in consequence call the front.

In *Lepralia bisinuata*, Smitt, the double sinus is only peristomial, and the lower edge of the operculum is straight.

In *Schizoporella jacksoniensis*, Busk, the ovicells are immersed, and the ovicelligerous zoœcia have the oral aperture wider than the other zoœcia.

Microporella coscinopora, var. *armata*, Waters, occurs from Station 162, off

Micropora coreacea, Esper, *Lepralia pertusa*, Esper, *Schizoporella auriculata*, Hassall, *Cellepora costazii*, Audouin, *Entalophora clavata*, Busk.

Escharoides verruculata, Busk.[1] I do not think this is the *Chorizopora verruculata* of Smitt, but believe that it is the *Rhynchopora profunda*, MacGillivray, but there was not material for further study. It has a large internal denticle placed diagonally.

Cribrilina monoceros, Busk, add Station 320, 600 fathoms.

Frondipora verrucosa, Lamouroux.

Madrepore rameux, &c., Marsigli, Hist. Phys. de la Mer, p. 150, pl. xxxiv. figs. 165, 166.
Krustensterna verrucosa, Lamouroux, Expos. Méth., p. 41, pl. lxxiv. figs. 10–13 (juv.), pl. xxvi. fig. 5.
Frondipora reticulata, Blainv., Man. d'Actin., p. 406, pl. lxix. fig. 1; Smitt, Öfversigt. k. Vetensk. Akad. Förhandl., vol. xxiii. 1866, p. 407, var. α and β; Busk, Mar. Polyz., part iii. p. 38, pl. xxi.; A. Milne-Edwards, Arch. des Missions Scient. et Litt., ser. 3me, vol. ix. p. 22.
Frondipora verrucosa, Busk, *loc. cit.*, p. 39; Waters, Ann. and Mag. Nat. Hist., ser. 5, vol. iii. p. 279, pl. xxiv. figs. 1–7.
Frondipora marsillii, Mich., Icon. Zooph., p. 68, pl. xiv. fig. 4; Pergens, Plioc. Bry. von Rhodos. Ann. Nat. Hist. Hofmuseums, vol. ii. p. 11, pl. i. fig. 3, 4.

Specimens in Edinburgh from Station 135c, marked *Fasciculipora ramosa*, are most undoubted *Frondipora*, spreading out for some inches with nearly round branches, frequently dichotomising, and often anastomosing, but also sometimes throwing out thin connecting bars from neighbouring branches.

From the specimens examined in the Mediterranean, I still adhere to my opinion that *Frondipora reticulata* and *Frondipora verrucosa* are undoubtedly the same, but as pointed out and shown in my figures (*loc. cit.*, figs. 4–6), the young colonies are in some stages much like the *Fasciculipora ramosa* of Busk. Although from Nightingale Island and marked *Frondipora ramosa*, I should presume these specimens have not been critically examined, and that the description has slipped in from some others.

Habitat.—Station 135c, off Nightingale Island, 110 fathoms; Mediterranean. Fossil —Pliocene of Sicily (A. W. coll.); Rhodes (P.).

Idmonea bifrons, Waters.

Idmonea bifrons, Waters, Quart. Journ. Geol. Soc., vol. xl. p. 685, pl. xxx. figs. 10, 11.

The zoarium is nearly cylindrical, but slightly compressed laterally, about 1·5 mm. in diameter, with 6 to 10 zoœcia on each side of an anterior and dorsal median line;

[1] *Zool. Chall. Exp.*, part xxx. p. 150.

sometimes the row of zoœcia is continuous, but often more or less interrupted at the side, in which case it has the appearance of two *Idmoneæ* joined back to back. This has been found fossil, and sometimes called *Idmonea disticha*, but as "*Retepora disticha*" of Goldfuss apparently relates to two or three species, and as there has been much confusion in the use of the specific term *disticha*, I found it necessary to rechristen it; and although Dr. Pergens has since called it *Idmonea disticha*, the reasons already given seem to justify the new name.

Habitat.—Washings of dredge between Fayal and Pico, 50 to 90 fathoms; abundant.

Defrancia striatula, Busk (Pl. III. fig. 45).

Defrancia striatula, Busk, Crag Polyzoa, p. 117, pl. xvii. fig. 5.

Zoarium stipitate. Zoœcia in much elevated, bi-multiserial rays starting from near the centre and extending to the margin of the cup. Central portion and interspaces without cancelli; opening of the ovicell infundibuliform between two of the rays, but the inflation is so very slight, that it would pass unnoticed except for the opening. Dorsal surface divided into subhexagonal divisions, the peduncle longitudinally ridged.

In appearance this resembles *Defrancia lucernaria*, Sars, but differs in not having the central portion cancellate. It is also much like *Tubulipora brongniartii*, M. Ed. and Manzoni, and also like *Pelagia insignis*, Mich., but we are yet much in the dark concerning the classification of such forms, so that it is difficult to know whether we should place it with *Tubulipora* or *Defrancia*.

Habitat.—Washings from dredge between Fayal and Pico, 50 to 90 fathoms. Fossil —Coralline Crag.

Lichenopora holdsworthii, Busk, occurs from Station 142, 150 fathoms, on *Adeonella regularis*.

Idmonea atlantica, Forbes, add Station 49, 85 fathoms.

PLATE I.

Diam.

Fig. 1. *Catenaria bicornis*, Busk, ... × 85

Figs. 2, 3. *Farciminaria biseriata*, n. sp., ... × 25

Fig. 4. *Ichthyaria oculata*, Busk; the lower part shows the lateral chitinous growth, . . × 25

Fig. 5. Section of *Calwellia sinclairii*, Busk; showing the membrane dividing the zoœcia, . . × 25

Fig. 6. *Bifaxaria submucronata*, Busk; the lower part is calcined, the upper part showing the ovicells is not, ... × 12

Fig. 7. *Bifaxaria corrugata*, Busk; showing the ovicells and avicularia as seen laterally, . . × 25

Fig. 8. *Bifaxaria corrugata*, Busk; ovicell from the front, ... × 25

Fig. 9. *Flustra separata*, n. sp.; the left hand avicularium is shown open, the right closed, . × 25

Fig. 10. *Flustra cribriformis*, Busk; showing the radical attachment, and from the cells on the right the upper wall has been removed to show the basal wall, ... × 12

Fig. 11. *Cribrilina latimarginata*, Busk, ... × 25

Fig. 12. *Cribrilina latimarginata*, Busk; base of vibraculum, ... × 150

Fig. 13. *Electra cylindracea*, Busk, ... × 25

Fig. 14. *Electra cylindracea*, Busk; transverse section, ... × 25

Fig. 15. *Thalamoporella steganoporoides*, Goldstein; calcined, ... × 25

Fig. 16. *Aspidostoma gigantea*, Busk; cervicorne processes seen from the side.

Fig. 17. *Aspidostoma gigantea*, Busk, ... × 12

Fig. 18. *Aspidostoma gigantea*, Busk, ... × 25

Fig. 19. *Porina proboscidea*, n. sp.; anterior surface, ... × 25

Fig. 20. *Porina proboscidea*, n. sp.; dorsal surface, ... × 12

Fig. 21. *Membranipora umbonata*, Busk, var., ... × 25

Fig. 22. Section of *Turritigera stellata*, Busk; showing the ovicells, ... × 25

Fig. 23. *Thalamoporella labiata*, Busk; calcined, ... × 25

Fig. 24. *Mucronella contorta*, Busk, ... × 25

Fig. 25. *Turritigera stellata*, Busk, ... × 25

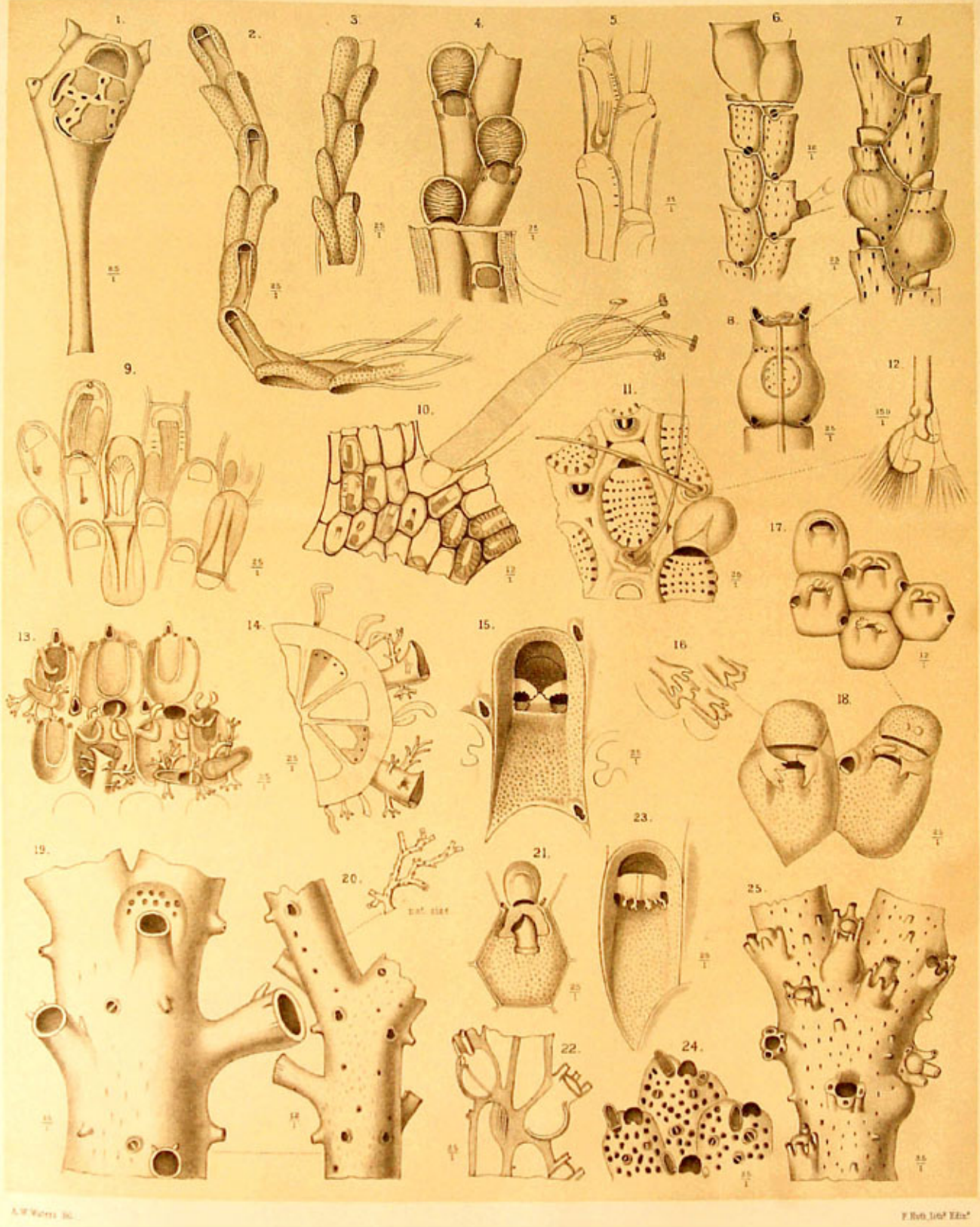
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PLATE II.

Diam.

Fig. 1. Transverse section of *Cellaria australis*, MacGillivray; showing the opercula *in situ*, and also the distal rosette plates, ... × 25

Fig. 2. *Cellaria australis*, MacGillivray; section of operculum as seen in fig. 1, showing the denticles in the sockets, ... × 250

Fig. 3. *Cellaria australis*, MacGillivray; distal rosette plates, ... × 250

Fig. 4. *Cellaria australis*, MacGillivray; outer membranous layer decalcified, showing operculum and ovicellular cover *in situ*, ... × 85

Fig. 5. *Cellaria rigida*, MacGillivray; section showing the denticles, an ovicell, and the pore tubes, . . × 85

Fig. 6. *Cellaria rigida*, MacGillivray; longitudinal calcareous section at a lower level than fig. 7, . . × 50

Fig. 7. *Cellaria rigida*, MacGillivray; longitudinal calcareous section cut near the surface showing the pores, × 85

Fig. 8. *Porina coronata*, Reuss (sent as *Myriozoum australiense* by Haswell from Holborn Island); section showing the ovicells, ... × 25

Fig. 9. *Adeonella polymorpha*, Busk; young cells, the lower one showing the commencement of the bridge, . × 85

Fig. 10. *Adeonella polymorpha*, Busk; ovicelligerous cell with double pore, ... × 85

Fig. 11. *Adeonella polymorpha*, Busk; with bridge forming a peristomial pore, ... × 85

Fig. 12. *Thalamoporella labiata*, Busk; calcareous section diagonally through a zoœcium, thus showing the projecting rosette plates, ... × 25

Fig. 13. *Thalamoporella labiata*, Busk; diagrammatical section showing the position of the rosette plates.

Fig. 14. *Thalamoporella labiata*, Busk; transverse section, ... × 25

Fig. 15. *Thalamoporella labiata*, Busk; section through the rosette plate, ... × 250

Fig. 16. *Monoporella capense*, Busk; showing lamina for the muscular attachments and also distal rosette plates, × 25

Fig. 17. *Monoporella capense*, Busk; distal rosette plate, ... × 250

Fig. 18. *Melicerita atlantica*, Busk; longitudinal section showing the position of the ovicell, . . . × 12

Fig. 19. *Melicerita dubia*, Busk; diagrammatic transverse section, ... × 12

Fig. 20. *Adeonella atlantica*, Busk; longitudinal section showing the position of the peristomial pore, . . × 25

Fig. 21. *Schizoporella polymorpha*, Busk, ... × 25

Fig. 22. *Schizoporella polymorpha*, Busk; section showing the peristomial aperture, with the operculum *in situ*, and also an ovicell in section, ... × 25

Fig. 23. *Schizoporella polymorpha*, Busk; diagrammatic longitudinal section, ... × 4

Fig. 24. *Schizoporella polymorpha*, Busk; operculum, ... × 85

Fig. 25. *Schizoporella challengeria*, n. n.; showing the position of the operculum and a cavity below the peristome (probably an ovicell), ... × 25

Fig. 26. *Schizoporella challengeria*, n. n.; diagrammatic section of zoarium, ... × 3

Fig. 27. *Schizoporella challengeria*, n. n.; section through the peristomial aperture, showing the tube leading to the avicularium, ... × 85

Fig. 28. *Schizoporella challengeria*, n. n.; operculum, ... × 85

Fig. 29. *Membranipora tubigera*, Busk; transverse section, ... × 25

Fig. 30. *Membranipora tubigera*, Busk; longitudinal section showing avicularian chamber and rosette plates, . × 25

Fig. 31. *Bifaxaria denticulata*, Busk; longitudinal section showing the ovicell above the oral aperture, . × 25

Fig. 32. *Steganoporella neozelanica*, Busk; longitudinal section, ... × 25

Fig. 33. *Thalamoporella labiata*, Busk; longitudinal section, ... × 12

Fig. 34. *Micropora impressa*, Moll; longitudinal section, from Naples, ... × 25

Fig. 35. *Adeonell (?) regularis*, Busk; operculum, ... × 85

Fig. 36. *Adeonella polystomella*, Reuss; operculum, ... × 85

Fig. 37. *Adeonella atlantica*, Busk; operculum, ... × 85

Fig. 38. *Adeonella platalea*, Busk; operculum, ... × 85

Fig. 39. *Adeonella intricaria*, Busk; operculum, ... × 85

Fig. 40. *Adeonella polymorpha*, Busk; operculum, ... × 85

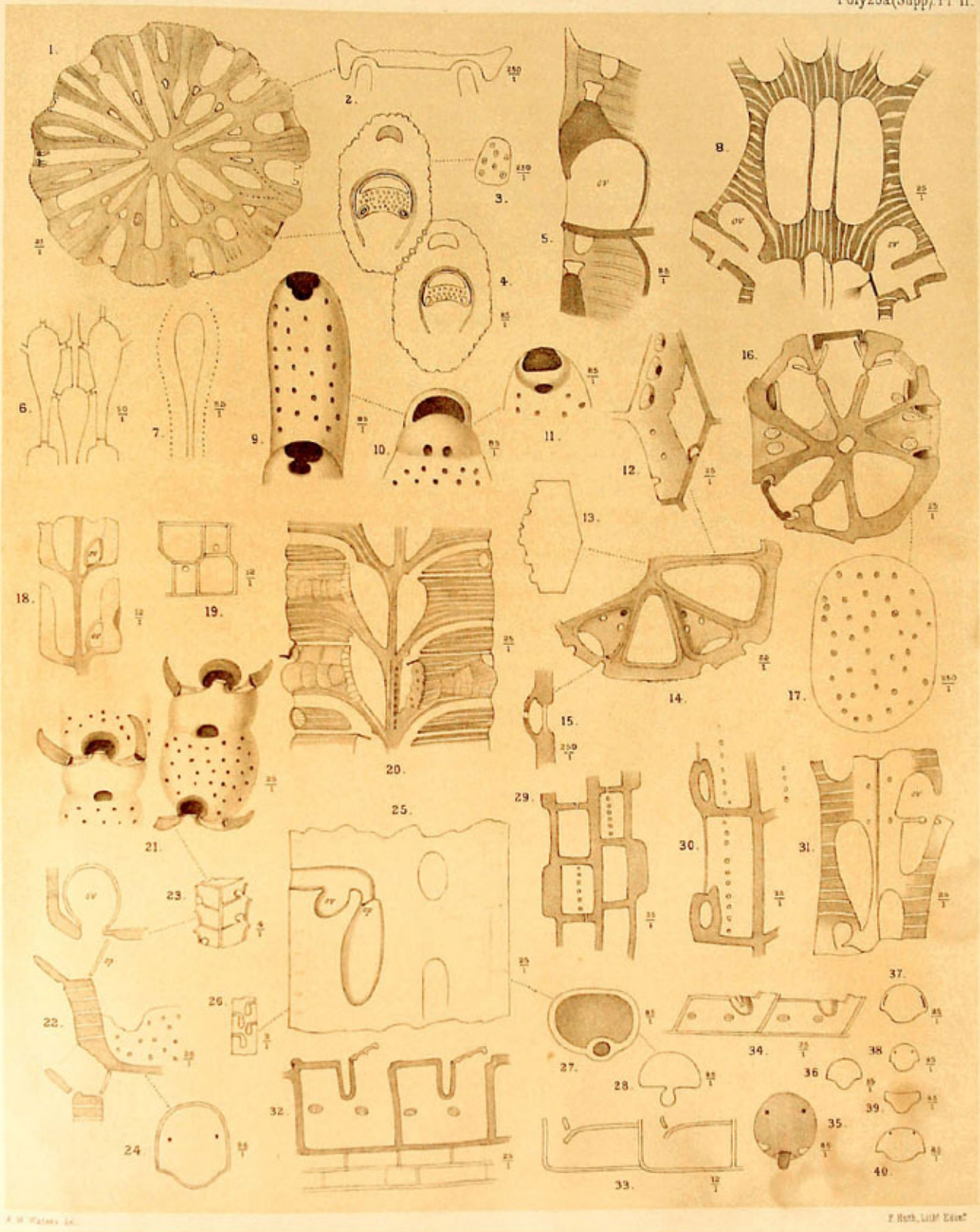
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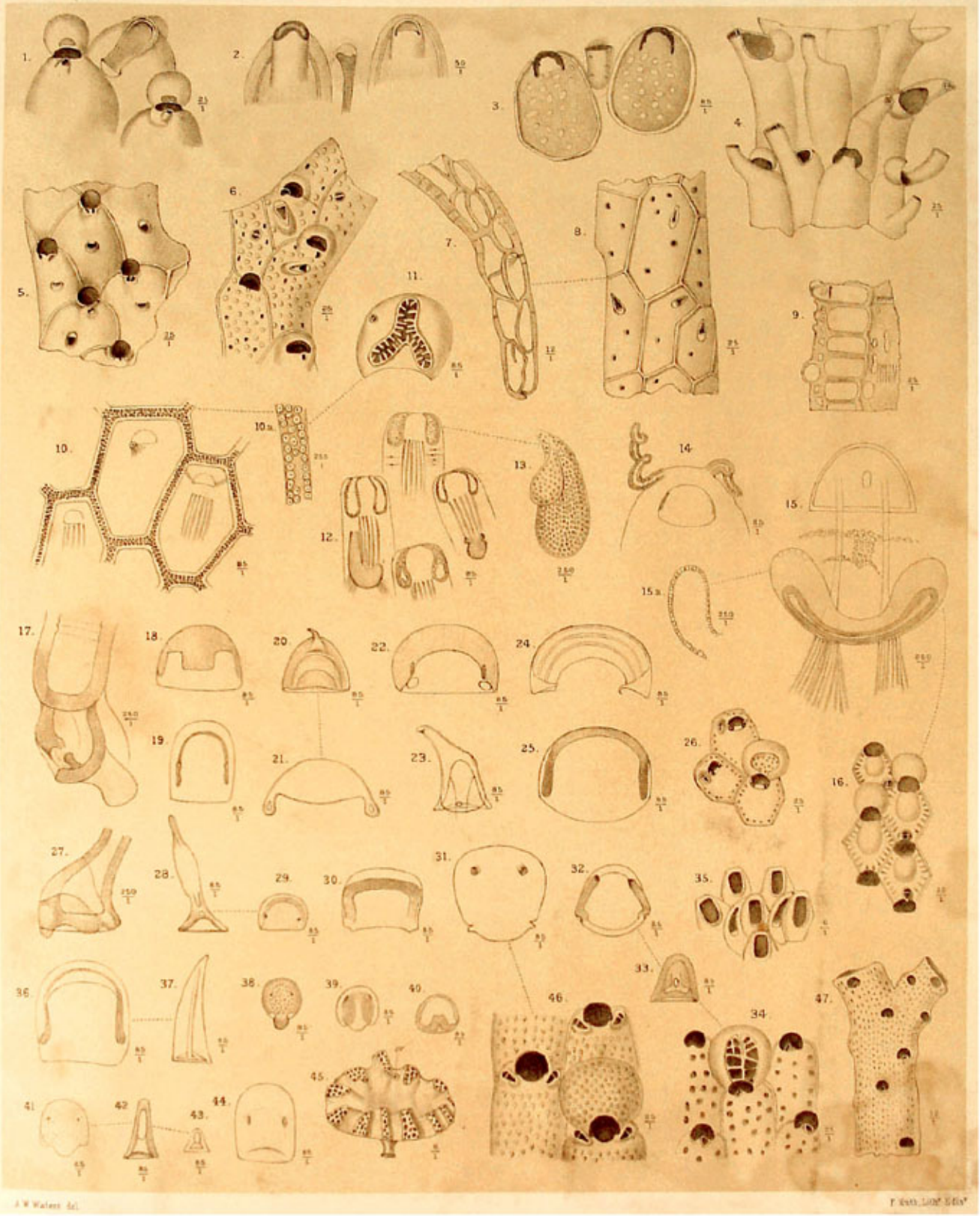
PLATE III.

Diam.

Fig. 1. *Cellepora pustulata*, Busk, ... × 25
Fig. 2. *Cupularia canariensis*, Busk, ... × 50
Fig. 3. *Selenaria maculata*, Busk, ... × 85
Fig. 4. *Cellepora armata*, Hincks, var. *erecta*, nov, ... × 25
Fig. 5. *Retepora magellensis*, Busk, ... × 25
Fig. 6. *Retepora gigantea*, Busk, ... × 25
Fig. 7. *Retepora tesselata*, Hincks, var. *imperati*, Busk; section of rooting process, ... × 12
Fig. 8. *Retepora tesselata*, Hincks, var. *imperati*, Busk; rooting process, ... × 25
Fig. 9. *Retepora lata*, Busk; section of calcareous structure, showing lacunæ on the right, ... × 25
Fig. 10. *Retepora columnifera*, Busk; section showing zoarial parenchym cord, ... × 85
Fig. 10a. *Retepora columnifera*, Busk; section showing zoarial parenchym cord, ... × 250
Fig. 11. *Retepora columnifera*, Busk; ovicell calcined, ... × 85
Fig. 12. *Retepora cellulosa*, L., Naples; showing gland-like sacs at the side, ... × 85
Fig. 13. *Retepora cellulosa*, L., Naples; double sac, ... × 250
Fig. 14. *Cellepora pertusa*, Smitt, Red Sea; showing vermiform gland-like bodies, ... × 85
Fig. 15. *Lepralia margaritifera*, Quoy and Gaimard; contents of avicularian chamber, showing double gland-like bodies and the protoplasmic mass, ... × 250
Fig. 15a. *Lepralia margaritifera*, Quoy and Gaimard; section of the larger body, ... × 250
Fig. 16. *Lepralia margaritifera*, Quoy and Gaimard, ... × 25
Fig. 17. *Selenaria maculata*, Busk; lower part of vibraculum, ... × 250
Fig. 18. *Bifaxaria submucronata*, Busk; operculum, ... × 85
Fig. 19. *Foveolaria elliptica*, Busk; operculum, ... × 85
Fig. 20. *Aspidostoma gigantea*, Busk; avicularian mandible, ... × 85
Fig. 21. *Aspidostoma gigantea*, Busk; operculum, ... × 85
Fig. 22. *Melicerita atlantica*, Busk; operculum, ... × 85
Fig. 23. *Electra cylindracea*, Busk; mandible, ... × 85
Fig. 24. *Melicerita dubia*, Busk; operculum, ... × 85
Fig. 25. *Monoporella capensis*, Busk; operculum, ... × 85
Fig. 26. *Smittia delicatula*, Busk, ... × 25
Fig. 27. *Cupularia canariensis*, Busk; base of vibraculum, ... × 250.
Fig. 28. *Diporula hastigera*, Busk; mandible, ... × 85
Fig. 29. *Diporula hastigera*, Busk; operculum, ... × 85
Fig. 30. *Lepralia mucronata*, Busk; operculum, ... × 85
Fig. 31. *Schizoporella vitrea*, MacGillivray; operculum, ... × 85
Fig. 32. *Lepralia occlusa*, Busk; operculum, ... × 85
Fig. 33. *Lepralia occlusa*, Busk; mandibles, ... × 85
Fig. 34. *Lepralia occlusa*, Busk, ... × 25
Fig. 35. *Melicerita dubia*, Busk; reduced from sketch, ... × 6
Fig. 36. *Lepralia castanea*, Busk; operculum, ... × 85
Fig. 37. *Lepralia castanea*, Busk; mandible, ... × 85
Fig. 38. *Hastiella auriculata*, Busk; operculum, ... × 85
Fig. 39. *Retepora tesselata*, Hincks, var. *imperati*, Busk; operculum, ... × 85
Fig. 40. *Retepora lata*, Busk; operculum, ... × 85
Fig. 41. *Cellepora armata*, Hincks, var. *erecta*, nov., operculum, ... × 85
Fig. 42. *Cellepora armata*, Hincks, var. *erecta*, nov., mandibles, ... × 85
Fig. 43. *Cellepora armata*, Hincks, var. *erecta*, nov., mandibles, ... × 85
Fig. 44. *Mucronella canalifera*, Busk; operculum, ... × 85
Fig. 45. *Defrancia striatula*, Busk, ... × 6
Fig. 46. *Schizoporella vitrea*, MacGillivray, ... × 25
Fig. 47. From Station 320 (see page 39), ... × 12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