EXPÉDITION ANTARCTIQUE BELGE

RÉSULTATS

DU

VOYAGE DU S. Y. BELGICA

EN 1897-1898-1899

SOUS LE COMMANDEMENT DE

A. DE GERLACHE DE GOMERY

RAPPORTS SCIENTIFIQUES

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COMMISSION DE LA BELGICA

ZOOLOGIE

BRYOZOA

BY

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ANVERS

IMPRIMERIE J.-E. BUSCHMANN

REMPART DE LA PORTE DU RHIN

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INTRODUCTION

The collections of the Belgian Antarctic Expedition, submitted to me by Dr Emile Racovitza, were obtained on 16 occasions, but of these, three localities were not within the Antarctic region, being collected from Chili and South America on the way further south, and a separate list of these Subantarctic forms is given.

The farthest south was Latitude 71° 35′ S., and the Antarctic collections were made between Longitude 102° 15′ W., and Long. 81° 45′ W., with temperatures varying between +0.8 Centigrade and —0.3 Centigrade. The depths are from 435-580 metres, with the exception of one fragment of *Scrupocellaria funiculata* MacG. from 2800 metres.

The following table of the dates, localities and depths of the dredgings will be found useful, in making comparisons from the lists and descriptions. The depths and temperature are sometimes those of the (1) nearest day when observations were made, however further particulars are given in the lists on pages 12-17.

Number	Date	Locality	Depths	Temperature at the bottom of the sea
242, 938	April 27th, 1898.	Lat. 70° 48′ S.- Long. 91° 54′ W.;	410 metres;	+0°.6 Cent. (Faubert) Tangles I.
272, 282, 288 . . .	May 11th, 1898.	Lat. 71° 09′ S.- Long. 89° 15′ W.;	460 metres;	+0°.3 Cent. (Chalut) Dredge I.
309, 320	May 12th, 1898.	Lat. 71° 14′ S.- Long. 89° 14′ W.;	460 metres;	+0°.3 Cent. (Faubert) Tangles II.
322	May 14th, 1898.	Lat. 71° 24′ S.- Long. 89° 12′ W.;	460 metres;	+0°.3 Cent. (Faubert) Tangles III.
332, 339, 343, 345, 346, 347, 348, 373, 1047.	May 18th, 1898.	Lat. 71° 18′ S.- Long. 88° 02′ W.;	435 metres;	—0°.3 Cent (Faubert) Tangles IV.
391, 392, 924. . . .	May 27th, 1898.	Lat. 71° 15′ S.- Long. 87° 39′ W.;	435 metres;	—0°.3 Cent. (Nasse) Eel trap I. (Faubert) Tangles V.
428.	May 28th, 1898.	Lat. 71° 19′ S.- Long. 87° 37′ W.;	436 metres;	—0°.2 Cent. (Faubert) Tangles VI
560 to 568, 570, 571, 573, 591, 596, 597, 922, 1012, 1250 . .	Oct. 8th, 1898.	Lat. 70° 23′ S.- Long. 82° 47′ W.;	480 metres;	+0°.8 Cent. (Faubert) Tangles VII
608 to 618, 620, 621, 623, 650, 683, 991 .	Oct. 18th, 1898.	Lat. 70° 00′ S.- Long. 80° 48′ W.;	580 metres;	+0°.9 Cent. (Faubert) Tangles VIII.
741, 742, 743, 744, 745, 752, 753, 1032 . .	Nov. 29th, 1898.	Lat. 70° 20′ S.- Long. 83° 23′ W.;	459 metres;	+0°.8 Cent. (Faubert) Tangles IX.
798, 799, 800, 820, 1028.	Dec. 20th, 1898.	Lat. 70° 15′ S.- Long. 84° 06′ W.;	569 metres;	+0°.8 Cent. (Faubert) Tangles X.
877	Mar. 14th, 1899.	Lat. 70° 40′ S.- Long. 102° 15′ W.;	2800 metr.;	+0°.5 Cent. (Chalut) Dredge III.
951	Dec. 18th, 1897.	Baie du Torrent, Ile Londonderry, Chili, — on Gasteropods.		
139, 140	Jan. 3rd, 1898.	Porte Torro, Ile Navarin, Magellanes, Chili.		
1068	No date.	Straits of Magellan, — on the carapace of *Eurypodius Latreilli*.		

(1) In the description of species it has not been throught necessary to call attention, each time, to the depths and temperature being sometimes approximate.

The number of species from several of the dredgings is considerable, and one of the most interesting hauls of Bryozoa, that has ever been made is the one on October 18th, 1898, from Tangles (Faubert) VIII when the large total of 55 species was obtained. The largest number recorded from any CHALLENGER station seems to have been 30.

Besides the general literature of the subject, the chief works to be consulted are :

ALCIDE D'ORBIGNY. Voyage dans l'Amérique méridionale, vol. V, pt. IV, Zoophytes, 1842.
QUOY AND GAIMARD. Zoologie du voyage de l'URANIE, 1825.
BUSK, G. Polyzoa of Kerguelen Island. (*Phil. Trans. Roy. Soc.*, vol. CLXVIII, p. 188.)
BUSK, G. Report of the Scientific Results of the Voyage of H. M. S. CHALLENGER « Polyzoa », vol. X, pt. XXX, 1884, and vol. XVII, pt. L, 1886.
WATERS, A. W. Supplementary Report, id., vol. XXXI, pt. LXXIX, 1889.
RIDLEY, S. O. Zoological Collections in the Straits of Magellan and on the Coast of Patagonia (Alert). Polyzoa. (*Proc. Zool. Soc. London*, 1881, p. 44.)
MACGILLIVRAY, P. H. Description of New or Little Known Polyzoa. (*Trans. Roy. Soc. Vict.*, 1881-1890.)
MACGILLIVRAY, P. H. « Polyzoa » in the Prodromus of the Zoology of Victoria. Edited by F. McCoy, 1878-1890.
MACGILLIVRAY, P. H. Tertiary Polyzoa of Victoria. (*Trans. Roy. Soc. Victoria*, vol. IV, 1895.)
JULLIEN, J. « Bryozoaires » in *Mission scientifique du Cape Horn*, vol. VI, 1885.
WATERS, A. W. Bryozoa from New South Wales &c. (*Ann. Mag. Nat. Hist.*, ser. 5, vol. XX, p. 81, 181, 253, and ser. 6, vol. IV, p. 1, 1887-1889 ; as well as papers in the *Quarterly Journal of the Geological Society*.)
HINCKS, T. South African and other Polyzoa. (*Ann. Mag. Nat. Hist.*, ser. 6, vol. VII, p. 285, 1891.)
KIRKPATRICK, R. « Polyzoa » in Report on the Collections of Natural History made in the Antarctic Regions during the Voyage of the SOUTHERN CROSS, published 1902, p. 286.

There are also lists by MACGILLIVRAY, WHITELEGGE and HAMILTON, of Bryozoa, from Australia and New Zealand ; further, descriptions of fossil Bryozoa by MAPLESTONE are now appearing in *Trans. Roy. Soc. Victoria*.

The literature of the Bryozoa, from the southern hemisphere, is by no means so extensive as that of the Arctic region, but on the other hand, being, for the greater part, more recent, the descriptions are fuller and more complete.

This is the first time, that a collection of Bryozoa has been brought for description from within the Antarctic circle ; though since I commenced the study of this BELGICA collection, a few, and for the most part poor specimens, were brought back from the Antarctic by the SOUTHERN CROSS Expedition, and these have been described by KIRKPATRICK [1].

The species as given by KIRKPATRICK are *Porella Hyadesi* Jullien ; *Inversiula nutrix* Jull. ; *Schizoporella hyalina* L., and var. *discreta ; Schizoporella Eatoni* Busk ; *Smittia Landsborovii* Johnst. ; *Idmonea organisans* d'Orb. ; *Lichenopora canaliculata* Busk ; *Alcyonidium flabelliforme*

(1) Report on the Collections of Natural History made in the Antarctic Regions during the Voyage of the SOUTHERN CROSS, published 1902, p. 286-289.

Kirkpatrick, all from Cape Adare. The species described by Kirkpatrick are all from the depth of a few fathoms only, and nearly all were previously known species, whereas the Belgica specimens are from a moderate depth and a large proportion are new. In considering the meaning of these facts we must only draw general conclusions, as the littoral fauna of South America is no doubt better known than the fauna from greater depths.

It is considered, that there has been a mistake about the specimens, to which Busk refers, as brought back from the Antarctic by Sir John Ross, otherwise they would be the first known Antarctic Bryozoa. To these specimens I have referred in my paper, on the « Bryozoa from Franz Josef Land », p. 62 &c. and in this memoir when describing *Hornera antarctica* nov.

Most genera of Bryozoa are widely distributed, and there are many cosmopolitan species, so that the Bryozoa fauna from any one locality has some considerable similarity with all others, but in comparing the Arctic and Antarctic fauna to see to what extent, if any, the bipolar theory receives support, it is not enough to show, that there are some similar forms, for this we should certainly expect, but what we want to know is, whether there is more similarity between the Arctic and Antarctic than between the Arctic and Subantarctic faunas; then we can carry on our comparisons to Southern Temperate, proceeding to Tropical regions and thence on to Northern Temperate. In any studies of geographical distribution we must keep in mind the extraordinary mixing of Northern and Australian forms in Japan showing how different faunas may occur side by side.

The value of geographical comparisons, however depends to a large extent upon the certainty there is in the classification; and with many genera or groups we are now in a position to use them in studying geographical distribution, whereas in others, and more especially in the Cyclostomata, we had better not attempt much, though there are a few more highly, differentiated species, such as *Idmonea radians* Lamk. &c. concerning the determination of which we may feel as sure as with any Cheilostomata.

However, geographical lists, unless prepared by specialists, are likely to be somewhat misleading, and as an example we may quote a paper valuable for many lists of Subantarctic species of vertebrates and invertebrates, by Dr George Pfeffer (1), in which he gives as Antarctic 18 Bryozoa, considered to be identical with those found in the Arctic seas. In the first place he means Subantarctic regions, and only two of those named in his list have been found in Antarctic regions. Then he gives *Microporella ciliata* Pall. and also *Lepralia ciliata* Pall. but these are synonyms, and the same is the case with *Schizoporella hyalina* L. and *Cellepora hyalina* L. Eight of the species are Cyclostomata, and there is as yet so much doubt regarding the classification and determination of this group, that we cannot be sure as to the identity of most of the eight. Further *Eucratea chelata* L. is cosmopolitan, and the same may be said of *Microporella ciliata* Pall., *Hippothoa (Schizoporella) hyalina* L., and *Membranipora membranacea* L.; *Schizoporella spinifera* Johnst. is certainly given by Ridley as from Tom Bay, S. W. Chili, but he adds « referred with much doubt to this species », and on reading his description I think we may now decide, that it is not *S. spinifera*. *Flustra papyracea* E. cannot

(1) Pfeffer, G., Die niedere Thierwelt des antarktischen Ufergebietes. *(Internat. Polarforsch. Deutsch. Exp.*, vol. II, 1890, p. 471.)

be considered southern, unless some reliable authority gives particulars as to its being found in the southern hemisphere; so that a careful examination of the list leaves *nothing* to support the position taken up by PFEFFER, when he says on page 471 : « Die wesentliche genetische Uebereinstimmung der arktischen und antarktischen Zone findet kaum noch irgendwo im Thierreich eine kräftigere Begründung als durch die Bryozoen. »

In my paper on the « Bryozoa from Franz Josef Land (1) » I examined and reduced the list of 16 species of Bryozoa, from the northern and southern hemispheres (unrecorded within the tropics) as drawn up by Sir JOHN MURRAY, from « BUSK's CHALLENGER Report », but would add that our knowledge is very incomplete as to the tropical Bryozoa, and in considering the bipolar theory this want is much felt.

Limits of the Antarctic

Though the Arctic and Antarctic faunas are strictly those within the Arctic or Antarctic circle, yet, this being an artificial division it seemed to me permissible to pass a little outside the circle in the Arctic regions, so as to include everything within the air isothermal of 0° C., and this does not much increase the area under consideration. It is certainly difficult to decide what should be considered Antarctic, and if the limit of the distribution of ice, as recommended by FRICKER (2), is taken in the south, then the area thus included is very much larger than that enclosed by the Antarctic circle ; now this limit, which has been used by various authors, is not an entirely temperature boundary, but is largely influenced by currents and other causes.

By taking the isothermal of 0° C. in the Antarctic the increase of area is however not very considerable ; whereas it has been seen that using the limit of the distribution of ice in the south enlarges the area, thus included, very materially. Now in considering geographical distribution, although temperature must be taken into consideration it is only one factor, certainly a very important one, while the question of distance is scarcely less important, especially as in past ages the temperature may have been, in fact we know that it has been, relatively entirely different. Many authors have however written of regions, far beyond the limit of ice drift, as being Antarctic, so that not only Kerguelen Island, in Lat. 50° S. (about the equivalent of Lands End and Cherbourg) are spoken of as Antarctic, but also with localities still further north the same mistake has been made ; as for example the Chatham Islands the equivalent of Genoa. By including localities as far away from the South Pole as the Chatham Islands, we just about double the distance apart of the limits of the area, and more than double the superficial area. If the isothermal of 0° C. is chosen, the fauna would be comparable with the Subantarctic faunas of the south of South America ; the Kerguelens ; the South Australasian ; and other southerly faunas, without considering them Antarctic.

The lavish use of the term Antarctic was made when practically no Antarctic fauna was known, whereas we are learning, that there is a rich Antarctic fauna related closely to the Subantarctic, but yet differing considerably from it ; so that we may find the Antarctic

(1) *Linn. Soc. Journ. Zool.*, vol. XXVIII, p. 48.

(2) The Antarctic Regions translated by A. Sonnenschein, 1900.

fauna as distinct as is the Mediterranean. This exaggerated use of the term raises a difficulty, when we wish to compare the Antarctic fauna, as the name has already been extensively employed for something quite different, which we must now speak of as a Subantarctic fauna.

Classification

Since I commenced the examination of this collection, made by the BELGICA, three important works have appeared, of which the first was CALVET's « Bryozoaires Ectoproctes marins », 1900, giving résumés of our knowledge of the structure of Bryozoa, and adding some results of the author's own work. Then S. HARMER (1) has shown the importance of the compensation sac, and in G. M. R. LEVINSEN's « Studies on Bryozoa (2) » the characters used in classification receive attention, especially the front wall, the ovicells, the rosette plates and pores; and with the more careful examination of a number of minute characters we may be sure, that the next few years will see some important modifications in our classification (3). We look to see how LEVINSEN will carry out his ideas, for he thinks, that the structural features of the rosette plates and the ovicells are most to be relied upon, besides which he considers, what he calls the « oral bow » of great classificatory value. He would make one of the leading characters the pores of the rosette plates, namely the main divisions would be based on there being one or many pores in the rosette plates ; but although I was the first to call attention to the value of the rosette plates in classification, I am not prepared to go as far as LEVINSEN, until he shows us how he carries out his ideas. If the number of pores is such a leading character we should expect, that the rosette plates of the distal and lateral walls would be of the same character, whereas we may find one-pored rosette plates on the one wall, and rosette plates with numerous pores on the other. For example in *Retepora lata* B. we have a distal rosette plate with several pores, whereas the lateral plates have only one pore, and there are similar cases in the Flustridæ.

As the result of many years examination of the opercula (4), and the preparation of the chitinous appendages of not far short of 1000 species I am more and more convinced, that no character will give as much help in the determination of the Bryozoa, and in making the classification more natural. This it will do, by enabling us to see in smaller groups, where the relationship is close, and thus to form larger groups.

I have more than once said that *Schizoporella, Lepralia* and *Cellepora* require revision, and have no doubt that the study of the opercula will give much assistance in doing so, but it is not only the shape that must be examined, but also the muscular attachments,

(1) On the Morphology of the Cheilostomata. (*Quart. Journ. Micr. Sc.*, vol. 46, n. s., p. 263-350, pl. XV-XVIII.)

(2) *Vidensk. Medd. fra den Naturh. Foren. i Kjobenhavn*, 1902.

(3) A valuable paper « Notes on the Natural History of East Finmark » in the *Annals and Magazine of Natural History*, s. 7., vol. XI and XII, by Canon A. M. NORMAN has appeared too late for me to make use of it for the present memoir. It contains many important suggestions as to classification

JULLIEN and CALVET, Bryozoaires provenant des campagnes de l'HIRONDELLE. (*Camp. scientifique du Prince de Monaco*, fasc. XXIII) was received just before the manuscript was sent off.

(4) The Use of the Opercula in the Determination of the Cheilostomatous Bryozoa. (*Proc. Manchester Lit. and Phil. Soc.*, vol. 18, pl. I, 1878.)

and the position in the zoœcium. Whenever possible the oral aperture should be examined from the inside, and the position of any denticles to which the opercula are attached should be noticed. Some of the present inconsistencies would have been removed if closer attention had been given to the various characters of the opercula ; but while urging that more study should be given to these chitinous structures, I am not maintaining that it is a character upon which the largest groupings can be based.

The genus *Lagenipora,* as extended by me, will show the value of the opercula, for here, throughout the group, the operculum is of nearly the same size and shape, with the muscular dots in the same position. This genus has throughout similar and characteristic ovicells, thus showing by the two characters a natural group, and proving the value of the characters. There are many cases in which the relationship has first been indicated by the opercula; and in species where other structures vary much in size and with age, the opercula, will as a rule, be found quite similar throughout a colony.

Caution is at present required, lest various authors taking different characters, should create such an unwieldy number of genera, that the study of the Bryozoa is thereby thrown back for a time.

A work like the present is not suitable for introducing new ideas of general classification, and often generic names have to be used about which there is much doubt, and where modifications are expected ; but in employing names now accepted it is believed, that the species will be readily recognised, however much the genera may be shuffled. The classification of the Cheilostomata is based upon a more solid foundation than that of the Cyclostomata, as so many more characters are used, and we have no reason to expect the changes to be universal, although some genera may be dropped and others modified.

Distribution

The number of genera now recorded from the Antarctic is greater than from the Arctic ; and further, many more genera are known from the southern hemisphere than from the northern in fact there are but very few northern genera not represented in the southern hemisphere, whereas a considerable number from the south are not known north of the equator. *Gemellaria* known in Arctic seas is not found in the Antarctic. *Pseudoflustra* has a close ally ; *Rhamphostomella* has not been found, but we are not sure about this being a satisfactory genus ; no specimen of the cosmopolitan *Crisia* has yet come from the Antarctic, but it is common in the Subantarctic and we may expect it to be found.

From the Antarctic, but not known in the Arctic there is *Catenicella, Turritigera, Bifaxaria, Beania* (which however occurs in northern seas), *Systenopora* gen. nov., *Cellarinella* gen. nov., *Chaperia, Heteropora* (1).

Having recently worked upon Arctic Bryozoa (2), old friends were looked for, and one of the most interesting forms is *Megapora hyalina* nov. most closely related to *M. ringens* Busk, only known from Shetland and Bergen ; *Scrupocellaria antarctica* nov. is the represen-

(1) Other genera known in the southern hemisphere only are *Bipora, Calpidium, Calwellia, Claviporella, Didymia, Dimetopia, Diplœcium, Euthyris, Farcimia, Foveolaria, Haswellia ?, Ichthyaria, Inversiula, Lunulites, Petralia, Selenaria, Thairopora, Thalamoporella, Urceolipora, Rhabdozoum, Caleschara, Aspidostoma.*

(2) Bryozoa from Franz Josef Land. (*Linn. Soc. Journ. Zool.*, vol. XXVIII, p. 43-105).

tative of *S. ternata* var. *gracilis ; Smittia antarctica* nov. has some points of resemblance to *Pseudoflustra palmata* Sars, of the Arctic, but is quite distinct, so that no species only known in the Arctic or neighbouring seas has been found in the Antarctic. This however is taking it for granted, that there is sufficient justification for making a new species of *Megapora hyalina,* which was done from small specimens, and may be open to question. There are some species common to high northern latitudes and to the Antarctic, but also found in intervening regions as *Micropora coreacea* Esper., *Hippothoa divaricata* Lamx., *H. distans* MacG., *Smittia reticulata* MacG., *Idmonea atlantica* Forbes, *Entalophora proboscidea* M. Ed., and these may all be called cosmopolitan. I have dealt elsewhere with the Cyclostomata, and refer to many of them being closely allied to cosmopolitan species.

When the description of the Antarctic Bryozoa was completed, and nine plates were drawn, I went to Paris in order to examine the collections of D'ORBIGNY, described in the « Voyage dans l'Amérique méridionale », and the recent forms described in the « Paléontologie Française » ; as well as those of JULLIEN, relating to the Cape Horn Expedition, as it was important to make the comparison with the fauna of the southern extremity of South America and the Falkland Islands as complete as practicable.

The collection of D'ORBIGNY, both recent and fossil, is in the Paleontological department of the Museum d'histoire naturelle in Paris, and is for the greater part in comparatively good order, though a portion having been kept all these years in open boxes a few things in the course of time have been changed or removed. It is however evident that D'ORBIGNY has often given descriptions from small and very imperfect specimens, which we should now pronounce to be indeterminable.

JULLIEN's collection in the Zoological department, was brought to the Museum some time after his death, and as he had been ill for many years, the collections may not have been left in working order. At any rate, fossils and recent specimens were mixed together in great confusion, so that I spent a week in separating them into two or three groups, before I could study the Cape Horn specimens. Much time is still required to get this enormous amount of material into order, but as a commencement has been made, it will now be easier for any one to arrange the parts. Besides the slides and specimens named by JULLIEN and described in vol. VI of the « Mission scientifique du Cap Horn », there was a drawer of unnamed material, as well as spirit specimens in several jars, which presumably JULLIEN had never seen. My examination of the encrusting forms has not been exhaustive, nor did I open all the jars where I could make the requisite determinations without doing so. I have however been able to add 30 species to the 56 mentioned by JULLIEN, and no doubt there are additions yet to be made.

Certain modifications, as to distribution &c, have been necessary in consequence of my visit to Paris ; and these will be apparent in the text, as well as some additions resulting from my examination of an important collection from the Bancs des Aiguilles, South Africa, in JULLIEN's collection. The Eastern Australian Bryozoa have now been thoroughly studied by MACGILLIVRAY and others, and a number of South African species have been described in the « CHALLENGER Reports » and scattered papers, but neither the South African nor South American fauna have been thoroughly examined. From South Africa I have a manuscript list of 107 species. I hope shortly to publish some notes on the D'ORBIGNY and Cape Horn collections.

Species of special interest

The Antarctic species of special interest may be said to be the following : *Catenicella frigida* nov., as occurring so far south; *Flustra flagellata* nov. as having vibracula instead of avicularia; *Microporella trinervis* nov. having within the front wall a diverging tube leading to a round opening on each side of the zoœcium, and it is to be hoped that some of the Expeditions will bring back better specimens, so that the structure can be understood; *Systenopora contracta* nov. has a narrow slit-like peristomial aperture (unlike that of other Cheilostomata), and has an avicularium within the aperture. A Cretaceous fossil appears to belong to the same genus. *Cellepora horneroides* nov. with the zoœcia only on one side, and with the surface so much reminding us of the Cyclostomata is interesting. In the *Reteporæ* several species have a lepralioid aperture, and this group of *Retepora* only known previously in two species is well represented. *Beania erecta* nov. has avicularia the same shape as the appendages of *B. crotali* Busk, and this seems to indicate that *B. crotali* is degenerata *B. erecta*. Thick sections of *Retepora hippocrepis* nov. reveal two short tubes arising from the flesby mass to which the oral glands are attached and this no doubt is an important structure requiring further study. *Heteropora claviformis* nov. occurs, but in an unsatisfactory condition for study, though any possibility of doubt as to its being Bryozoa is removed.

Alcyonidium is found, and as it has only been recorded from the southern hemisphere in a few cases, there are grounds for believing, that it may have been overlooked.

As to which species are common we have sometimes to judge not by the large quantities, but by finding specimens occurring from various dredgings; and from the quantities or the frequency we may say that common species are *Membranipora uniserialis* nov., *Cellaria Dennanti* MacG.; *Micropora brevissima* nov.; *Cribrilina projecta* nov.; *Schizoporella frigida* nov.; *Hippothoa divaricata* Lamx.; *H. distans* MacG.; *Systenopora contracta* nov.; *Cellarinella foveolata* nov.; *Smittia reptans* nov.; *S. inclusa* nov.; *S. antarctica* nov.; *Cellepora horneroides* nov.; *Turritigera stellata* Busk; *Retepora antarctica* nov.; *R. hippocrepis* nov.; *Hornera antarctica* nov.; *Stomatopora antarctica* nov.

Number of Species

In the material submitted to me there were 97 species of Bryozoa, but 11 of these were collected before the Expedition reached the Antarctic, while 2 occur both from the Antarctic and Subantarctic material. Of these 11 species all had been previously described, and do not require further discussion. The remaining 86 species and varieties, collected within the Antarctic area furnished 29 described and 57 new. As however there is so much more uncertainty as to the determination and position of the Cyclostomata, it is better to consider the Cheilostomata first, however mentioning that there is one new Ctenostome. In the suborder Cheilostomata there are 22 previously described species, and 50 considered to be new, but figures do not fully express the state of the case, as many are very closely related to known species, however, even taking this into consideration, the number of new forms is remarkably large.

Of the Cheilostomata 9 are considered to be Australian and New Zealand species, 16 South American, 4 Argentine and Chili, 3 South African, 9 already known from the

South Indian Ocean, 6 from the South Atlantic, 1 from the South Pacific, only 7 are known from the Northern Hemisphere, all of which have been found fossil ; and of the total Cheilostomata 11 have been described fossil.

Smittia reticulata MacG. ; *Idmonea atlantica* Forbes ; *Stomatopora incrassata* Sm., are also Arctic species, and are cosmopolitan. The Cyclostomata are dealt with later on.

Jullien described 56 species of Bryozoa from the district of Cape Horn, and it is surprising what a small proportion of these are now found, although the distance from South America was not very great, but as stated elsewhere, an examination of the Cape Horn material has increased the number of species known from both localities. Some of the species described by d'Orbigny in the « Voyage dans l'Amérique méridionale » occur in the Antarctic, but the proportion is again not very large.

In many cases, where Bryozoa are described, the depth from which they were obtained is not given, so that it is impossible to give the range fully. However there are five species only previously known from considerable depths, namely *Bugula bicornis* Busk from 1950 fathoms (3160 metres); *B. reticulata* Busk, found at 600 fath. (970 met.) ; 1325 fath. (2150 met.), 1600 fath. (2590 met.), and 2160 fath. (3500 met.) ; *Bifaxaria denticulata* Busk, from 600 fath. (970 met.) ; *Cellaria dubia* Busk, from 600 fath. (970 met.) ; *Turritigera stellata* Busk, 150-600 fath. (240-970 met.). All the others have been recorded from the littoral or laminarian zones, though *Micropora coreacea* Esper, also occurs down to 450 fath. (730 met.); *Hippothoa divaricata* Lamx. to 1000 fath. (1620 met.) ; *Smittia reticulata* MacG. to 300 fath. (490 met.) ; *S. crozetensis* nom. nov. to 210 fath. (340 met.); *Idmonea atlantica* Forbes to 1000 met. ; *Lichenopora fimbriata* B. down to 150 fath. (240 met.).

Before passing to details I would express my obligations to those who have given me assistance, especially to Mr Kirkpatrick to whom I have gone several times, to see the Challenger and other collections in the British Museum. For permission to study the collections in the Museum d'histoire naturelle in Paris my thanks are due to Prof. Perrier, Prof. Boule, Mons. Gravier and Prof. Joubin, as well as to members of the staff for help given.

The following lists enumerate the species, first according to the dates on which they were collected ; and then the second according to our present ideas of classification, giving also the distribution.

LIST OF SPECIES OF BRYOZOA COLLECTED (ACCORDING TO THE DATES)

December 18th, 1897. — Fixés sur les *Priene cancellata* (Lam.), N° 118, Baie du Torrent, Ile Londonderry, Canal Français, Magellanes, Chili.

Barentsia discreta Busk.

January 3rd, 1898. — Porto Torro, Ile Navarin, Magellanes, Chili. Nos 139, 140.

Aetea sp.
Hiantopora monoceros MacG.
Microporella Malusii Aud.
Schizoporella Eatoni Busk.
Hippothoa divaricata Lamx.
Lepralia galeata Busk.
Smittia Landsborovii form *personata* Hincks.
Tubulipora organisans d'Orb.

April 27th, 1898. — Swab or Tangles (Faubert) I. Nos 242 and 938. Lat. 70° 48′ S.- Long. 91° 54′ W. (on the 26th 410 metres, +0°.6 C.).

Cellaria Dennanti MacG.
Retepora protecta nov.
Retepora sp.
Cellepora horneroides nov.

May 11th, 1898. — Dredge (Chalut) I. Nos 277, 282, 288. Lat. 71° 09′ S.- Long. 89° 15′ W. (on the 10th 460 metres, +0°.3 C.).

Cellaria Dennanti MacG.
Membranipora uniserialis nov.
Micropora brevissima nov.
Lepralia frigida nov.
Hippothoa divaricata Lamx.
Smittia reptans nov.
— *crassatina* nov.
— *crozetensis* nom. nov.
Stomatopora antarctica nov.
Lichenopora octoradiata nov.

May 12th, 1898. — Swab or Tangles (Faubert) II. Nos 309, 320, 319bis. Lat. 71° 14′ S.- Long. 89° 14′ W. (on the 10th 460 metres, +0°.3 C.).

Megapora hyalina nov.
Smittia crozetensis nom. nov.

Bifaxaria denticulata Busk.
Turritigera stellata Busk.
Retepora protecta nov.
— *antarctica* nov.
— *laevigata* nov.
— *protecta* var. *crassa* nov.

May 14th, 1898. — Swab or Tangles (Faubert) III. N° 322. Lat. 71° 24′ S.- Long. 89° 12′ W. (on the 10th, 460 metres, +0°.3 C.).

Retepora laevigata nov.

May 18th, 1898. — Swab or Tangles (Faubert) IV. Nos 332, 339, 343, 345, 346, 347, 348, 373, 1047. Lat. 71° 18′ S.- Long. 88° 02′ W. (on the 20th, 435 metres, —0°.3 C.).

Scrupocellaria antarctica nov.
Beania erecta nov.
Lepralia frigida nov.
Schizoporella gelida nov.
— *simplex* d'Orb.
Smittia conspicua nov.
— *crassatina* nov.
Bifaxaria denticulata Busk.
— *rustica* d'Orb.
Retepora antarctica nov.
— *protecta* nov.
— *frigida* nov.
Turritigera stellata Busk.
Orthopora compacta nov.
Osthimosia clavata nov.
Stomatopora incrassata Smitt.
Diastopora solida nov.
Lichenopora octoradiata nov.

May 27th, 1898. — Eel trap (Nasse) I. Nos 391, 392. Lat. 71° 15′ S.- Long. 87° 39′ W. (on the 26th, 436 metres, —0°.2 C.).

Membranipora uniserialis nov.
— *incrustans* Waters.
Megapora hyalina nov.
Microporella trinervis nov.
Schizoporella simplex d'Orb.
Hippothoa divaricata Lamx.
Stomatopora antarctica nov.
Diastopora sp.
Lichenopora sp.

May 27th, 1898. — Swab or Tangles (Faubert) V. N° 924. Lat. 71° 15′ S.- Long. 87° 39′ W. (on the 26th, 436 metres, —0°.2 C.).

Scrupocellaria antarctica nov.

May 28th, 1898. — Swab or Tangles (Faubert) VI. N° 428. Lat. 71° 19′ S.- Long. 87° 37′ W. (on the 26th, 436 metres, —0°.2 C.).

Smittia crozetensis nom. nov.
Smittia reptans nov.
Osthimosia clavata nov.
Orthopora compacta nov.
Retepora laevigata nov.
Bifaxaria rustica d'Orb.
Schizoporella simplex d'Orb.

October 8th, 1898. — Swab or Tangles (Faubert) VII. Nos 560, 561, 562, 563, 564, 565, 566, 567, 568, 570, 571, 573, 591, 596, 597, 992, 1012, 1250. Lat. 70° 23′ S.- Long. 82° 47′ W. (on the 7th, 480 metres, +0°.8 C.).

Scrupocellaria antarctica nov.
Bugula reticulata Busk.
Beania erecta nov.
Membranipora incrustans Waters.
— *uniserialis* nov.
Chaperia patulosa nov.
— *cylindracea* var. *protecta* nov.
Cellaria dubia Busk.
— *lata* nov.
Micropora brevissima nov.
Cribrilina projecta nov.
Microporella proxima nov.
— *exigua* nov.
Lepralia frigida nov.
Schizoporella Ridleyi MacG.
— *simplex* d'Orb.
— *hosteensis* Jullien.
Hippothoa divaricata Lamx.
— *distans* MacG.
Cellarinella foveolata nov.
Bifaxaria denticulata Busk.
Smittia marsupium MacG.
— *crozetensis* nom. nov.
— *inclusa* nov.
— *praestita* nov.
— *reptans* nov.
Cellepora horneroides nov.

Turritigera stellata Busk.
Retepora hippocrepis nov.
Stomatopora antarctica nov.
— *dichotoma* d'Orb.
— *major* var. nov.
— *divergens* nov.
Diastopora sp.
Entalophora proboscidea M. Ed.
Hornera antarctica nov.
Lichenopora fimbriata Busk.

October 18th, 1898. — Swab or Tangles (Faubert) VIII. Nos 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 623, 650, 683, 991. Lat. 70° 00′ S.- Long. 80° 48′ W. and Long. 80° 45′ W. ; 500 ? metres, +0°.9 C.

Catenicella frigida nov.
Bugula bicornis Busk.
— *reticulata* Busk.
— *reticulata* var. *spinosa* nov.
— *tricornis* nov.
Brettia longa nov.
Flustra flagellata nov.
Membranipora incrustans Waters.
— *irregularis* nov.
Chaperia cervicornis Busk.
— *patulosa* nov.
Cellaria Dennanti MacG.
Micropora coreacea Esper.
— *brevissima* nov.
Microporella parvipora nov.
— *proxima* nov.
— *divaricata* Canu.
— *exigua* nov.
Lepralia frigida nov.
Cyclicopora polaris nov.
Schizoporella hosteensis Jull.
Hippothoa divaricata Lamx.
Systenopora contracta nov.
Cellarinella foveolata nov.
— *nodulata* nov.
— *dubia* nov.
Smittia marsupium MacG. (non Hincks).
— *marionensis* Busk.
— *reticulata* MacG.
— *Landsborovii* var. *personata* Hincks.

Smittia conspicua nov.
— *tripora* nov.
— *antarctica* nov.
— *inclusa* nov.
— *directa* nov.
— *gelida* nov.
— *crozetensis* nom. nov.
— *dentata* nov.
— *crassatina* nov.
— *pileata* nov.
— *reptans* nov.
Escharoides biformata nov.
Cellepora horneroides nov.
Osthimosia signata Busk.
— *clavata* nov.
Orthopora compacta nov.
Turritigera stellata Busk.
Retepora protecta nov.
— *antarctica* nov.
— *gelida* nov.
— *hippocrepis* nov.
Stomatopora antarctica nov.
— *incrassata* Smitt.
— *divergens* nov.
Idmonea atlantica Forbes.
Filisparsa ? superba Jullien.
Entalophora proboscidea M. Ed.
Hornera antarctica nov.
Heteropora claviformis nov.

November 29th, 1898. — Swab or Tangles (Faubert) IX. Nos 741, 742, 743, 744, 745, 752, 753, 1032. Lat. 70° 20′ S.- Long. 83° 23′ W. (on the 28th, 459 metres, +0°.8 C.).

Scrupocellaria antarctica nov.
Membranipora strigosa nov.
Cellarinella foveolata nov.
Cellepora horneroides nov.
Turritigera stellata Busk.
Retepora lepralioides nov.
Alcyonidium antarcticum nov.

December 20th, 1898.— Swab or Tangles (Faubert) X. Nos 798, 799, 800, 820, 1028. Lat. 70° 15′ S.- Long. 84° 06′ W., 569 metres, +0°.8 C.

Bugula reticulata, var. *spinosa* nov.
Micropora brevissima nov.
Microporella proxima nov.

Schizoporella sp.
Hippothoa divaricata Lamx.
— *distans* MacG.
Cellarinella foveolata nov.
Smittia crozetensis nom. nov.
— *inclusa* nov.
Turritigera stellata Busk.
Stomatopora antarctica nov.
— *eburnea* d'Orb.
Hornera antarctica nov.

March 14th, 1899. — Dredge (Chalut) III. N° 877. Lat. 70° 40′ S.- Long. 102° 15′ W.; 2800 metres ; +0°.5 C.

Scrupocellaria funiculata MacG.

No date. — Sur la carapace d'*Eurypodius Latreilli,* Straits of Magellan. N° 1068.

Scrupocellaria fuegensis Busk.
Bicellaria grandis Busk.
Beania Hyadesi Jullien.
— *magellanica* Busk.
Cellaria malvinensis Busk.

Page	Antarctic Species	Tangles I	Dredge I	Tangles II	Tangles III	Tangles IV	Eel trap I	Tangles V	Tangles VI	Tangles VII	Tangles VIII	Tangles IX	Tangles X	Dredge III	South of S. America	Australasia	S. Africa	South Indian Ocean (Kerguelen) &c.	South Atlantic (Tristan d'Ac.) &c.	South Pacific	North. Hemisphere	Fossil.
	CHEILOSTOMATA																					
20	*Catenicella frigida* sp. nov.										+											
21	*Bugula bicornis* Busk										+							+				
22	— *reticulata* Busk									+	+				+			+				
22	— *reticulata*, var. *spinosa* nov.									+	+											
23	— *tricornis* sp. nov.										+											
23	*Scrupocellaria funiculata* (MacG.)													+		+						
24	— *antarctica* sp. nov.					+				+		+										
26	*Brettia longa* nov.										+											
27	*Flustra flagellata* nov.										+											
30	*Beania erecta* nov.									+												
31	*Membranipora irregularis* d'Orb.										+				+						+	+
31	— *incrustans* Waters.						+			+	+				+				+			
32	— *uniserialis* nov.					+				+												
32	— *strigosa* nov.											+										
33	*Chaperia cervicornis* (Busk)										+					+	+	+			+	+
33	— *patulosa* nov.									+	+											
34	— *cylindracea* B., var. *protecta* nov.									+								type +				
36	*Cellaria Dennanti* MacG.	+	+								+											+
37	— *dubia* Busk									+									+			
38	— *lata* nov.									+												
39	*Megapora ? hyalina* nov.			+			+															
39	*Micropora coreacea* Esper.										+					+		+	+		+	+
40	*brevissima* nov.		+							+	+				+							
41	*Cribrilina projecta* nov.									+												
43	*Microporella parvipora* nov.										+											
44	— *exigua* nov.									+												
44	— *proxima* nov.									+	+	+										
45	— *trinervis* nov.							+														
46	— *divaricata* Canu										+											+
47	*Lepralia frigida* nov.		+			+				+												+
50	*Schizoporella Ridleyi* MacG.									+					+	+						
51	— *simplex* d'Orb.					+	+			+					+							
51	— *hosteensis* Jullien										+				+							
52	— *gelida* nov.					+																
53	*Cyclicopora polaris* nov.										+											
53	*Hippothoa divaricata* Lamx.									+	+				+	+	+		+		+	+
54	— *distans* MacG.									+					+	+		+		+	+	+
56	*Systenopora contracta* sp. nov.										+											
57	*Cellarinella foveolata* nov.									+	+	+	+									
58	— *nodulata* nov.										+											
58	— *dubia* nov.																		+			
59	*Bifaxaria denticulata* Busk.			+						+												
60	— *rustica* d'Orb.					+					+				+							
61	*Smittia marsupium* MacG.										+				+	+						+
62	— *reticulata* MacG.										+				+	+		+			+	+
62	— *marionensis* var.										+											
63	— *Landsborovii* Johnst., var. *personata* H.										+				+	+		+			+	
64	— *crozetensis* nom. nov.									+			+					+				
65	— *antarctica* nov.										+											
66	— *conspicua* nov.					+					+											
67	— *tripora* nov.										+											
67	— *praestita* nov.									+												
68	— *inclusa* nov.									+	+		+									
69	— *directa* nov.										+											
70	— *crassatina* nov.		+			+					+	+										
70	— *pileata* nov.										+											

Page		Tangles I	Dredge I	Tangles II	Tangles III	Tangles IV	Eel trap I	Tangles V	Tangles VI	Tangles VII	Tangles VIII	Tangles IX	Tangles X	Dredge III	South of S. America	Australasia	S. Africa	South Indian Ocean (Kerguelen) &c.	South Atlantic (Tristan d'Ac.) &c.	South Pacific	North. Hemisphere	Fossil
71	*Smittia gelida* sp. nov.										+											
71	— *dentata* nov.										+											
72	— *reptans* nov.		+						+	+	+											
72	*Escharoides biformata* nov.										+											
73	*Cellepora horneroides* nov.	+								+	+	+										
73	*Osthimosia signata* Busk.										+				+							
74	— *clavata* nov.					+			+		+											
75	*Orthopora compacta* nov.					+			+		+											
76	*Turritigera stellata* Busk.			+		+				+	+	+	+		+		+		+			
80	*Retepora antarctica* nov.			+		+					+											
81	— *protecta* nov.	+		+		+					+											
81	— *protecta*, var. *crassa* nov.			+																		
82	— *frigida* nov.					+																
82	— *laevigata* nov.				+																	
83	— *lepralioides* nov.											+										
84	— *gelida* nov.										+											
84	— *hippocrepis* nov.									+	+											
	CTENOSTOMATA																					
85	*Alcyonidium antarcticum* nov.											+										
															15	9	3	9	6	1	7	10
	CYCLOSTOMATA																					
87	*Stomatopora dichotoma* d'Orb.									+					+							
88	— *major* var. nov.									+												
88	— *eburnea* d'Orb.												+		+							
88	— *incrassata* Smitt					+					+										+	+
89	— *divergens* nov.									+	+											
89	— *antarctica* nov.		+				+			+	+		+									
90	*Diastopora solida* nov.					+																
90	*Diastopora* sp.																					
91	*Idmonea atlantica* Forbes										+					+	+	+	+		+	+
91	*Filisparsa superba* Jullien										+										+	
91	*Entalophora proboscidea* M. Ed.									+	+				+	+		+			+	+
93	*Hornera antarctica* nov.									+	+		+									
96	*Lichenopora fimbriata* Busk									+					+	+		+	+			
97	— *octoradiata* nov.		+								+											
98	*Heteropora claviformis* nov.										+						+					
		3	7	6	1	16	4	1	3	35	57	9	7	1	19	12	5	12	8	1	11	13
	Subantarctic Species																					
20	*Aetea*																					
24	*Scrupocellaria fuegensis* (Busk)														+	+						
—	*Bicellaria grandis* Busk															+						
28	*Beania magellanica* (Busk)														+	+	+	+	+	+	+	
30	— *Hyadesi* (Jullien)														+							
37	*Cellaria malvinensis* Busk														+	+		+				+
42	*Microporella Malusii* Aud.														+	+	+		+		+	+
42	*Hiantopora monoceros* Busk														+	+			+		+	+
52	*Schizoporella eatoni* Busk														+	+		+				
48	*Lepralia galeata* Busk														+			+				
63	*Smittia Landsborovii*, var. *personata* Hincks.														+	+		+			+	
53	*Hippothoa divaricata* Lamx.														+	+					+	+
92	*Tubulipora organisans* d'Orb.														+							
99	*Barentsia discreta* Busk														+					+	+	

DESCRIPTION OF SPECIES

Suborder **CHEILOSTOMATA**

Aetea sp.

When examining other specimens from 139, I made a note that there was a small piece of *Aetea* having ovicells as described in *Aetea anguina* forma *recta* (1), but as it has not been found again further particulars cannot be given. There is also, from 986 Tangles VIII, three or four zoœcia of *Aetea* on the inside of a Brachiopod shell. It has much the appearance of *A. recta,* but determination is not possible.

Catenicella frigida sp. nov.

(Pl. I. figs. 1*a-d*)

Zoarium with usually two single zoœcia, followed by a geminate one, but there are also a few zoœcia attached by short chitinous tubes to the side of other zoœcia. This is not usual in the *Catenicellidae,* but occurs in *Catenicellopsis pusilla* Wilson, and *Claviporella pulchra* MacG. Zoœcia elongate, contracting to the base with a broad vitta on each side, reaching nearly to the base, and a similar short depression higher up ; along the lower vittae there is a row of pores (5-8). There is an area, below the oral aperture, with three large pores (fenestrae) towards the proximal end, and two small ones near the aperture. The small lateral avicularia are directed outwards, and are situated near the distal end of the zoœcium, but one of the lateral avicularia is often wanting. The oral aperture has the lower edge straight, the length being greater than the breadth ; and there is a raised line above the distal end of the aperture. The secondary zoœcium of the geminate cell is short, and there is usually only one avicularium. The radicle tube starts on the dorsal surface, from close to the proximal end (also sometimes there is a radicle on the front), forming firm bundles. Ovicell unknown.

This is very closely allied to the Victorian fossil described by MacGillivray as *Catenicella auriculata* (2), and possibly more material might show a range including both forms. The Antarctic specimens are smaller but relatively longer, while the fossil has a much longer suboral area, with about ten fenestrae; both belong to the *Catenicella ventricosa* group, and they have much similarity with *C. sacculata* Busk (Chall.). The specimens are very fragmentary, only consisting of a few zoœcia and although found in four different bottles, all are from the same locality.

Habitat. — Exp. Antarct. Belge.

Nos 617, 621, 623, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? metres ; +0.9 C.

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(1) *Linn. Soc. Journ. Zool.*, vol. XXVI, p. 5, pl. I, figs. 1-4.

(2) MacGillivray, Monogr. of the Tertiary Polyzoa of Victoria. (*Trans. Roy. Soc. Vict.*, vol. IV, 1895, p. 15, pl. II, fig. 5.)

Bugula bicornis Busk.

(Pl. I, figs. 4*a-k*)

Bugula bicornis Busk, Zool. Chall. Exp., vol. X, pt. XXX, p. 40. pl. IX, fig. 1.

In the Antarctic specimens there is a structure not mentioned in the « Challenger Report », for from the main branches formed of long zoœcia there arise, at the distal end of the zoœcia, from the dorsal surface of the free terminations, branches formed of much smaller zoœcia, and as far as I have seen, these short celled branches never divide or give off fresh branches. As a rule these growths do not exceed six or seven zoœcia, but exceptionally may reach to twenty. These short zoœcia are only attached to one another by two lateral rosette plates near the base, while the distal end is free. The long zoœcia have about four lateral rosette plates, and the first short zoœcium is attached at the proximal end, by one rosette plate to the long zoœcium of the main branch (fig. 4, *b. r.*).

The finest specimen, from 608 growing on *Retepora,* forms a kind of mat with the branches growing in all directions, and reaching to a width of about 50 millimetres.

The radicles are attached to neighbouring branches, as in *B. reticulata* B., but this of course cannot be compared with the connecting tubes of *Canda arachnoides,* &c. A pair of vermiform bodies arise from the front wall of the zoœcium, and these are most distinct in zoœcia which are otherwise quite empty, or only contain a « brown body », though they can be found in zoœcia having an active polypide. Although assuming a different form this is undoubtedly the equivalent of the gland-like body to which I have frequently referred. They commence as small almost globular bodies, but may attain to nearly the length of a zoœcium; and also in *Bugula reticulata,* var. *spinosa* nov. small globular bodies are seen, but none of an elongate form have been found.

In the lateral branches, with short zoœcia, there seems usually to be only one small avicularium to a zoœcium, though occasionally there is one large one nearer to the proximal end, but while there is a difference in size the shape is similar.

Besides the strong muscles, for closing the mandibles, there are a row of muscles round the proximal edge of the avicularium (see Pl. I, fig. 4*k*). These are similar to the muscles which I have previously figured in the mandible of *Beania magellanica* Busk [1] (Pl. II, figs. 14, 15) and in this memoir in Pl. VIII, figs. 7*a, b*; and this is a point of very great interest, as, apparently, these muscles are homologous with those of the compensation sac of the zoœcia.

There are 23-25 tentacles. Busk says 18-20 but probably these figures are not taken from sections, and but little reliance can be placed upon the counting of tentacles unless sections are cut.

Bugula avicularis has 14-15 tentacles (H.), 14 (Bened.), 13-15 (Calvet); *B. flabellata* Thomps. has 16 (W.), 14 (H.); *B. Murrayana* Johnst., 18-21; var. *fruticosa* Pack., 17; *B. plumosa* Pall., 11-13 tentacles; *B. spicata* H., 16; *B. turbinata* Alder, 16; *B. purpurotincta* Norm., 14 (Sars), 16-18 (Daly.); *B. neritina* L., 23 (Calvet); *B. calathus* Norm., 15 (Calvet); *B. Sabatieri* Calvet 12-14 (Calvet); *B. reticulata* B., 21-22 (W.); *B. bicornis* Busk, 23-25 (W.).

(1) On Bryozoa from Rapallo, &c. (*Linn. Soc. Journ. Zool.*, vol. XXVI, pl. II, figs. 14, 15.)

Habitat. — South Indian Ocean. Lat. 53° 55′ S.- Long. 108° 35′ E.; 1950 fathoms (3160 metres).

Exp. Antarct. Belge.

Nos 608, 618, 620, 621, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? metres; +0.9 C.

Bugula reticulata Busk.

Bugula reticulata Busk, Zool. Chall. Exp., vol. X, pt. XXX, p. 40, pl. VIII, fig. 3.

There are only two or three small fragments, but in these, lateral radicles are given off from the side of the zoœcium, just as in the Challenger specimens, but the avicularian pedicel is longer than those figured by Busk. There are two distal rosette plates, and 21 to 22 tentacles.

Habitat. — Crozet Islands 1600 fathoms (2590 metres); off the Argentine, 600 fathoms (960 metres); off Chili, 2160 fathoms (3500 metres); Patagonia, 1325 fathoms (2150 metres).

Exp. Antarct. Belge.

N° 568, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ N.; 480 met.; +0.8 C.

N° 621, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Bugula reticulata Busk, var. **spinosa** nov.

(Pl. 1, figs. 3*a-d*)

Type; *Bugula reticulata* Busk, Zool. Chall. Exp., vol. X, pt. XXX, p. 40, pl. VIII, fig. 3.

The Antarctic form most nearly resembles the *B. reticulata*, var. *unicornis* Busk of the Challenger; and to show the connection it seems simplest to call it var. *spinosa*.

The primary zoœcium of the specimen from 610 (fig. 3*a, b*) has an open area in front, about half the length of the zoœcium, and both this and the following zoœcium have six spines, but then after several normal zoœcia, with three spines, the tenth zoœcia again has six. In another specimen, from the same locality, the first seven or eight zoœcia, after the primary, have four spines, and then follow normal zoœcia with three. The zoœcia as a rule have two spines on the outer border and one on the inner. The zoœcia are shorter than those of the Challenger var. *unicornis* B., while, from the locality already referred to, there is a small piece (fig. 3*d*) with rather longer zoœcia, and in this specimen the small pediculated avicularium, just below the area is quite similar to those shown in (figs. 3*a, b*). These variations indicate, that there is no sufficient reason for specific separation. The radicles arise from a bifurcation, but in the younger zoœcia of the specimen first referred to, there are a few radicles from near the proximal end, and although elsewhere no radicles are found growing from the side of the zoœcia, yet there are to many zoœcia small internal radicle chambers. In previous papers allusion has been made to the fact, that in many species of Bryozoa these chambers are often found when there are no radicles.

In a few zoœcia without polypides there are a pair of small globular bodies, arising from the distal end of the zoœcium; no doubt these are homologous with the vermiform bodies in *B. bicornis*. In a later stage they are further removed from the distal end and

are unattached except by protoplasmic threads. The genus *Bugula* seems about equally well represented in the two hemispheres.

Habitat. — Exp. Antarct. Belge.
N° 610, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.
N° 798, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W.; 569 met.; +0.8 C.

Bugula tricornis sp. nov.

(Pl. I, figs. 9*a-d*; Pl. VIII, fig. 3)

The zoaria are irregular in width, with here and there three of four zoœcia in series, though usually there are only two. The distal portion of the zoœcium is free.

The zoœcia have three spines, the two situated at the corners of the zoœcia often attaining to a considerable length, while the third, placed lower down on the outer border and directed inwards, is shorter. Just below the area there is a small pediculate avicularium, borne on a thin pedicel, and resembling the avicularium of *B. reticulata* B., to which this and *B. bicornis* B. are closely allied and they seem to form a distinct group, in which the distal rosette plates differ from what generally obtains in *Bugula*. The avicularia vary much in size, and across the avicularian below the mandible there are two median projections (Pl. VIII, fig. 3), which do not meet, but are the equivalents of the cross bar of so many avicularia; and a similar structure has been found in *Beania magellanica* B. The ovicells are recumbent, broad, widely open with the surface smooth. The radicles start about the middle of the side of the zoœcium from large projecting chambers. There are two large lateral rosette plates near the proximal end, and the distal wall has two smaller plates.

Habitat. — Exp. Antarct. Belge.
N° 616, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Scrupocellaria funiculata (MacG.)

(Pl. VIII, figs. 1*a*, *b*)

Menipea funiculata MacGillivray, « Descr. New or Little Known Polyzoa », pt. IX. (*Trans. Roy. Soc. Vict.*, vol. XXII, p. — (1), pl. I, fig. 8; Zool Victoria, decade XVIII, p. 285, pl. 177, fig. 6.)

There is a fragment, in a broken condition, from 877, which was almost concealed in bundles of chitinous radicles; but it has been possible, after cleaning, to make out that it is a stout form, in one part multiserial, and there is as a rule one stout spine at the outer corner, and a somewhat thinner one on each side rather lower down. In one zoœcium, believed to be from near the base, there are two pairs of stout spinous processes and a spine lower down on the outer side. The scutum has wavy bubble-like markings and, in this respect, differs from typical Australian *S. funiculata*, which has only a central hollow line. We are reminded of the scutum of *Scrupocellaria obtecta* Haswell, where however the markings are in two branches.

There is a small triangular avicularium below the area, rather to one side, and there are lateral avicularia. Above the broken-down ovicells there is a pair of triangular avicularia. The radicles start from near the base of the zoœcium, as in the typical form, and the only differences are the markings on the scutum, and that the spines are not regularly three on

the outside and one inside. It is also closely related to *S. benemunita* Busk, as well as to *S. obtecta* Haswell; and *S. cervicornis* Busk, has a somewhat similar scutum, but also has a vibraculum.

Habitat. — Victoria. If it is the same as *benemunita* then it occurs also from Kerguelen and S. America.

Exp. Antarct. Belge.
N° 871, Dredge III. Lat. 70° 40′ S.- Long. 102° 15′ W.; 2800 met.; +0.5 C.

Scrupocellaria fuegensis (Busk)

Menipea fuegensis Busk, Brit. Mus. Cat., p, 21, pl. XIX.

A specimen from the Straits of Magellan on the carapace of *Eurypodius Latreilli,* is the species described by Busk in the « British Museum Catalogue », and has the same short internodes, 4 spines, a lateral avicularium to the lower zoœcium, an acicular curved scutum, an anterior avicularium below each area, a radicle chamber in the lower zoœcium opposite the anterior avicularium. Jullien describes and figures as *Menipea fuegensis* B. (1) a form in which the internodes with female zoœcia are very long, sometimes having as many as 20 zoœcia, but this is not the case in the present specimen, in which there are a few ovicells in internodes about the usual size. In specimens of *S. ternata*, var. *gracilis* from the Kara Sea, and from the Gulf of St. Lawrence ovicells occur on internodes of the ordinary length. The *M. fuegensis* of Jullien however has no anterior avicularium and has not the long spines characteristic of *M. fuegensis* Busk; and further the scutum is usually cleft, which is not the case in Busk's figures nor in the Antarctic species, and it seems that Jullien's form should be specifically separated. Busk, in his « Challenger Report » (2), describes and figures as *Menipea aculeata* a much more attenuated form with three spines, a bi-trifurcate scutum, no lateral avicularia but an anterior avicularium to each zoœcium. This was found from off South America and Falkland Island, and apparently from Kerguelen Island; and Busk considered that it is the *Bicellaria aculeata* of d'Orbigny, but that species is figured without any avicularia or scutum. Unfortunately there does not seem to be any named specimen of *B. aculeata* (3) in d'Orbigny's collection in Paris, for though there is a tube so marked, I only saw *Membranipora* on the leaf of a deciduous tree, and inside the tube the label was « Algers » (Algiers), so that a change has been made somewhere.

I and others have shown that the allied *Scrupocellaria ternata* Ell. and Sol. of the Arctic regions exhibits a considerable range of variation in the spines, scutum, and avicularia and the same may be the case here; but we have no proof yet that there are not three distinct species.

Habitat. — Tierra del Fuego, and Falkland Islands (B.). Hamilton mentions it from Wanganui, New Zealand; and Harvey from Bass's Straits, but it is not mentioned by MacGillivray or Whitelegge in their lists of Victorian and New South Wales Bryozoa.

(1) Mission du Cap Horn, p. 70, pl. XII, figs. 1, 2; pl. VII, figs. 8-10.
(2) Zool. Chall. Exp., vol. X, pl. XXX, p. 20, pl. IV, fig. 2.
(3) Voyage dans l'Amérique méridionale, p. 8, pl. II, figs. 1-4.

Exp. Antarct. Belge.
N° 1068. St. of Magellan. Sur la carapace d'*Eurypodius Latreilli*.

Scrupocellaria antarctica sp. nov.

Pl. I, figs. 5*a-e*; Pl. VIII, figs. 2*a*, *b*

Zoarium large, apparently about 40^{mm} long, jointed above the area of the outer zoœcium, as is the case in *S. Smittii* Norman (1). The zoœcia have a large bordered area, with an irregularly shaped scutum filling up two thirds of the area. The edge of the scutum is curved and entire. Anterior triangular avicularia near the median line of the zoarium, and lateral avicularia near the distal end of the area; a long oral spine more distinctly seen on the dorsal face of the zoarium than on the anterior.

With the exception of the specimens from 924 none have a spine at the bifurcation, but in the specimen mentioned this spine exists in some cases, but not in all; in the specimen from 924 there is another peculiarity, the considerable amount of calcareous matter making the specimen white, which is unusual in *Scrupocellaria*.

In *Scrupocellaria antarctica*, the radicle tube starts from a small radicular chamber near the proximal end of the zoœcium. The raised ovicell is long and large, and has a thinner area on the front, where the outer of the two walls of the ovicell is wanting; the inner wall has minute tubercles producing a dotted appearance. There is an internal spinous process, sometimes bifurcate or lobate, arising from the proximal wall near the rosette plate (Pl. VIII, figs. 2*a*, *b*, *dt*). In no other species of *Scrupocellaria*, in my collection, has a similar structure been found. A pair of somewhat similar spines is known in *Cellarinella foveolata* nov. and *Systenopora contracta* nov., as well as the comb-like process in *Membranipora tehuelcha* d'Orb. (2), and there is a single comb-like process in *Membranipora nitens* Hincks.

The dorsal surface is like that of the Arctic *S. ternata*, var. *gracilis* Smitt, a species corresponding in many particulars with the present. The articulations are late in forming, and many branches are without any articulation. I showed in 1882 (3), that in a large number of articulated species, the calcareous wall is at first continuous, but subsequently is broken across, and one or more chitinous tubes then form the articulation; and this was afterwards confirmed by Lomas.

According to the classifications of Hincks and Busk this would be *Menipea*, but Jullien (4) found a few vibracula upon his *Scrupocellaria marsupiata*, and said he had also found some upon the anterior surface of *S. scabra* Van Bened. from Greenland &c. and he therefore considered that *Menipea* should be merged in *Scrupocellaria*. Subsequently I proposed (5), that the genus *Menipea* should be retained for forms of the *M. Buskii* MacG. type, and then the majority of the remaining *Menipea* belong to *Scrupocellaria*.

(1) Waters, Bry. from Franz Josef Land. (*Linn. Soc. Journ.*, vol. XXVIII, pl. VII, fig. 8.)

(2) Waters, On Membraniporidæ. (*Linn. Soc. Journ. Zool.*, vol. XXVI, pp. 675, 677, pl. XLVIII, figs. 3, 5, 7.)

(3) Waters, *Quart. Journ. Geol. Soc.*, vol. XXXVII, p. 320; and *Ann. Mag. Nat. Hist.*, ser. 5, vol. XX, p. 89, pl. IV, figs. 6, 7.

(4) Jullien, Drag. du « Travailleur ». (*Bull. Soc. Zool. de France*, vol. VII, p. 508 (11).)

(5) Waters, *Linn. Soc. Journ. Zool.*, vol. XXVI, p. 2.

Habitat. — Exp. Antarct. Belge.
N° 347, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W. ; 435 met. ; —0.3 C.
Nos 561, 568, 573, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.
N° 924, Tangles V. Lat. 71° 15′ S.- Long. 87° 39′ W. ; 435 met. ; —0.2 C.
N° 1032, Tangles IX. Lat. 70° 02′ S.- Long. 83° 23′ W. ; 459 met. ; +0.8 C.

Brettia longa sp. nov.

(Pl. I, figs. 2*a*, *b*)

The zoœcium is long, commencing as a narrow tube, which expands at the end to form the zoœcial chamber. The area occupies the whole of the upper part of the zoœcium and is oval, with a wall sloping inwards to the oval opesium, and at the upper corner of the zoœcium on one side there is a short spine. On the dorsal surface there are, near the distal end, a pair of disks and again below these a smaller pair, besides a pair of small pores on the front of the zoœcial tube.

The new zoœcia are given off from the dorsal surface of the older ones, and in one case there is a second tube, apparently the lower part of the second zoœcium; also in another there are tubes, which we must conclude are zoœcial tubes growing from the side of the zoœcium. The walls are more calcareous than in other species of *Brettia*. It seems closely allied to *Brettia cornigera* Busk, brought by the Challenger, from the West Indies, but as there are only a few more zoœcia of *Brettia longa* than those figured, it is impossible, from such fragments, to feel quite certain as to the specific position.

Brettia occurs in the Arctic as *B. frigida* Waters and *B. minima* Waters.

Habitat. — Exp. Antarct. Belge.
Nos 621 and 623, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

Bicellaria grandis Busk

(Pl. I, figs. 6*a*, *b*)

Bicellaria grandis Busk, Brit. Mus. Cat., p. 42, pl. XLIV ; MacGillivray, Zool. Victoria, decade VI, p. 38, pl. LIX, figs. 2, 3.

This shows some slight variation in the number and position of the spines but there does not seem to be sufficient reason for separating it from Busk's species. On the digitiform process there are usually three spines, though often only two and the number may occasionally be reduced to one. Further back there are two long articulated spines, and there is a short one from the distal end of the dorsal surface. A new branch arises on the dorsal surface, on the outer side close to the base of the ordinary zoœcium, corresponding in structure with the growth of *Bugula bicornis* Busk (Pl. I, fig. 4*b*). The radicle grows from the distal end on the dorsal surface, near to the inner short spines, and these radicles unite together forming a thick bundle. Avicularia and ovicells are unknown.

In *Bicellaria* the zoœcia are but very slightly attached, there being but one lateral rosette plate and that near the distal end, while between these rosette plates the lower

tubular portion of the zoœcia is quite free. Probably this is the most important character of the genus *Bicellaria*.

Bicellaria is well represented in the southern hemisphere, but only by very few species in the northern.

Habitat. — Bass's Strait (Busk); Victoria (MacG.).

Exp. Antarct. Belge.

N° 1068. Straits of Magellan. Sur la carapace d'*Eurypodius Latreilli*.

Flustra flagellata sp. nov.

Pl. II. figs. 1*a*, *b*

Zoarium unilaminate. Zoœcia elongate, contracted below, with a vibracular chamber at the proximal end of each zoœcium, with very long vibraculae. There are about 6 lateral rosette plates, and the distal wall has two pores, with sometimes also two or three small ones between them.

There is only a small fragment, in which there are no polypides, although all the muscles remain in the vibracular chamber. In two cases where two zoœcia grow from an older one, there is a vibraculum at the base of each, and from this fact and the position of the distal rosette plates, we speak of the vibraculum being at the proximal end of the zoœcium. This is the only case of *Flustra* having vibracula, but there does not seem to be any reason for generic separation on that account.

Calvet (1) in a very important work dealing with the structure of the Ectoproct Bryozoa says : « Les aviculaires et les vibraculaires ne sont que deux formes d'une même individualité, ne se distinguant entre elles que par la longueur plus ou moins grande de la mandibule et le développement plus ou moins réduit du bec. » I certainly cannot go as far as Calvet, although of course there is much similarity in the two organs with probably a similar origin. The difference between the two is, in my opinion, quite independant of the length of the setae, and is to be looked for at the base and in the muscular attachment. The base of a vibraculum is unsymmetrical, and besides, the central articulate portion has various protuberances to which muscles are attached, thus permitting movement in all directions, whereas the base of the avicularium is symmetrical and there is only movement in one direction.

I figured the base of the vibraculum of *Cribrilina latimarginata* Busk (2) in my « Supplementary Challenger Report », and then referred to the difference in structure. *Scrupocellaria*, *Selenaria*, *Cupularia*, *Caberea*, &c. have true vibracula, whereas the extremely long mandible of *Diporula Hyndmanni*, var. *ensiformis* Hincks has a symmetrical base and is part of an avicularium. It is true that many avicularia with long mandibles have been wrongly called-vibracula, and further Smitt's figure of the vibraculum of *Scrupocellaria scruposa* L., which is incorrect has been reproduced by Hincks and others, and has no doubt led to some confusion.

(1) Louis Calvet, Contr. à l'hist. nat. des Bryozoaires Ectoproctes marins, 1900, p. 440, etc..

(2) Waters, Zool. Chall. Exp., vol. XXXI, pt. LXXIX, p. 22, pl. I, fig. 12.

The vibracula of *F. flagellata* has not been prepared out, as there is only one small specimen, which is figured as seen in the transparent mount.

HABITAT. — Exp. Antarct. Belge.

N° 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? metres; +0.9 C.

Beania magellanica (Busk)

(Pl. VIII, figs. 7*a-c*)

For synonyms see Miss JELLY's Catalogue, to which add

Diachoseris (sic) *magellanica* ORTMANN. Die japanische Bryozoenfauna (*Arch. f. Naturgesch.*, 1890, vol. I, p. 25, pl. I, fig. 22).

Beania magellanica WATERS, *Linn. Soc. Journ. Zool.*, vol. XXVI, p. 16, pl. II, figs. 11-14; *Journ. Roy. Micros. Soc.* ser. 2, vol. V, p. 3, pl. XIV, fig. 4; MARION, ... CALVET, Bryoz. marins de la région de Cette (*Trav. Inst. Zool. de l'Univ. de Montpellier*, sér. 2, mém. 11, p. 25; Bryoz. marins de Corse, id., mém. 12, p. 9.

The four projections on the dorsal end of the zoœcium are small, but are quite distinct, and although JULLIEN did not find them, in his specimens from Cape Verde, or Tierra del Fuego, they seem to be pretty general, and though small in the Cape Horn specimens yet they are indicated.

According to ORTMANN the Japanese specimen has the edge of the avicularium dentate, but this is not the case in any from other localities that have come under my observation.

JULLIEN says 26-30 tentacles; and in my Naples specimens 26 seems to be the average number: in the specimen brought by the Belgian Expedition I find 23 tentacles. *B. quadricornuta* H. has 23 tentacles, *B. Hyadesi* Jull. 20 tentacles.

It is necessary to refer in some detail to the muscles in the avicularia, as JULLIEN's figure is not entirely correct in some particulars, and although in my paper on the « Bryozoa from Rapallo [1] » correct figures as far as they go were given, it has been advisable to give one with more detail. JULLIEN figures, at the lower or proximal part of the avicularium, thick muscles with isolated fibres, which he calls « muscle en épaulette », but instead of these muscles fastened to the base of the mandible, there is a row of isolated muscles in a semicircle round the submandibular part of the avicularium (see pl. VIII, fig. 7*b*), and also « Bryozoa from Rapallo [1] », (pl. II, fig. 14). On the upper part they are attached to the front wall, on which there is a semicircular band rather thicker than the rest of the wall; the lower attachments are to the side walls of the avicularium [2].

In my paper, already alluded to, I explained these muscles as no doubt contracting the integument behind the mandible, thus helping in the slow opening of the beak; and the interest of these muscles is very great, as we seem to have an action here in the avicularium, which must be compared with the muscular contraction in the compensation sac, shown by HARMER to be common in the Cheilostomata.

(1) *Linn. Soc. Journ. Zool.*, vol. XXVI, p. 16, pl. II, figs. 14, 15.

(2) In *Bugula* there are muscles in the proximal part of the avicularium and they are dealt with on page 21 under *Bugula bicornis*.

The « anterior » muscles of JULLIEN are not readily seen, and where found have consisted of only two or three fibres and not a bundle as figured by JULLIEN. These are referred to by HARMER (1), as indicating the occurrence of two sets of occlusors.

There is a cross bar to the avicularium, which does quite meet across ; further the base of the mandible curves upwards, so that there is a vacant space, which may be an opening, in certain positions, to the avicularium. The two columellae have been previously referred to, and are only known in *B. magellancia* B., *B. bilamnata* Hincks, and *B. erecta* nov.

JULLIEN (2) enters into a comparatively long discussion of the object of the avicularia, but it is possible, that through placing it in his explanation of plate 12, instead of in the text of the work, it has sometimes been overlooked. He considers them only monstrosities (3), and their object as entirely unknown. Although not accepting the orthodox explanation, neither do I agree with JULLIEN, and have already explained my view, that seeing the polypide dies down from time to time, and a colony may be left with few or no active polypides it remains in vigor, through the avicularian organs retaining vitality, and thus keeping the protoplasmic parenchym in indirect communication with the external surroundings. The avicularia have protoplasmic threads passing to the « peculiar body », and the vitality of the colony will, both in times of full and dimished vigor, be increased by the avicularia ; for the constant snapping of the mandibles often continues, when the polypides are not extending themselves out of the zoœcia, and as before said, even when there are few or no polypides. Sections often show the avicularia in unchanged condition, when the zoœcia only contain histolysed remains of polypides.

The ciliated organ (« peculiar body ») is in *Beania magellanica* connected with the muscle, being evidently withdrawn at the same time as the mandible is closed.

There are large oval bodies which have been called « eggs » or « egg masses » but it must be through a mistake that I attributed the name to JULLIEN. They commence at each side near the distal end and start near the lateral wall, and as they grow they have near the surface a large number of vacuolated cells while the interior consists of slightly granulated matter. These are attached by protoplasmic threads and would seem to be the equivalent of the suboral glands.

HABITAT. — Adriatic ; Naples ; Marseilles ; Rapallo ; Riou and Podesta ; St. of Bonifacio ; Cette ; Corsica (all Mediterranean) ; Cape Verde Island ; Japan, 100 fathoms ; Mauritius ; Portland (Victoria) ; Port Jackson (N. S. Wales) ; New Zealand ; Bancs des Aiguilles (South Africa) (JULLIEN det.) 75 met. ; Kerguelen ; Tristan d'Acunha, 8-12 fathoms ; Tierra del Fuego ; Falkland Island.

Exp. Antarct. Belge.

N° 1068. Sur la carapace d'*Eurypodius Latreilli*. Straits of Magellan.

(1) The Morphology of the Cheilostomata. (*Quart. Journ. Micr. Sc.*, vol. 46, n. s., p. 320.)

(2) JULLIEN, Mission scientifique du Cap Horn, p. 90.

(3) YVES DELAGE in his « Vermidiens » in the « Traité de Zoologie concrète », p. 97, follows JULLIEN in considering the avicularia as monstrosities.

Beania Hydesia (Jullien)

(Pl. I, fig. 7)

Diachoris Hyadesi Jullien, Mission scientifique du Cap Horn, vol. VI, 1885, p. 74, pl. VII, figs. 1, 2.

A specimen, from the Straits of Magellan, has one short triangular avicularium on the dorsal surface, situated on a slightly raised chamber. The position is strange, and no avicularia have been described previously, nor could I find any in the specimens in Jullien's collection. The zoœcia are so close together, that the tubular connections can frequently not be followed either on the anterior or dorsal surface. The thick radicle is situated near the proximal end, and terminates in cervicorne attachments, radiating in all directions. There are four stout oral spines, and also spines on the border of the zoœcium, usually five on each side, and these are more delicate than the oral spines and acute at the ends. Sections show 20 tentacles.

From examination of the British Museum specimen of *B. inermis* Busk, it would seem that the specimen is in an unsatisfactory and worn condition, but the relationship between the two species is undoubtedly very close.

Jullien mentions *B. inermis* B. as well as *B. Hyadesi* J. from Cape Horn. The *B. inermis* B. of the Challenger may be *B. Hyadesi*.

Habitat. — Baie Orange (Jullien), « sur les frondes de *Macrocystis pyrifera* ».

Exp. Antarct. Belge.
N° 1068. Straits of Magellan. Sur la carapace d'*Eurypodius Latreilli*.

Beania erecta sp. nov.

(Pl. I, figs 8*a-c*

Besides a specimen from 1012, in which the chief characters can be deciphered, there is a small imperfect one from 343.

The zoœcia are erect, as in *B. crotali* Busk, *B. hirtissima*, var. *conferta* MacG., and *B. fragilis* Ridley, in all of which the connections occur at the base of the zoœcium and the radicle also grows from the lower part. The oral aperture is large, and on each side, above the aperture, there is a rudimentary spine. On the side of the zoœcium a large capitate avicularium is articulated, having a much prolonged mandible, and the mandibles have the double columella characteristic of *B. magellanica* B., and *B. bilaminata* Hincks, while the avicularium is broader than that of *B. magellanica* Busk.

The shape of the appendage of *B. crotali* B. in a specimen from Port Phillip Heads is exactly similar to the mandible of *B. erecta,* even to the contraction at the distal end, where the narrow mandible terminates, and it seems probable that *B. crotali* B. is degenerate *B. erecta*, having the appendages without mandibles. Upon putting a zoœcium from spirit to water it quickly became much inflated, and the lateral walls between the attachment of

the muscles bulged out, and was very transparent, showing the muscles through the walls (figs. 8*c-d*).

Habitat. — Exp. Antarct. Belge.
N° 343, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W. ; 435 met. ; —0.3 C.
N° 1012, Tangles VII. Lat. 70° 23′ S.- Long. 82°47′ W. ; 480 met. ; +0.8 C.

Membranipora irregularis d'Orbigny, and Smitt (non Hag.)

Membranipora irregularis d'Orbigny, Voyage dans l'Amérique méridionale, vol. V, pt. 4, p. 17, pl. VIII, figs. 5-6 ; Smitt, Floridan Bryozoa, pt. II, p. 8, pl. II, fig. 63 ; ? Busk, *Quart. Journ. Micr. Sc.*, vol. I, 1861, n. s., p. 77, pl. XXXIII, fig. 3.

This species has the zoœcia about the same size as the larger form of *M. incrustans* Waters, but there are no avicularia, and the ovicell is wide, cap-like. From d'Orbigny's figures it is difficult to be sure what he had before him, but Smitt has since refigured specimens which he considered were *M. irregularis*. I did not see any *M. irregularis* in the Museum d'histoire naturelle in Paris.

In the specimen from 619, growing on stones, the polypides can be seen.

Habitat. — Madeira ? (Busk) ; Florida (Smitt) ; Falkland Island (d'Orb.).

Exp. Antarct. Belge.
N°s 619, 683 on stones, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? metres ; +0.9 C.

Membranipora incrustans Waters

(Pl. II, figs. 15*a*, *b*, *c*)

Membranipora incrustans Waters, On Membraniporidæ. (*Linn. Soc. Journ. Zool.*, vol. XXVI, p. 686, pl. XLVII, fig. 13.)
Membranipora crassimarginata var. *incrustans* Busk (pars), Zool. Chall. Exp., vol. X, pt. XXX, p. 63.
Membranipora Dumerilii (Aud.). Waters, Supp. Rep. Zool. Chall. Exp., vol. XXXI, pt. LXXIX, p. 12.
Membranipora coronata Jullien (non Hincks), Bryozoaires. Mission du Cap Horn, p. 76.

Specimens from 570 and 596 have zoœcia about the same size as those of the Challenger specimens, but the avicularium is rather larger and the avicularian chamber is often more raised. This is larger than *M. levata* Hincks. A specimen from 392 is however still larger than the others having zoœcia about 1^{mm} long instead of about 0.6^{mm}-0.7^{mm}. There are several species of *Membranipora* with oval zoœcia and an avicularium at the distal end, and this group is a difficult one on account of the few characters available.

I saw several specimens of this in Paris in the material collected by the Cape Horn Expedition and the short avicularium distinguishes it from the *M. coronata* of Hincks, which has a vibraculum. Jullien evidently intended to make a new genus for *Membranipora* with a vibraculum above the zoœcium, but this is not a sufficient reason for a fresh genus, as we know other genera having either avicularia or vibracula.

Habitat. — Station 135*a*. Tristan d'Acunha, 75 fathoms (120 met.) (Challenger). Cape Horn on seaweeds &c.

Exp. Antarct. Belge.

N° 392, Eel trap I. Lat. 71° 15′ S.- Long. 87° 39′ W. ; 436 met. ; —0.2 C.

N° 570 on stones 596 on shell, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met.; +0.8 C.

N° 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

Membranipora uniserialis sp. nov.

(Pl. II, fig. 2)

Zoarium creeping, uniserial, with new branches arising from the side of a zoœcium. The zoœcium is somewhat pyriform, expanding in the upper part, and contracted at the proximal end to a narrow stalk, the flat elliptical area on the front is surrounded by a raised ridge. Just below the ridge of this area, at the distal end, there are three or four spines on each side, and in the upper part of this area there is an unsymmetrical opesial opening, which is rounded at the distal end and contracts near the middle, while the proximal edge is diagonal. There are two pore chambers on each side and one distal one. The ovicell is nearly as broad as the zoœcium with a short keel in the front.

This species is abundant upon some stones brought back by the Expedition, but the spines are not always present, nor is the shape of the opesium always the same, through the diagonal position is general, being horizontal only in a few zoœcia. I have only seen the one complete ovicell of which I made a sketch at the time, and when preparing the plate could not meet with the perfect ovicell again, however, there are a few broken down ovicells.

Habitat. — Exp. Antarct. Belge.

N° 288, Dredge I. Lat. 71° 09′ S.- Long. 89° 15′ W. ; 460 met. ; +0.3 C.

N° 392, Eel trap I. Lat. 71° 15′ S.- Long. 87° 39′ W. ; 435 met. ; —0.3 C.

N°s 570, 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.

Membranipora strigosa sp. nov.

(Pl. II, fig. 4)

The zoœcia are large, oval or nearly round, somewhat irregular. The walls are thin, sloping outwards, smooth, and the small ovicells have an area with minute pores. This is a very simple form, without any avicularia, and in general appearance much resembles the *M. macilenta* of Jullien, found off Spain, and which I consider is the same as a *Membranipora* from Franz Josef Land.

The specimen is growing upon a stone, and the polypides are visible, but the material is not sufficient for sections.

Habitat. — Exped. Antarct. Belge.

N° 745, Tangles IX. Lat. 70° 20′ S.- Long. 83° 23′ W. ; 459 met. ; +0.8 C.

Chaperia cervicornis (Busk)

For synonyms see Miss JELLY's Catalogue and add,

Amphiblestrum cervicorne MEISSNER, Liste der von Prof. Semon bei Amboina und Thursday Island gesammelten Bryozoen. (*Jen. Denk.*, vol. VIII, p. —, 1902.)

Membranipora cervicornis JULLIEN & CALVET, Bryozoaires provenant de campagnes de l'« Hirondelle », 1903, p. 126.

There is a single specimen, which however is not in a good state of preservation. The spines do not branch as much as in Australian specimens.

HABITAT. — Victoria (MACG.) ; Bass's Straits (H.) ; Torres Strait (KIRKP.) ; Marion Island (WAT.) ; New South Wales (WAT.) ; Amboina (SEMON) ; Bancs des Aiguilles, S. Africa, Lat. 34° 57′ S.- Long. 19° 55′ E. (Mus. d'hist. nat. Paris) ; Plage de Praya, Graciosa (Azores), Lat. 38° 03′ 25″ N.- Long. 30° 18′ W. on seaweed (JULL. & CALV.).

Fossil. Mt Gambier (S. Australia) ; and Napier (N. Zealand).

Exp. Antarct. Belge.

N° 619, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

Chaperia patulosa sp. nov.

(Pl. II, fig. 5)

This is closely allied to the fossil and recent *C. annulus* Manz. also called *galeata* Busk, but it differs in having an avicularium below the area, and in having the proximal edge of the wide opesium straight as in *M. patula* Hincks.

The zoarium of 596 encrusts the skeleton of a *Gorgonidæ*. The zoœcia are wide with the front raised, the opesia also are wide and nearly straight below, the area is depressed and granulated. At the distal end of the zoœcium there is a pedunculated avicularium, and on each side two spines, the lower ones being furcate, while below the area there is sometimes an avicularium, which may be long and pedunculate, or may spread out laterally, the mandible is obtusely lanceolate.

The ovicell is erect, broad, with one or two pedunculate avicularia.

It is impossible to give a satisfactory figure of this species, as the spines are frequently erect, only showing the extremity, so that the figure is to a small extent diagrammatic.

Whether the differences are sufficient to justify a new name is somewhat doubtful, but whether called a species or a variety, the fact of importance is, that it is closely allied to the recent and fossil *C. annulus*, although there are slight differences. It is also allied to *C. cristata* Busk, which occurs off Kerguelen and South Africa.

HABITAT. — Exp. Antarct. Belge.

Nos 566, 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.

Nos 619, 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

Chaperia cylindracea Busk, var. **protecta** nov.

(Pl. II, fig. 3)

Type *Electra cylindracea* Busk, Zool. Chall. Exp., vol. X, pt. XXX, p. 78, pl. XXXIII, fig. 2; Waters, Suppl. Report. Zool. Chall. Exp., vol. XXXI, pt. LXXIX, p. 12, pl. I, figs. 13, 14; pl. III, fig. 23.

This agrees in the main characters with the Challenger specimens, but it differs in the shape of what Busk called the « hollow process », which might in the variety be called a protecting plate with irregular cervicorne growth on each side, and bearing on the front in the centre an elongate avicularium directed downwards. The specimen is only small, and encrusts the stalk of a seaweed.

The avicularium above the oral aperture is similar in this and in the Challenger type, and on each side of it there is a spine which becomes wider at the extremity; still lower down by the border, there is another spine, more or less flattened and curved. The ovicell bears one or two « hollow processes », similar to those in front of the opesia, but smaller.

Protecting plates or processes are also known in « *Membranipora imbricata* » Busk, and in « *Amphiblestrum umbonatum* » Busk, and further the so-called « opercular spine » of *Membranipora bellula* Hincks, is similarly placed. The structure of the « hollow process » was not quite correctly appreciated by Busk, and therefore I attempted to make it clearer by figures 13, 14 in my Supplementary Report.

Habitat; type. — Prince Edward Islands 80-150 fathoms (170-240 metres).

Exp. Antarct. Belge.
N° 591, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

CELLARIA (1) Lamouroux

Cellaria is a genus now generally distributed, and has been common through the Tertiaries, while the family *Cellaridæ* is represented in the Cretaceous, though the cretaceous forms are not articulated, at any rate not in most cases. It is, however, doubtful whether some as for instance *Eschariuella elegans* d'Orb. should not be placed in the genus *Cellaria*.

A point of considerable importance is, that we can in the genus find various characters showing resemblance to Cretaceous fossils allied to the living *Onychocella*, and which we may for convenience speak of as the *Onychocellidæ*.

In the *Escharella Argus* d'Orb. (2) (also called *Escharifora*) of which I have given a fresh figure in my paper on the *Meliceritidæ* (3), we find a pair of superior and inferior teeth just

(1) It has recently been suggested that we should call this genus *Cellularia* Pallas, but as I have said (Notes on Bryozoa from Rapallo, *Linn. Soc. Journ. Zool.*, vol. XXVI, p. 3) the retention of the name *Cellularia* has long been most undesirable, as it has been used in such various senses. Pallas who gave the name included under it *Tubucellaria*, *Cellaria*, *Notamia*, *Bugula*, *Scrupocellaria*, *Eucratea*, *Aetea*, and other genera. As *Tubucellaria opuntioides* was the first mentioned, this would be the type; and the only genus to which according to the laws of priority the name could be applied is *Tubucellaria*. This shows how impracticable it is to revert to old genera based on characters now known to be valueless.

(2) Pal. fr., vol. V, p. 209, pl. 666, figs. 13-16.

(3) *Ann. Mag. Nat. Hist.*, ser. 6, vol. VIII, pl. VI, fig. 7.

as in *Cellaria*, and in a specimen sent to me as *Rhagasostoma elegans* d'Orb. (1) from Faxoe there are similar teeth, and the upper teeth we must look upon as the equivalent of the lamella in the *Cellepora vaginata* of Hagenow, for which CANU has proposed the genus *Hagenowilla*. In *R. elegans* the upper teeth are seen to be the ends of a lamella, the same shape though smaller and less developed than that in *H. vaginata*. A shelf is known in many genera, and LEVINSEN (2) has called attention to its importance.

There seems good reason for thinking that the cretaceous *Rhagasostoma* as given by CANU are closely allied to *Cellaria*. The lower lip turns up as in *Cellaria* and the opening has been closed by the operculum, though no doubt there has been a covering membrane as in *Cellaria*. In *Rhagasostoma Argus* d'Orb. and its allies there is no cross bar to the avicularium, resembling in this respect avicularia of some *Cellaria*, as for example *C. Dennanti* MacG. Again in *Onychocella angulosa* Reuss, there is no distinct bar, in fact sometimes no trace of any protuberance is seen ; while in others two ridges indicate the bar, and in the cretaceous fossils of this group, there are numerous cases of onychocellaires without a bar, so that from analogy we may say the base of the mandible was across the middle of the opening, and was attached to a membrane covering the proximal end of this vicarious avicularium. Of the cretaceous fossil Bryozoa a very large proportion are related to *Onychocella*. In the *Meliceritidæ* there are also vicarious avicularia, as shown in my paper already referred to, but LEVINSEN (3) says that the avicularia do not quite agree with those occurring in Cheilostomata. The main difference according to CANU is that there is no membranous area (submandibular area) proximal to the mandible, and it is true that there seems to be a difference, but in *M. royana* Waters (see fig. 2, loc. cit.) the submandibular portion is depressed, and no doubt this has been covered by a membrane connected with the mandible. The lower part of the avicularium of *M. semiclausa* d'Orb. (fig. 1, loc. cit.) is similar to the lower part of the zoœcium. While it is of interest to find the submandibular part of the avicularium is calcified it seems perhaps too much to say that they are of a different type, and I cannot agree with LEVINSEN, that the slight differences furnish a reason for placing *Meliceritites* with the Cyclostomata.

Since writing the above I have seen in the Museum d'histoire naturelle de Paris, among the JULLIEN material, a specimen from the Bancs des Aiguilles, South Africa, which is closely allied to, if not identical with the *Macropora cribrilifera* Maplestone, fossil from Mitchell River, Victoria, and the large vicarious avicularia are without any submandibular area, thus entirely corresponding with the avicularia of *Meliceritidæ*. The vicarious avicularium has the same position and shape as those of *Lepralia claviculata* Hincks, but the mandible is spatulate, and there is no submandibular area or mark. *Macropora* to my mind is a synonym of *Monoporella*, and it seems nearest related to *Lepralia*, having a straight edge to the proximal wall of the oral aperture.

GREGORY, CANU, and LEVINSEN would still retain *Meliceritidæ* under Cyclostomata

(1) The zoœcia at the border are similar to those on the front surface of the zoarium, and therefore I am not quite sure as to the correctness of the determination.

(2) Studies on Bryozoa. (*Vidensk. Medd. fra den Naturh. Foren i Kjöbenhavn*, 1902, p. 19.) I have referred to such a shelf and teeth in my paper on Bryozoa from Bairnsdale, as occurring in the fossil *Cribrilina monoceros*. (*Quart. Journ. Geol. Soc.*, vol. XXXVIII, p. 507.)

(3) Loc. cit., p. 29.

although there are, as I have shown avicularia, but even if we should not go so far as to place it under Cheilostomata as now understood, it does not seem that it should remain with Cyclostomata. The zoœcial chamber becomes much wider near the aperture, and has the shape of that of several of the Cheilostomata ; the projections indicate a moveable operculum (1) of the same character as those of *Cellaria*, and further the shape of the zoœcia, and the perforated front walls are similar in *Cellaria*. The central tubular structure is not known in any living Cheilostoma and the ovicells as figured by Gregory do not resemble those of Cheilostomata. The conclusion to which I am led is, that *Cellaria* and *Onychocella* branched from a common ancestor before the Cretaceous, and that this common ancestor and the *Meliceritidæ* separated at a still earlier period. I may add that if we had found *Myriozoum truncatum*, in the chalk, and it allies were unknown, then its position would have been as great a puzzle as is *Meliceritites*.

Cellaria Dennanti MacG.

(Pl. II, figs. 9*a-f* : Pl. VIII, fig. 4*a*

Cellaria Dennanti MacGillivray, Tert. Polyzoa of Victoria, p. 31, pl. XXII, fig. 14.

In six of the bottles sent there were specimens, though mostly in but small pieces ; one specimen, however, attains to about 40^{mm} in length, and in no case is there any sign of articulation. In two colonies there are basal radicle attachments, from the proximal end of the zoœcia. The zoœcia are rhomboidal, the oral aperture has two denticles on the straight, proximal margin ; in some parts the distal edge of the zoœcium is rounded and in the oldest parts is somewhat raised.

The avicularium is rounded at the distal end, is about the same width as the zoœcia, but longer, the opening is rounded above, and contracts to the two attachment ridges, which are near the proximal end of the avicularium. The proximal edge of the avicularian opening is either rounded or forms an obtuse angle ; the mandible, corresponding with the border of the avicularian chamber, thus extends distally considerably over the avicularian opening. The mandible, which is straight below, with straight sides, and rounded distal end, is among the larger mandibles of the Cheilostomata, exceeded however by those of *Flustra abyssicola* Sars, and *Membranipora perfragilis* MacG., all of which are of the same type.

The avicularian chamber as seen in transverse sections is enormous, reaching more than half way across the zoarium (fig. 9*e*). In a good specimen (242) the border of the avicularium is considerably raised, but this is not always the case.

The opercula have a much raised ridge on each side for the muscular attachments, and at each side a so-called foramina which fits over the opercular denticle, and in the covering membrane there is a « trabeculum » on each side of the operculum.

The ovarian opening does not occur in all the specimens, and is not very generally found in any. It is quite at the distal end of the zoœcium and at first is semicircular then becomes oval or nearly round.

(1) The operculum of *Euthyris clathrata* Harmer works upon condyles very similar to the projections in *Meliceritites*.

In *C. Dennanti* the distal end of the operculum is situated deeper than is usual in *Cellaria* and rests on a slight shelf. There are 20 tentacles, while in *C. clavata* from the CHALLENGER there are 15 ; CALVET gives 14-15 tentacles for *Cellaria salicornioides ;* 15 for *C. fistulosa ; C. malvinensis* B. has 14 tentacles.

Fossil : Cape Otway (Victoria).

HABITAT. — Exp. Antarct. Belge.

N° 242, Tangles I. Lat. 70° 48′ S.- Long. 91° 54′ W. ; 410 met. ; +0.6 C.

N° 282, Dredge I. Lat. 71° 09′ S.- Long. 89° 15′ W. ; 460 met. ; +0.3 C.

N°s 614, 623, 683, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

Cellaria dubia (Busk)

(Pl. II, fig. 12)

Salicornaria dubia. BUSK, Zool. Chall. Exp., vol. X, part. XXX, p. 91, pl. XII, fig. 2, and fig. 10 in the text.

There is only a small specimen (from 1012) in which the ends dichotomize, but without any completed articulation, though the breaking at the joint is commencing. This is however a young branch and the branches, as is usual in *Cellaria* are at first continuous, as I have shown in « Bry. S. W. Victoria », *Quart. Journ. Geol. Soc.*, vol. XXXVII, p. 320 ; and *Ann. Mag. Nat. Hist.*, ser. 5, vol. XX, p. 92, pl. IV, fig. 6.

The « interior ridges » are very pronounced, and stand out a long way, to an extent that I have seen in no other species, but there are more or less similar prominences or ridges in *C. bicornis* var. α Busk, *C. ovicellosa* Stol., *C. divaricata* Busk, *C. salicornioides* Lamx. The ridges are more raised at the growing end of the zoarium.

The operculum is almost semicircular and no teeth are visible in the spirit specimen, which is however too small for dissection.

HABITAT. — Off the Argentine, 600 fathoms (970 met.) (BUSK).

Exp. Antarct. Belge.

N° 1012, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.

Cellaria malvinensis (Busk)

(Pl. II, figs. 10*a*, *b* ; Pl. VIII. fig. 5)

Salicornaria malvinensis BUSK, Brit. Mus. Cat., p. 18. pl. LXIII, figs. 1-2 ; pl. LXV (bis), fig. 1.
Cellaria ornata D'ORBIGNY. Voyage dans l'Amérique méridionale, p. 9. pl. II, figs. 10-14.
For other synonyms see Miss JELLY's Catalogue.

This corresponds in size and other characters entirely with specimens from Baie Orange, sent to me by JULLIEN, whereas specimens from New Zealand are stouter with longer internodes, and the front of the zoœcium is less depressed, while the beak of the mandible is much narrower, so that perhaps they should be separated as varieties. The chitinous tubes at the joints occur all round the branch, and arise from the distal end of the zoœcia in the older

branch, being attached to the proximal end of the zoœcia in the newer branch. The leading characteristic of *C. malvinensis* is the situation of the large oral aperture close to the distal end of the zoœcium.

The Magellan specimen has 14 tentacles and the calcareous wall is more solid than is usual in *Cellaria*. The specimen *Cellaria ornata* 13607 from Patagonia in D'ORBIGNY's collection is but small, consisting of about four articulations. The chitinous tubes, of course are attached to the two nodes and are not free, as figured by D'ORBIGNY, pl. II, fig. 11. There are several triangular avicularia, which D'ORBIGNY does not seem to have noticed, when he described and figured this specimen. In the Cape Horn material there is *C. malvinensis* of the same size as D'ORBIGNY's specimen as well as *Cellaria clavata* Busk, and *C. variabilis* Busk.

MACGILLIVRAY [1] has named a fossil from Curdies Creek, Victoria, *C. contingua*, which had been referred to by me as *C. malvinensis*, and I think MACGILLIVRAY is right, as the avicularium is not symmetrical, and differs from that of the South American form, but with regard to the zoœcia being disposed alternately in longitudinal series, it should be remembered that the position is not always constant ; for example in *C. variabilis* B. (from Port Elizabeth, South Africa), a species closely allied to *C. malvinensis* there are in some parts of a colony zoœcia alternate in longitudinal series, while in other parts they are opposite laterally, and the same is the case in the small specimen of *C. malvinensis* now described.

HABITAT. — Falkland Island (Busk) ; Kerguelen 28 fathoms (45 metres) ; Marion Island 50-75 fathoms (80-120 metres) ; Patagonia 45 fathoms (73 metres) ; Fiji 1450 fathoms (2450 metres) (CHALL.) ; Baie Orange (JULL.).

Fossil : Australia and New Zealand.

Exp. Antarct. Belge.

N° 1068. On the carapace of *Eurypodius Latreilli*. Straits of Magellan.

Cellaria lata sp. nov.

(Pl. II, fig. 11

There is only one small unbranched specimen. The zoœcia are very wide with interior ridges, which however are not raised as in *C. dubia* Busk, except near the oral aperture ; and above the aperture there is a projection on each side. The oral aperture is wide, crenulated on the distal edge, and has two denticles on the proximal border.

The ovicell is but very slightly raised, however, in the semitransparent spirit specimen it can be distinctly seen, with its semicircular or round aperture just on the zoœcial border.

HABITAT. — Exp. Antarct. Belge.

N° 1012, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.

(1) Tert. Polyzoa of Victoria, p. 28, pl. III, fig. 18.

Megapora hyalina sp. nov.

(Pl. II, figs. 13*a*, *b*, and figure 1 in the text)

Zoarium adnate. Zoœcia hyaline, ovate, with enclosed area the border of which is crenulate. There are on the front of the area two elongate foramina, somewhat irregularly placed, but far from the oral aperture and not near to the crenulated border. The oral orifice is straight on the lower edge and the lower part is raised, so that the proximal part of the operculum, which is darker and thicker than the rest, is directed upwards, as if it were hinged, but there is no calcareous bar between the two parts. The sides of the oral aperture are nearly straight, the complete aperture having much the same shape as that of *Lepralia*, as the lower part does not extend laterally. There are six oral spines, and also one, two or even three minute spines on the zoœcium outside the area about half way down. In the first specimen received, only the pores of the small broken lateral spines were seen and the description was first drawn up from one small specimen on a large stone, on which it was awkwardly placed for examination, but since the plates were in the lithographer's hands, another specimen from 319 has been sent to me, and on this the oral and minute spines were first found.

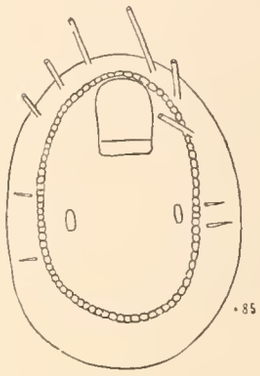

Fig. 1. — *Megapora hyalina* nov. Showing the oral spines, and the small lateral spines.

This has many characters in common with the northern *M. ringens* Busk, in which the operculum readily separates into two parts (Pl. III, fig. 13). In some specimens from Shetland, kindly given to me by Canon Norman, I am unable to find any vibracula, and there is no calcareous bar separating the two parts of the operculum as some previous figures seem to indicate. The frontal surface of these specimens is finely granular. Re-examination of *M. ringens* has not shown any foramina or opesiules.

These two species are at any rate closely allied, the main difference being that in *M. ringens* the lower darker part of the operculum, or opercular appendage, spreads out laterally (Pl. III, fig. 13). There is a relationship with *Micropora*, and it will be seen, that there is much in common with *Setosella vulnerata* Busk.

M. ringens B. has been found off Shetland and Bergen.

Habitat. — Exp. Antarct. Belge.

N° 392, Eel trap I. Lat. 71° 15′ S.- Lat. 87° 39′ W. ; 436 met. ; —0.2 C.

N° 319bis, Tangles II. Lat. 71° 14′ S.- Long. 89° 14′ W. ; 460 met. ; +0.3 C.

On *Errina gracilis* Marenzeller, a species mentioned by Marenzeller from Tangles II though not from 319. The *Errina* is said to have been growing on a Gasteropod.

Micropora coreacea Esper.

A few zoœcia on a stone are considered to belong to this species.

Habitat. — N° 619, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Micropora brevissima sp. nov.

(Pl. II, figs. 7a-c)

Zoarium incrusting. Zoœcia broadly ovate, with distinct raised margins, but there are no lateral « knobs », surface minutely granular and punctate, an elongate foramen on each side a little below the oral aperture ; the oral aperture is very wide and short, directed forwards rather than upwards. One small triangular avicularium (683) above the orifice has been found, but they are usually absent, though from Cape Horn they occur frequently. Ovicell globular, raised, smooth or slightly granular, and the ovicelligerous zoœcia are the same size as the other zoœcia. There are pore chambers round the zoœcia, about six lateral ones on each side and one distal. There are two oral spines, only seen however on the terminal zoœcia.

This differs from *M. coriacea* Esper, in having the oral aperture very wide and short, in the absence of « knobs », and of the projection on the ovicell, though a trace of this can sometimes be seen. The mandibles, as prepared from Cape Horn material, are about double the size of those of *M. coriacea* and of the same type although there are minor differences. It much resembles *M. perforata* MacG., in shape and other respects, but the operculum is wider and shorter, perhaps they should be considered varieties.

In *M. stenostoma* Busk the ovicelligerous zoœcia are much larger than the others, whereas in *M. coriacea* and *M. brevissima* they are the same size.

The *Escharina peruviana* d'Orb. is probably *M. perforata* MacG.

Habitat. — Cape Horn, and apparently from New Zealand.

Exp. Antarct. Belge.

N° 288 on stones, dry, Dredge I. Lat. 71° 09′ S.- Long. 89° 15′ W. ; 460 met. ; +0.3 C.
Nos 591, 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.
Nos 619, 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.
N° 820, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W. ; 569 met. ; +0.8 C.

The geographical distribution of *Micropora* would seem to be (1).

Northern :	*M.* (Cellaria) *borealis* Busk ; *M. coriacea* Esp.
Mediterranean :	*M. coriacea* Esp., *M. impressa* Moll.
N. Atlantic :	*M. coriacea* Esp.
S. Atlantic :	*M. uncifera* B., *M. coriacea* Esp.
Australasian :	*M. uncifera* B., *M. impressa* Moll. (A. W. W. coll.).
	M. elongata Hincks, *M. perforata* MacG.
S. Indian Ocean :	*M. coriacea* Esp.
N. Pacific :	*M. borealis* B.
S. Pacific :	*M. perforata* Mac G., as *peruviana* d'Orb.
S. American :	*M. uncifera* B., *M. brevissima* nov.
Antarctic :	*M. coriacea* Esp., *M. brevissima* nov.

(1) I have given similar geographical lists of *Flustra* (*Journ. Roy. Micr. Soc.*, 1896, p. 286) ; of *Membranipora* (*Journ. Linn. Soc. Zool.*, vol. XXVI, p. 664) ; of *Cribrilina* (*Journ. Linn. Soc. Zool.*, vol. XXVIII, p. 64). Species printed in italics occur from a second region.

Cribrilinidæ

I cannot at all follow JULLIEN when he replaces the family *Cribrilinidæ* by the *Costulidæ*, and think, that instead of considering the ribbed structure of the front as of chief importance we may have to break up the *Cribrilinidæ*, by placing various species elsewhere, and only considering the ribbed structure of generic value, or in some cases of perhaps specific value, as already hinted at by HARMER.

A radiate structure of the pores is found in a great number of genera, then between the pores we may get tubercles, formed as in various species of *Lepralia*, when a young growing zoœcium shows many of the characters of *Cribrilina*, the surface in the growing edges is first formed by a smooth calcareous growth, and any ridges or knobs are subsequent ; these cannot however be compared with spines. A better knowledge of the growing stages is much required. In such species as *Pseudoflustra palmata* Sars, *Cyclicopora polaris* sp. nov. and a large number with a row of pores round the border, the pores are first formed, and then a ridge grows between each pore.

The ribbed structure seems to be foreshadowed in many cases, and we find the cribrilline form with Microporellidan structure ; with Gemellipora aperture, as in *C. clithridiata* Waters ; and as mentioned by HARMER also in *Catenicella*.

The choice of the fossil *Esharella Arge* d'Orb. to be the type, and the only representative of the genus *Costula*, from which the family name is taken, is peculiarly unfortunate, as according to CANU the fossil is lost, and there is every probability, that the figure and description given by D'ORBIGNY were from a worn specimen. HINCKS discusses the *Costulidæ* in « Critical Notes on the Polyzoa » (*Ann. Mag. Nat. Hist.*, ser. 6, vol. V, p. 89, &c.).

Cribrilina projecta sp. nov.

(Pl. II, figs. 14*a-d*)

Zoœcia broadly oval, with about 11-14 rows of pores on each side, at the junction of two or three zoœcia there is a small raised triangular avicularium, which has the appearance of being at the proximal end of the zoœcium, whereas it is in interzoœcial spaces. The mandible (fig. *a*) is narrow and long. The peristome, raised on the distal edge, divides into prominent processes, and the proximal edge is also sometimes raised. Whether one or two pores, immediately below the peristome, belong to the surface perforations or are suboral pores is uncertain, and the ovicells are unknown. There are pore chambers, and the primary zoœcium has 12 spines.

There are no complete polypides, histolysis having commenced, but sections show brown bodies and groups of cells that had not lost their vitality, also the avicularian muscles, but not the general muscular system, while sections cut longitudinally show in the outer membrane, between the pores, cavities containing granular bodies (figs. 14*c*, *d*). The front membrane of the zoœcial chamber, or perhaps we should say the base of the compensation sac, is much thicker than the other membranes, apparently being somewhat chitinous. This differs from *C. setirostris* MacG. in having so many more pores, and in the smaller avicularia not having a

setiform prolongation, also in having a projecting peristome. It may be the *C. cornuta* MacG. (1) described fossil from Victoria, but the avicularia do not seem to quite correspond. *C. projecta* would, on account of the raised inferior border of the peristome, belong to *Reginella* of JULLIEN, but a genus based upon such an unsatisfactory character, as a slight protuberance on the inferior border cannot be retained.

HABITAT. — Exp. Antarct. Belge.

Nos 563, 567, 571, 591, 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.

Pieces from 567, on stalk of seaweed and some on *Cellepora horneroides* nov.

Hiantopora monoceros (Busk) non Reuss

Lepralia monoceros BUSK, Brit. Mus. Cat., p. 72, pl. XCIII, figs. 5, 6.
Cribrilina monoceros MACGILLIVRAY, Zool. of Victoria, dec. XIX, p. 319, pl. 187, fig. 6.
Hiantopora monoceros MACGILLIVRAY, Tert. Polyzoa of Victoria, p. 62, pl. VIII, fig. 22.
For other synonyms see Miss JELLY's Catalogue. This cannot be considered specifically identical with *Porina larvalis* MacG.

In a specimen from 139 there are very long suboral glands near the zoœcial wall, and the ovaria are situated in various positions, most are near the distal end consisting usually of four ovarian cells. There may be ovaria close to the lateral walls at the distal end, formed of two ovarian cells, and in one case there is an ovarium at the proximal end, consisting of two cells. In the frontal pores there is a small denticle giving the pore a more or less kidney-shape, which is common to *H. Liversidgei* T. Woods and some other species.

HABITAT. — Straits of Magellan 10-20 fath. (B.), and 6-10 fath. (RIDLEY) ; Tierra del Fuego 19 fath. (B.), and specimens in British Museum 30 fath. ; Falkland Island 10 fath. (B.) ; Cape Horn 40 fath. (B.) ; Baie Orange (JULLIEN) ; CHALLENGER Stations 303, 1325 fath.; St. 313, 55 fath. ; St. 315, 12 fath. ; St. 303, 313, 315 are all South American ; St. 253, 3125 fath. N. Pacific ; and specimen from Station 320, 600 fath. off Argentine (not mentioned by BUSK) is probably a variety ; Victoria (MAC G.) New South Wales (W.) ; Napier, Wanganui, Foveaux St., Dusky Sound ; New Zealand (HAMILTON).

Fossil : Muddy Creek (Victoria) ; Bairnsdale (Gippsland) ; Napier and Petané (New Zealand).

Exp. Antarct. Belge.

N° 139. Porto Torro, Ile Navarin, Magellanes, Chili.

Microporella Malusii (Aud.)

Pl. III, figs. 4*a-d*)

Specimens from Porto Torro, Ile Navarin, Chili, have the zoœcia larger and the oral aperture about one third larger than British and Mediterranean specimens. There is a line forming an area within which the stellate pores occur ; in these pores the teeth do not join

(1) MACGILLIVRAY, Tert. Polyzoa of Victoria, p. 58, pl. VIII, figs. 10-12.

in the middle, being irregular in shape, sometimes bifurcate. The area is larger than that of *Lepralia thyreopora* (Busk), to which however it is most nearly related, though possibly Hincks is not correct in uniting Busk's species with *M. Malusii* Aud. and speaking of it as a very important variation.

There has been a tendency to create too many varieties of the common *M. Malusii*, and *M. ciliata*, even where there are considerable differences, which in other cases would have been thought sufficient for specific separation. Hincks considered the range was very great, and we certainly find gradual change of the number and position of the pores, showing how impossible it is to place much reliance on the surface pores for generic division.

On the other hand, Jullien and Neviani would make the shape of the suboral pore of generic value, proposing several new genera based on the shape of the pore. Very closely related to the *Malusii* and *decorata* group there are forms, in which the pore takes quite different shapes, and I cannot follow Neviani in all the divisions he makes.

The *Microporella Malusii*, var. *umbonata* MacG. has ovicelligerous cells with apertures double the width of those of other zoœcia, and in a specimen sent me as *Microporella violacea*, from Guernsey the ovicelligerous zoœcia are much the largest having three or more median pores, while the ordinary zoœcia have uniformly two median pores. This is doubtless the var. α of Hincks, and in the Paris Museum there is a specimen from Baie de Cadiz, 30 metres, dredged by the Talisman ; also in the British Museum there is a similar one named *M. violacea*. It would belong to the genus *Heckelia* of Neviani, and it may be that in *M. Malusii*, var. *umbonata* and this *violacea* we have the commencement of characters now become general in *Adeonella*.

Habitat. — *M. Malusii* seems to be quite cosmopolitan : the variety *thyreopora* is also widely distributed, and *Malusii* has been found fossil in the Tertiaries of Europe and Australia.

Exp. Antarct. Belge.
Nos 139, 140. Porto Torro, Ile Navarin, Magellanes, Chili. Jan. 3rd, 1898.

Microporella parvipora sp. nov.

(Pl. III, fig. 2*a*, *b*)

Zoarium adnate. Zoœcia ovate, distinct, near the distal end and border small pores, which do not seem to be stellate. Oral aperture arched above, straight below, with 6 oral spines. Median pore crescentic, placed above the middle of the zoœcium.

This in general appearance much resembles *M. Malusii* Aud., but differs in having small zoœcia, and much smaller aperture, also the pores are smaller and not stellate. In the specimen drawn I could not distinguish any oral spines, but found them in some others.

In the British Museum there is a *Microporella* from Tierra del Fuego, which is either this species or is closely allied to it, though the median pore appears to be much larger, but the specimen being worn the characters are not very clear. From New Zealand I have a specimen with large crescentic pore, with internal denticles, but without stellate pores, and this no doubt is *M. parvipora*. In the d'Orbigny collection it occurs from the Falkland Islands, No 13676.

Habitat. — Exp. Antarct. Belge.
Nos 570, 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.
N° 619, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

Microporella exigua sp. nov.

(Pl. III, figs. 3*a*, *b*)

Zoarium adnate (on stones). Zoœcia oval, ventricose, porcellanous, smooth ; the median pore is round and situated about the middle of the zoœcium on a slight elevation ; the pores on the surface are round and do not show any signs of stellate structure, being less numerous near the border than in *M. parvipora* nov. ; further there are usually two pores immediately below the aperture ; on the distal border of the aperture there are eight spines. The oral aperture is relatively longer than in other *Microporellæ*. There is one distal pore chamber, and apparently three lateral ones. The ovicell is unknown. This species is smaller than either *M. Malusii* Aud. or *M. parvipora* nov., but is closely allied to the later.

Habitat. — Exp. Antarct. Belge.
N° 570, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C., one specimen.
Nos 619, 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 met. ; +0.9 C. ; only a few zoœcia.

Microporella proxima sp. nov.

(Pl. II, fig. 16)

Zoarium incrusting. Zoœcia smooth, porcellanous, with small round pores, not stellate, situated near the border and at the distal end ; also a small round median pore near to the oral aperture, and sometimes an umbo below. There are six oral spines at the distal border of the semicircular aperture, and on a colony from 570 there is an ovicell which is globular, raised, smooth, with a row of small pores near to the base. Frequently the zoœcia are not in contact, and then the interspaces are filled up by an irregular growth with moderate sized pores in the calcareous wall.

This and *M. exigua* nov. are closely allied, in some respects resembling the northern *M. impressa* Aud. from which however they are quite distinct. Both Hincks and I have made a mistake in considering the *M. impressa* Aud. and *M. bimucronata* Moll. (1), as varieties. They both occur in the Mediterranean and off the British coasts, and they can be distinguished by the pores, for *M. impressa* has a small round median pore, and the surface pores are also round and plain, whereas in *M. bimucronata* the median pore has a cruciform opening and the surface pores are stellate. A most interesting fact, of greater importance is, that the central zoœcium, namely the primary, has in neither species a median pore but instead there is a sinus in the aperture, and in *M. impressa* the operculum of the primary is as seen in specimens

(1) See my figure. (*Ann. Mag. Nat. Hist.*, ser. 5, vol. III, pl. VIII, figs. 2, 3.)

from Capri and Guernsey, Hippothoan, being similar to that of *H. hyalina* L., while in *M. bimucronata* from Guernsey the operculum of the central zoœcium is Schiporellidan, like *S. auriculata* Hass.

The Antarctic species *M. parvipora* nov., *M. exigua* nov., *M. proxima* nov. have some points in common with *M. Malusii* Aud., and perhaps with a sufficient series we shall be able to fill up the links between *M. impressa* Aud. and *M. Malusii* Aud. though, according to those who lay great stress on the shape of the median pore, they would be placed in different genera. The variation in the position and form of the surface pores is very great in this group, and should cause us to hesitate before attaching too much classificatory value to these characters.

From Port Phillip Heads, Victoria there is an allied hyaline form, with a transverse dentate median pore, and on the front there are small round pores enclosed in an area. This is the species described by Hincks as a variety of *M. diadema* MacG. (1), form *angustipora*, but the pore is transverse and in other respects it is quite different from *angustipora*, so that we cannot doubt that a mistake has been made. I think it might be called *Microporella transversa*.

Habitat. — Exp. Antarct. Belge.
N° 570, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.
N°s 619, 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.
N° 820, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W. ; 569 met. ; +0.8 C.

Microporella trinervis sp. nov.

(Pl. II, fig. 17)

Zoarium adnate. Zoœcia oval, distinct, moderately raised with deep depressions between the zoœcia. Aperture wide, with the distal end nearly semicircular, and the anterior straight, the lower peristomial lip is raised, and has a slight notch. In the middle of the front wall there is a large pore usually elongate, but varying considerably in form, so that in a few cases it might be called semilunar.

Within the calcareous wall there is a tube, which starts from the peristomial lip and divides close to the median pore, one branch turning to each side of the zoœcium and ending with a round opening close to the aperture of the next lower zoœcium. Ovicell not much raised with a median ridge. The specimens are all dry, and at present we cannot follow the significance of the internal tubes, which do not seem to have been found in any other Chilostomatous Bryozoa, and probably a new genus will have to be made, though it has been provisionally placed under *Microporella*. Only two ovicells were found. The internal tubes can be traced more easily, through having been somewhat stained by the organic matter. There is a further peculiarity in the zoœcia, being evidently connected in the upper part, instead of near the basal part, as usual.

Habitat. — Exp. Antarct. Belge.
N° 391, Eel trap I. Lat. 71° 15′ S.- Long. 87° 39′ W. ; 436 met. ; —0.2 C.

(1) *Ann. Mag. Nat. Hist.*, ser. 5, vol. XV, p. 249, pl. VIII, fig. 3*a*.

Microporella divaricata Canu

Pl. III, figs. 1*a-c*

Microporella divaricata Canu, Mém. de la Société Geol. de France, 1903.

Zoarium erect, bilaminate. Zoœcia having the surface only very slightly convex, and the sides of the zoœcia straight, separated by distinct lines, while the distal end is curved; the entire surface perforated. The oral aperture is fairly large; about the middle of the front of the zoœcium there is a large semilunate median pore, and at the proximal end of many zoœcia there is an imperforate semicircular depression, the same character being marked in the fossil. This I take it, is the commencement of an ovicell, similar depressions being seen, in *Retepora* and other genera, when the ovicells are forming. There are two lateral rosette plates, and two distal ones with numerous pores.

Onchoporella selenoides Ortmann [1] from Japan is very similar, but is not perforated over the surface.

Monsieur Canu, after seeing my drawings, showed me this species fossil from Patagonia, named by him *Ortmanella divaricata*, as he proposed to place it in a new genus. From Patagonia there are many narrow, bilaminate branching specimens of this fossil.

Canu considered that the median pore did not communicate directly with the interior of the zoœcium in the fossils, and at his request I again examined the small Antarctic specimen, which had when dredged, no doubt been dead some time, so that the soft parts were not preserved. It is mounted in balsam, which is not the most favorable for the examination; at any rate I was unable to find any indication of the connection through the median pore being abnormal. In consequence of my remarks, Canu intended to re-examine his fossils, by means of sections, but being for a time, incapacitated from work through illness, he very generously placed some of his material at my disposal for the study of the median pore. I made my study on two fossils, frequently examining the longitudinal and transverse sections, during the course of preparation.

The most important point was the state of fossilisation, for a calcareous deposit has taken place in each zoœcium, sometimes to so great an extent as to nearly fill it up, at other times only forming a thick layer of calcite on the inside of the cell wall. Now when the outer or shell layer is broken away, this internal cast shows the markings of the surface pores, but the median pore is not found as a larger one. This gives the appearance of there being two layers of shell wall, which is not the case, though it is not very uncommon to find various species of recent Bryozoa, which flake away as if there were two distinct shell layers.

The filling up of the zoœcial chamber with calcite has made the study more difficult; however the sections prepared gave no proof of there being a separate chamber into which the median pore opens. Dark deposits, presumably of iron, are seen in the pore tubes, and often near the inner opening of the median pore, as well as in other places, but these metallic markings, to my interpretation, indicate that there has been organic matter here, causing precipitation. These dark marks near the median pore are in the calcite deposit. When Canu is again able to make preparations, he will no doubt check my results, and we shall see if he finds sufficient reason for placing this species in a new genus.

(1) Ortmann, A., Die japanische Bryozoenfauna. (*Arch. f. Naturgesch.*, 1890, p. 28, pl. II, fig. 2.)

There is one interesting thing, shown in one of the sections, for before fossilisation the two layers have been slightly separated, and the various zoœcial chambers have been somewhat displaced. The individual zoœcia of the fossil now readily separate.

Habitat. — Exp. Antarct. Belge.
N° 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; + 0.9 C.
Fossil : Patagonia (Aquitanian or Burdigalian).

Lepralia frigida sp. nov.

(Pl. III, figs. 9*a*, *b*, & Pl. VIII, fig. 9)

Zoarium adnate. Zoœcia ovate or in older growth irregularly hexagonal, surface porcellanous and granular. In all but the younger zoœcia, there is near the aperture but rather below it, a stout process, which has on the inner side a semicircular avicularium, though from the position it is not always possible to see the opening and mandible. The aperture is much depressed, so that the shape of the opercular aperture can only be distinguished when it is possible to look down the peristome ; the operculum has the distal end rounded, the sides nearly straight and the proximal edge subtriangular ; there is a thickened ridge curved at each side and the muscular attachment is very high up, being close to the distal end. The ovicell is small, short, distinct, not much raised, very finely granular, with the zoœcial wall in some cases covering the sides.

A piece decalcified, in order to prepare out the opercula shows, that the zoœcial chambers are connected together through long tubes (Pl. VIII, fig. 9) one to each neighbouring zoœcium, with a communication plate near the one end ; and as there are some other species connected by long tubes, this structure will have to be taken into consideration in classification. The zoœcial chamber as seen from below is nearly round, but as seen from above it expands to the opercular end.

This is an interesting species in showing resemblances to *Lepralia* and to *Schizoporella* as well as in having the muscular attachment of the operculum so near to the distal end. The thickened ridges of the operculum suggest *Lepralia,* but in not having a straight proximal edge it is like *Schizoporella.* In the group known as *Schizoporella* the opercular attachment is, in species when there is a wide sinus, placed higher than in other cases ; as examples of the wide sinus are *S. biaperta* Mich., *S. marsupifera* Busk, *S. laevigata* Waters, *S. tumida* Hincks, whereas where there is distinct sinus as in *S. Cecilii* Aud., *S. circinata* H., *S. vulgaris* Moll, *S. armata* Hincks, *S. cribrillifera* Hincks [1] the muscular attachments are placed lower down.

Neviani has given the name *Hippoporina* to the *Lepralia* of Hincks, because the genus *Lepralia* had formerly included forms now belonging to various genera, and perhaps Hincks would have done better to have given the genus a new name, instead of retaining the name for a subdivision, after the genus had been entirely subdivided. However the *Lepralia* of Hincks has been generally adopted, and while it may ultimately be advisable to accept

(1) *S. cribrillifera* Hincks and perhaps *S. armata* H., as well as *S. magnifica* H. may fall into *Phonicosia* of Jullien, but the genus made from one specimen and based on one character cannot be accepted until further work has been given to the group.

Neviani's genus, it is perhaps better to adhere to Hincks, until a careful revision of this and allied genera has been made, as not all that are now placed under *Lepralia* will belong to *Hippoporina*.

Habitat. — Exp. Antarct. Belge.
N° 288, Dredge I. Lat. 71° 09′ S.- Long. 89° 15′ W.; 460 met.; +0.3 C.
N°s 332, 373, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.
N°s 596, 1250, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.
N° 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500? met.; +0.9 C.

Lepralia galeata Busk

(Pl. VIII, figs. 11*a*, *b*)

Lepralia galeata Busk, Brit Mar. Polyzoa, p. 66, pl. XCIV, figs. 1-2; (*Phil. Trans.*, vol. CLXVIII, p. 3).
Porina galeata Ridley, Proc. Zool. Soc., 1881, p. 48.

The specimen from Porto Torro has on the dorsal surface large radicle processes, on account of which I provisionally named it *radicifera*, but there does not seem to be sufficient reason for separating it from *galeata*. The surface has large pores, the ovicell being also perforated, though with somewhat smaller pores than those on the front of the zoœcium. The aperture has a wide sinus and below it there is an avicularium with an oval mandible. The thickened margin of the aperture is continuous with the raised smooth part upon which the avicularium is situated. The moderately large oral glands are attached to the diaphragm.

There are 16, 17 tentacles, and there are ova in the ovicells, and ovaria in the zoœcia, together with testes and spermatozoa.

In the specimen in the British Museum collection, described in Busk's « Marine Polyzoa », the avicularia only occur to a few zoœcia.

This is much like the *S. pachnoides* MacG. which however has not as large pores and has a triangular mandible. I have also a specimen sent to me marked « Singapore or Phillipines » which may be this species, though it has a triangular mandible replaced in some cases by a much larger one, which sometimes becomes duck-billed shaped. In *S. galeata* from Kerguelen, collected by the English Venus Expedition, and now in the British Museum, there are only pores round the border and the mandibles are spatulate.

The aperture in *S. nivea* B. and *S. furcata* B. is very similar to that of *S. galeata*.

Habitat. — Kerguelen; Falkland Islands; Straits of Magellan; (Elizabeth Island 6 fathoms, and Sandy Point 7-10 fathoms) (Ridley).

Exp. Antarct. Belge.
N° 139. Porto Torro, Ile Navarin, Magellanes, Chili. Jan. 3rd, 1898.

SCHIZOPORELLA

In my paper on the « Bryozoa from Madeira [1] » I mentioned that a revision of *Schizoporella* as now understood was required and indicated certain groups. Regarding the

(1) *Journ. Roy. Micr. Soc.*, 1899, p. 7.

« triangula » group, I now consider that it should be separated as a genus, and will temporarily speak of it as the *Gemellipora* group of SMITT (1), though I hesitate to use the generic name, as it seems possible, that as revision progresses, the species first mentioned by SMITT, may have to remain under *Pasythea*, while closely allied to others of the group. The opercula of all are subtriangular (2) with two small lateral projections, corresponding with two small lateral teeth in the aperture, the muscular attachment is close to the side of the operculum (Pl. VIII, fig. 25), and in this respect entirely differs from the operculum of such species as *S. Cecilii* Aud., *S. Ridleyi* MacG., &c. The aperture of the ovicelligerous zoœcia differs in shape from that of the ordinary zoœcia, in most species being wider with a flatter sinus. In this character it is similar to *Hippothoa*, and they are nearly allied genera. In the *Gemellipora* group as restricted, the front of the zoœcium, as at present known, has large pores and the ovicell is also more or less perforated. The size of the aperture is, within moderate limits, the same throughout the group.

The species now placed under *Gemellipora* are *G. triangula* H., *G. lata* MacG., *G. subimmersa* MacG., *G. ambita* Waters, *G. arrogata* Waters, *G. venusta* Norm., *G. scabra* Hincks, *G. cincta*, var. H., *G. inconspicua* Hincks. As this group is not represented in the Antarctic, further discussion is not required.

The next is the *S. Ridleyi* group, in which immediately below the aperture there is an avicularian chamber spreading out on both sides. The operculum fits into a wide sinus, and has muscular dots some distance from the edge of the operculum ; and here again throughout the group the aperture is about the same size, and the oral operculum closes the ovicell (3) (Pl. VIII, fig. 23). The surface of the zoœcium and of the ovicell is usually smooth.

JULLIEN based his genus *Buffonella* on the imperforate front, and said there was only one species known. Perhaps it might be as well to extend JULLIEN's diagnosis and retain the genus *Buffonella*.

The species examined are *S. Ridleyi* MacG., *S. simplex* d'Orb., *S. rimosa* Jull., *S. marsupifera* B., *S. tumida* H., *S. levata* H., *S. laevigata* Waters, also *S. Edwardsiana* d'Orb. This is a group well represented in the southern hemisphere but only known in the northern from one species.

HINCKS when he described the genus *Schizoporella* did not fix on any species as the type, but mentioned *S. sanguinea* Norm., and *S. linearis* Hass. as belonging to it. Either of these can be taken as the type, and in both the muscular attachment is close to the side of the operculum ; the lower edge of the operculum is straight, with a projection in the middle, fitting into the sinus of the aperture (Pl. VIII, fig. 22). The front walls of the zoœcia and of the ovicells are perforate. This includes *S. linearis* Hass., *S. sanguinea* Norm., *S. auriculata* Hass., &c., and is closely allied to the *Gemellipora* group, but the ovicelligerous zoœcia do not differ from the ordinary zoœcia. This group may ultimately remain

(1) Floridan Bryozoa, p. 35.

(2) *Cribrilina clithridiata* Waters has a similarly shaped aperture with an interior tooth on each side, where the aperture contracts, and it differs so much from other *Cribrilina* in this particular, that its position is doubtful at present.

(3) *S. biaperta* Mich. and *S. divisopora* Waters have similar opercula.

Schizoporella, a name, which at present will be more widely used, until various groups are definitely separated.

The *S. Cecilii* Aud. group, containing *S. circinata* MacG., and *S. pes anseris* Smitt, has an operculum with a moveable tongue in the middle of the nearly straight proximal edge (Pl. VIII, fig. 24). *Phonicosia Jousseamei* Jullien may belong to this group, but as it was described from one small dead specimen, without opercula, we are not sure as to the structure, and the sinus is wider than in any of the mentioned species.

Another group seems to be formed by *S. tuberosa* Reuss, *S. polymorpha* Busk, *S. filocincta* Waters, *S. conservata* Waters, all of which have very large opercula with the muscular attachments some distance from the edge (Pl. VIII, fig. 21).

The necessity of a revision is shown by the fact that Busk placed under *Lepralia* his *L. incisa* B. of the Challenger Expedition, and described another species with a similar aperture as *Schizoporella nivea* B. and these two seem to be the same species or very closely allied.

In *Lepralia* the muscular attachments seem always to be at the side of the operculum, usually part of a ridge. *Lepralia vestita* Hincks must be removed from *Lepralia* to *Schizoporella,* on account of the muscular attachments being far from the edge.

Schizoporella Ridleyi MacGillivray

Schizoporella Ridleyi MacGillivray. *Trans. Roy. Soc. Vict.*, vol. XIX, p. 191, pl. I, fig. 1; *Prod. Zool. Vict.*, dec. XIV, p. 148, pl. 138, fig. 6; Tert. Polyzoa Victoria, p. 85, pl. XI, fig. 18; Quelch, *Ann. Mag. Nat. Hist.*, ser. 5, vol. XIII, p. 215; Waters, *Quart. Journ. Geol. Soc.*, vol. XLIII, p. 64; Hamilton, *Trans. New Zealand Inst.*, vol. XXX, p. 192.

Schizoporella maruspium (of MacG.). Ridley, *Proc. Zool. Soc.*, 1881, p. 48, pl. VI, fig. 6.

Buffonella rimosa Jullien, Mission du Cap Horn, p. 47, pl. I, fig. 1.

There are only a few zoœcia, and there is only one small globular ovicell. There is a distal pore chamber and usually four lateral pore chambers, but this is subject to variation as is seen in a specimen sent to me by Jullien, as *Buffonella rimosa* J.

It has been a question whether this is the *Escharina simplex* d'Orb. described as punctured, however this was a mistake of d'Orbigny's, as the original specimen in the Museum in Paris is granular. The *S. Ridleyi* is a smaller species than *S. simplex,* with smaller aperture and this last is referred to on page 51.

This, as already stated, belongs to a group throughout which the opercula are almost identical, having the muscular attachments some distance from the border, and there is a tumid avicularium below the aperture, with an internal tubular connection at each side of the avicularian chamber. The surface of the zoarium and the ovicell is smooth, or nearly so, in the group, and if Jullien's description of *Buffonella* were not so limited, the generic name could have been adopted, and this may yet be the best course.

Habitat. — Victoria, New Zealand (Ham.); Elizabeth Island, Straits of Magellan (Ridley); Ile Hoste, Baie Orange (Jull.).

Fossil : New Zealand (Wat.); Muddy Creek (MacG.).

Exp. Antarct. Belge.

N° 570 on stone, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

N° 820, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W.; 569 met.; −0.8 C.

Schizoporella simplex (d'Orb.) (non Johnst.)

Pl. III, fig. 6)

Escharina simplex D'ORBIGNY, Voyage dans l'Amérique méridionale, p. 13, pl. V, figs. 5, 8.
Reptoporina simplex D'ORBIGNY, Pal. fr., Terr. crét., p. 442.

Zoarium adnate. Zoœcia ovate, surface faintly granular; oral aperture with a distinct narrow sinus, and a little below the aperture there is a chamber, which must probably be considered as a degenerate avicularium. It has a small round opening, but there does not appear to be any mandible, and from each side of this chamber, there is a tube opening on the interior of the zoœcium, but visible through the cell wall. As I have mentioned, in previous papers, avicularia are frequently connected with two different parts of the zoœcium, so that this chamber may be looked upon as typical avicularian, although the mandible is wanting and the chamber seems too small to be functional.

The *S. simplex* d'Orb. 13673 from the Falkland Islands has the avicularian chamber as just described, and the surface is finely granular, not punctured, as stated by D'ORBIGNY. Before examining the type I had not recognised the identity, and had named the Antarctic form *S. bijuncta* nov. but although D'ORBIGNY's description was not quite correct it is perhaps better to retain the name he gave.

The Antarctic *S. simplex* d'Orb. has the aperture just about twice the width of that of *S. Ridleyi* MacG., but they are in many respects very similar. The smaller *S. Ridleyi* is however smooth, whereas *simplex* is granular.

HABITAT. — Falkland Islands (D'ORB.).
Exp. Antarct. Belge.
N° 332, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.
N° 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.
N° 392, Eel trap I. Lat. 71° 15′ S.- Long. 87° 39′ W.; 436 met.; —0.2 C.

Schizoporella hosteensis (Jullien)

(Pl. III, figs. 11*a*, *b*, *c*)

Lacerna hosteensis JULLIEN, Mission scient. du Cap Horn, p. 48, pl. I, fig. 2.
Lacerna de Carforli JULLIEN, Ibid., name on plate I, fig. 2.

Specimens from the Antarctic are in most respects much like JULLIEN's, but differ in being slightly granular, whereas JULLIEN's from Cape Horn are smooth. A specimen sent to me by the late Dr JULLIEN cannot however be called hyaline, as described by him; and it also has the zoœcia smaller than the mature zoœcia of the Antarctic form, but as can be seen in fig. 11*a*, the early zoœcia vary much in size.

In the specimens from 619, the zoœcia as a rule, have only two oral spines, but in a few cases there are four; while from 596 there are never less than four. The ovicell of 619 is smooth, and has a row of pores round the border.

In the older zoœcia the pores round the border are often indistinguishable, and there are frequently two larger pores near the aperture. The pore chambers can be seen in the right hand zoœcium fig. 11*a*. There are 10 spines to the oval primary zoœcium.

Habitat. — L'île Hoste, Baie Orange, on seaweeds (Jullien); Cape Horn on *Aspidostoma gigantea* B., moderately granular.

Exp. Antarct. Belge.
N° 596, Tangles VII on shell. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; —0.8 C.
N° 619, Tangles VIII on stones. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.
N° 683, do (one decidedly granular, others slightly so).

Schizoporella Eatoni (Busk)

Pl. III, fig. 10)

Lepralia eatoni Busk, *Ann. Mag. Nat. Hist.*, ser. 4, vol. XVII, p. 117; *Phil. Trans.*, vol. CLXVIII, p. 191, pl. X, figs. 7, 8, 1879; Kirkpatrick Report of the Collections of Natural History made in the Antarctic Regions during the Voyage of the « Southern Cross », Polyzoa, p. 287.
Schizoporella arachnoides MacGillivray, *Trans. Roy Soc. Vict.*, 1882, vol. XIX, p. 192, pl. I, fig. 4; *Prod. Zool. Vict*, dec. XIV, p. 148, pl. 138, fig. 8.

There are only a few zoœcia growing on a stalk of seaweed from (140) Chili. In a specimen sent as *S. arachnoides*, from Western Point, Victoria, the pores round the border can sometimes be distinguished; and a specimen from Port Phillip Heads, Victoria, sent to me as *S. insignis* Hincks (1), which however I marked *insignis* var., may be a variety of *S. eatoni*. In this last mentioned variety the sinus is wider than is usual in *S. eatoni* B., while the ovicells have the characteristic form of the *eatoni*, and the raised line enclosing a part of the front occurs as described by Hincks, however this is also the case with varying degrees of distinctness in *S. eatoni*. There are a few zoœcia of *S. eatoni* from Prince Edward Island, Marion Islands, collected by the Challenger, but not mentioned in the Reports.

In specimens of *S. eatoni*, from Cape Adare, brought back by the Antarctic « Southern Cross » Expedition there are stout spines, and the pores are divided by the raised line as in *S. insignis* Hincks. The primary zoœcium of the Cape Adare specimens has 11 spines, and sections show 14 tentacles.

Habitat. — Kerguelen (B.); Victoria (MacG.); Prince Edward Island, Challenger (W.); Cape Adare (Kirkpatrick) 8 fathoms (17 metres).

Exp. Antarct. Belge.
N° 139. Porto Torro, Ile Navarin, Magellanes, Chili. Jan. 3rd, 1898.

Schizoporella gelida sp. nov.

Pl III, figs. 12*a*, *b*, *c*)

The specimen is adnate on stone. The older zoœcia are irregular, but the younger ones are subovate, the surface is so slightly granular, that with the lower powers it appears smooth. The oral aperture being situated low down, the true shape is only made out from

(1) *S. insignis* H. was figured by Desmarest and Lesueur as *Cellepora cingulata*, Pl. IX, fig. 8, in a series of 14 unpublished plates, to which I shall refer elsewhere. Pergens (*Bull. Soc. Roy. Malacol. de Belgique*, vol. XXII, 1887) has given particulars of these plates.

the operculum, which is nearly round, and has the proximal part thickened and this fits into a wide sinus ; the muscular attachments are placed high up, not near the edge of the operculum. The ovicell is depressed having a sunk plain area. The lateral denticles as seen from the interior are shown in fig. 12*b*.

Habitat. — Exp. Antarct. Belge.
N° 332, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W. ; 435 met. ; —0.3 C.

Cyclicopora polaris sp. nov.

(Pl. III, figs. 5*a-f*)

This occurs both adnate and bilaminate, from the same locality. The zoœcia in the bilaminate specimen are oblong, slightly raised, surface smooth, with a row of pores round the border, from which there are irregular suture-like lines and a similar median line. In the adnate specimen the zoœcia are broader, and may be called subhexagonal to broadly ovate, and above the oral aperture there are 4 spines.

The oral aperture is wide, nearly round, with a very wide sinus. In some cases there are two small projections of the calcareous wall over the ends of the sinus. The operculum has a broad thickened border, reminding us of the opercula of some *Membranipora,* such as *M. tenuirostris* Hincks ([1]). The distal rosette plates are small and numerous, placed near the basal wall. The lateral plates are very large, with several pores, and are nearer to the frontal wall than to the basal. There usually seem to be four lateral plates.

This species recalls the Arctic *Pseudoflustra palmata* Sars, and in the present form the rosette plates more nearly approach to the *Flustra* type than they do in the Arctic species. The entirely separable operculum brings it near to species named *Schizoporella.*

Habitat. — Exp. Antarct. Belge.
N°s 991 and 623, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

Hippothoa divaricata Lamx.

(Pl. VII, fig. 3)

Hippothoa divaricata Lamx., Expos. méth., p. 82, pl. LXXX, figs. 15, 16.
For synonyms see Miss Jelly's Catalogue.

This is about twice the size of *H. distans* MacG., and in the Antarctic specimens each zoœcium starts from the previous one without any caudate « prolongation ». There are some broken down ovicells, on specimen 596, which are raised at the end of the zoœcia, and both these ovicelligerous zoœcia and the ordinary zoœcia are the same size. The figure is a restoration as there are no perfect ovicells. The *H. dispersa* of Hagenow from the chalk is so similar that perhaps they should be united.

Habitat. — Arctic seas ; British and French seas ; Mediterranean ; Azores ; between Fayal and Pico (Atlantic) ; Challenger Station 135, Tristan d'Acunha (60-1000 fathoms); Gulf

(1) See, Observations on Membraniporidæ. (*Linn. Soc. Journ. Zool.*, vol. XXVI, pl. 47, fig. 7.)

of St. Lawrence ; Hobson's Bay (Australia) ; Victoria ; Tasmania ; New Zealand ; Cape Town (S. Africa) ; Mazatlan ; Patagonia ; Falkland Islands.

Fossil : Tertiaries of Italy and Sicily ; English Crag.

Exp. Antarct. Belge.
Nos 277, 288, Dredge I. Lat. 71° 09′ S.- Long. 89° 15′ W. ; 460 met. ; +0.3 C.
No 392, Eel trap I. Lat. 71° 15′ S.- Long. 87° 39′ W. ; 436 met. ; —0.2 C.
Nos 561, 570, 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.
No 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.
No 820, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W. ; 569 met. ; +0.8 C.
No 140. Porto Torro, Ile Navarin, Magellanes, Chili.

Hippothoa distans MacG.

(Pl. III, fig. 8*a-g*)

Hippothoa distans MacGillivray, *Trans. Roy. Soc. Vict.*, vol. IX, p. 130, 1868 ; *Zool. Vict.*, dec. XIX, p. 321, pl. 187, figs. 10-13 ; Hincks, *Ann. Mag. Nat. Hist.*, ser. 5, vol. VIII, p. 62 ; op. cit., vol. XI, p. 21.
Hippothoa flagellum Manzoni, Bry. foss. Ital. 4d cont. (*Sitzungsb. Ak. Naturw.*, vol. LXI, p. 16, pl. I, fig. 5, 1870) ; Supp. alla Fauna dei Bry. Medit. (*Sitz. der K. Ak. Wissensch.*, vol. LXIII, p. 13, pl. I, fig. 1) Bri. del Plioc. Ant. di Castrocaro. p. 5, pl. I, fig 14 : Sequenza, Le Formaz. Terz. nella Prov. di Reggio (*R. Accad. dei Lincei*, an. CCLXXVII, 1879, pp 197, 294, 327, 367) ; Hincks, *Ann. Nat. Hist.*, ser. 4, vol. XX, p. 218 ; British Marine Polyzoa, p. 293, pl. XLIV, figs. 5-7 ; Busk, Zool. Chall. Exp., vol. X, pt. XXX, p. 4, pl. XXXIII, fig. 7.
Terebripora ramosa d'Orbigny, Voyage dans l'Amérique méridionale, p. 23, pl. X, figs. 16, 17.

This occurs on the same stones as the *H. divaricata*, which however is twice the size. There is sometimes a keel and the ovicells have an umbo. The outlines of both the polypide cell, and of the ovicell are distinctly seen through the shell wall, and the ovicelligerous zoœcium is about the same length as the ordinary zoœcium. The shells to which it is attached are usually somewhat excavated where the zoœcia grew, but this is not at all unusual in Bryozoa, so that there is no reason for the genus *Terebripora*, however we cannot take d'Orbigny's name as he gave practically no description of the zoœcia.

In a specimen of *Hippothoa* from Sydney, New South Wales (fig. 8*e, f, g*), which I think must be united with *H. distans* there are two short processes (never exceeding 1mm) arising from the side of the zoœcium, below the lateral tubular branches. These processes have a chitinous disk at the end, but I am unable to state that it is moveable though apparently this is the case. What their function may be it is difficult to say, for while at first considering they might be the male cells of Jullien there is nothing to support this, and perhaps the function is similar to that of avicularia in keeping the colony oxygenated when the polypides are dead.

Hippothoa occurs in the Cenomanian (d'Orb.) and in the Senonian of France, Belgium, Bohemia &c. ; but in the fossils it is difficult to be sure of the determination of these creeping species, unless the region of the aperture is well preserved, and therefore we cannot do more than say that *Terebripora capillaris* Dollfus, from the Devonian, appears to be *Hippothoa*. Some Jurassic fossils described by Fischer are also probably *Hippothoa*.

The two Antarctic species and close allies are widely destributed in space and time.

Habitat. — British, Shetland, French seas, Mediterranean, Cumshewa and Houston Stewart Channel (Queen Charlotte Island), Victoria, Bass's Straits, New Zealand, Singapore (H.), Challenger Station 151, Heard Island 75 fathoms, Arica (Peru) (d'Orb.), Cape Horn (Museum, Paris).

Fossil : Italian Pliocene. The *H. desiderata* of Novak (1) from the Bohemian chalk may be this species.

Exp. Antarct. Belge.

N° 570 on stone, 591 on seaweed stalk, 596 on shell and stone, 597 seaweed, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.

N° 820, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W. ; 569 met. ; +0.8 C.

SYSTENOPORA gen. nov.

The specimens described as *Systenopora contracta,* do not seem to belong to any established genus, and at present we cannot tell, which of the characters are of the greatest generic importance, and can only say the characters of the genus are those of the species. The name is taken from the narrow contracted aperture, which is quite unusual in *Cheilostomata.*

There is however a genus *Systenostoma* of Marsson, and the figure of the cretaceous *S. asperulum* Marsson (2) is much like the Antarctic species, which from Marsson's diagnosis might have been placed under *Systenostoma;* but from specimens kindly sent to me by Mr Levinsen it is clear that the two things are quite distinct, and the *Systenopora* of Marsson is probably only *Gemellipora.*

On first examination of *S. contracta* it was thought to belong to the genus *Cucullipora* of MacGillivray, however on receiving specimens of the Australian fossil, for which I am indebted to Mr Charles Maplestone, it was then seen that they were generically distinct, and *Cucullipora tetrastoma* MacG. was found to be closely allied to *Lepralia semilaevis* Reuss (3) from the lower Tertiaries of N. Italy, and it was doubtful whether they should be specifically separated, but there is perhaps sufficient reason for considering them to be distinct species. Now, that I have the key in the Australian fossil, I find that there was a vibraculum and not an avicularium in *Lepralia semilaevis* Réuss. A specimen I collected from the Senonian of Royan, and which I have taken to be the *Flustrella polymorpha* d'Orb. (4) has a similarly contracted aperture, with an ear-like projection at one side, and should probably be united with the Antarctic species under *Systenopora.* The preservation of the specimen collected at Royan is however not perfect, and Canu (5) places *polymorpha* under his subgenus *Rynchotella,* but I cannot agree as to there being any relationship between *Membranipora rhynchota* Busk, and what I have taken to be *polymorpha* d'Orb., though possibly d'Orbigny had two species before him when drawing up his description.

(1) Bry. der Böhmische Kreideform., p. 86, pl. II, figs. 1, 2. (*Denk. K. Akad. Naturw.*, XXXVII, Abth. II.)

(2) Th. Marsson, Die Bryozoen der weissen Scheibkreide der Insel Rügen. (*Paleont. Abhand. Berlin*, vol. IV, p. 89, pl. IX, fig. 2.)

(3) Waters, North Italian Bryozoa. (*Quart. Journ. Geol. Soc.*, vol. XLVII, p. 18.)

(4) Pal. franç., vol. V, p. 286, pl. 697, figs. 13-15.

(5) Revision des Bryoz. du Crétacé fig. par d'Orbigny. (*Bull. Soc. Géol. de France*, vol. XXVIII, p. 368.)

Systenopora contracta sp. nov.

(Pl. V, figs. 1*a-k*)

The zoœcia do not show external marks of separation, the surface has large pits, and the region of the peristomial aperture is raised. The secondary aperture is slit-like in the direction of the zoarial axis, being formed by a plate, which slopes diagonally inwards on the one side, and terminates with a straight edge; on the other side there is an ear-like projection, at the base of which there is a circular avicularium, with beaked nearly semi-circular mandibles. There are two or three other circular avicularia situated near the aperture, and further there is [1] within the aperture (but quite invisible until sections have been made) a fairly large avicularium (figs. 1*k, l*) with a triangular mandible, having a central lucida, and resembling the semicircular mandibles to the external avicularia. This is entirely under the diagonal plate. The oral aperture is some distance from the slit-like secondary aperture and is transverse to the zoarial axis (fig. 1*g*); it is nearly round, but slightly flattened on the top, namely the edge nearest to the zoarial border. There does not seem to be any chitinous operculum, but a strong bundle of muscles appears to draw the lining membrane over the aperture.

The ovicells are entirely concealed, though where the ovicells occur there is over part of the wall an absence of pits. There are, as a rule, six lateral rosette plates, having several communication pores; and on the distal walls numerous communication pores extend over an irregular area, which is really the rosette plate. Above this rosette plate we find a pair of stout cervicorne processes, irregularly curving over the communication pores, and growing from each side (figs. 1*g, h, i*). These are probably homologous with the comb-like process, which I described as occurring in *Membranipora tehuelcha* (d'Orb.) [2] and in *Membranipora nitens* Hincks, though in both cases the comb-like process is some distance from the base of the zoarium. To these I also refer when describing an internal denticle in *Scrupocellaria antarctica* sp. nov.

There are about 20 tentacles.

The zoarium is grey and the zoœcia are loaded with pigments and foreign matter, which has made the examination difficult. There are no complete polypides in the sections cut (612), but there are many brown bodies, and also embryos in a growing condition, as well as testes. The muscles of the compensation sac start from the lower wall as isolated threads, but on the upper wall several are attached close together.

Habitat. — Exp. Antarct. Belge.

Nos 612 (12 pieces), 621 (1 piece), 623 (1 piece), 683 (10 pieces), 991 (fragments), Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500? met.; +0.9 C.

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(1) Levinsen, G. M. R., Studies on Bryozoa (*Vidensk. Medd. fra d. Naturh. Foren. i Kjöbenhavn*, 1902, p. 21), speaks of an internal avicularium in *Flabellaris roborata* (Hincks), but the avicularium in that case is of the *Membranipora Flemingii* type, and although not readily seen, as it is far within the area, yet it is scarcely internal like that of *S. contracta*. Perhaps the avicularium of *Schizoporella challengeria* Waters should be compared with the internal avicularium of *S. contracta*.

(2) Waters, On Membraniporidæ. (*Journ. of the Linn. Soc. Zool.*, vol. XXVI, p. 675.)

CELLARINELLA gen. nov.

Cellarinella is proposed for some rather problematic species allied to *Myriozoum,* but without distinct opercula. In the species known there are rosette plates, and one or two avicularia below the aperture, having triangular or semicircular mandibles. Besides the *C. foveolata* nov., *C. nodulata* nov., *C. dubia* nov., the *Myriozoum marionensis* Busk (1) will have to be placed here, and the relationship is in certain points with *Myriozoum, Haswellia* and *Tubucellaria,* but probably most close with *Systenopora* gen. nov., and further knowledge may show *Cellarinella* to be superfluous. We may however find that a new suborder has to be made for forms without an operculum, but in which there are a group of strong muscles drawing a membrane over the oral aperture, which is situated low down some distance from the peristomial aperture ; *Systenopora* and *Cellarinella* would be included, and probably some other forms, but this requires further elucidation with better specimens, and I hope to return to it when opportunity occurs.

Cellarinella foveolata sp. nov.

(Pl. V, figs. 2*a-h*)

Zoarium cylindrical, branching in various planes, with spreading calcareous base. Some colonies are as much as 50^{mm} in height. The surface is deeply pitted without zoœcial divisions, the peristomial aperture is broad, and short (often having the shape of a new moon), with a raised cap over the distal end, and sometimes, but not often, it is also raised below the aperture ; there is a plate within the proximal edge of the peristome directed downwards. In the older zoœcia the secondary aperture is round, and below the aperture, in some zoœcia, there is a round avicularium with a semicircular mandible, while in older zoœcia the avicularium may be within the peristome.

The oral aperture is a considerable distance from the peristomial opening and at right angles to it, the shape being nearly round with the proximal edge straightened. No operculum can be prepared out, nor is any seen in cut sections, only a membranous contraction. The ovicell is but little raised, and is not always visible on the surface. There are about four lateral rosette plates, each with about ten communication pores, and there is one distal plate, over which there is a pair of spinous processes, which are sometimes very slender, in other cases stouter (fig. 2*g*). There are about 22 tentacles.

This is very much like a CHALLENGER specimen from Station 320, mentioned and figured in my Supplementary Report (2), however the Challenger one is slighter and the pores are more elongate, and I describe the mandibles as triangular, but a mandible seen sideways or within the peristome often appears more triangular than is the case.

This and *Systenopora contracta* nov. differ from *Myriozoum* as represented by *M. truncatum* Pall. in not having thick opercula, and further in the shape of the aperture ; also in having lateral rosette plates with several communication pores. As I have elsewhere shown *M.*

(1) This is not the *M. marionensis* of JULLIEN and CALVET, Bryozoaires provenant de campagnes de l'« Hirondelle », 1903.

(2) Zool. Chall. Exp., vol. XXXI, pt. LXXIX, p. 39, pl. III, fig. 47.

truncatum, and *Porina gracilis* Ed. have wide tubes from the surface, and also from zoœcium to zoœcium, but no distinct rosette plates. *Haswellia* has many similar characters, but has a suboral pore, and a thick Schizoporellidan operculum. There seems to be most resemblance to *Tubucellaria*, which however is jointed, though this is a character on which we should not place much importance. The generic name is chosen on account of this resemblance.

In 609 and 611 there are no polypides, but degenerate remains and many buds, also ovaria in the zoœcia consisting of two or three rather large cells, situated by the lateral wall, about half way between the two extremities. The walls of the compensation sac are visible.

Habitat. — Exp. Antarct. Belge.

Nos 560, 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.

Nos 609, 611, 619, 621, 623, 683, 691, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

No 743, Tangles IX. Lat. 70° 20′ S.- Long. 83° 23′ W. ; 459 met. ; +0.8 C.

This specimen is nodulated (see fig. 2*c*) and has a pronounced shelf on the distal end of the oral aperture.

Nos 799, 1028, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W. ; 569 met. ; +0.8 C.

Cellarinella nodulata sp. nov.

(Pl. VIII, figs. 6*a-c*

The specimen from 623 was at first thought to be the nodulated variety of *Cellarinella foveolata* nov., but there are important differences.

The zoarium is erect, about 35mm long and about 5mm wide, it is somewhat compressed, and at irregular intervals contracts, forming nodulations; it is attached at the base by chitinous radicles. Similar nodulations sometimes occur in *Cellarinella foveolata* nov. and according to Bidenkap in both *Myriozoum coarctum* Sars and *M. subgracile* d'Orb.

The zoœcia have large pits, distributed over the surface, and the outlines of the zoœcia are not distinguishable; below the aperture there is a long striated projecting median mucro, much like that of *Lepralia ocellata* Hincks. At one side of the aperture is a triangular avicularium with broad triangular mandible.

Lepralia pachycera Reuss (Olig. Gaas, p. 471, pl. IV, fig. 1) has a similarly shaped mucro and there are other species with strong mucros, as *L. ceratomorpha* Rss., *L. monoceros* Rss. There are no polypides, but there are buds and the remains of polypides. The muscles for closing the aperture are similar to those of *C. foveolata*.

Habitat. — Exp. Antarct. Belge.

No 623, Tangles VIII, Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 met.; +0.9 C.

Cellarinella dubia sp. nov.

Pl. VIII, figs. 12*a*, *b*, and fig. 2 in text)

Fragments were found in the cotton wool of one of the jars, and probably they were derived from 623, though this is not quite certain, as the jar also contained 309 and 591.

Zoarium erect, compressed, with the two flatter surfaces slightly curved, and with

zoœcia on all four surfaces, with very large open pores or pits. On the anterior and dorsal surfaces there are two longitudinal rows of alternate zoœcia while at the sides there is one row. Specimens from Cape Horn have the zoarium round.

On one or both sides of the aperture there is a raised avicularium, with an obtuse triangular mandible, and at the base of the avicularium a projection forms a kind of denticle, contracting the peristome, and giving it the appearance of a Schizoporellidan aperture. Where there is only one avicularium the peristomial aperture is unsymmetrical, as there is no denticle on the one side ; and in the few cases, where there is no avicularium, both denticles are wanting.

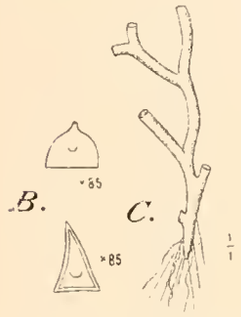

Fig. 2. — *Cellarinella dubia* nov. From Cape Horn, lat. 50°52' S.-long. 67°36' W.
B, mandibles.
C, colony, natural size.

Larger pieces of this species were found in the spirit material from the Cape Horn Expedition, Dredge 4. Lat. 50° 25′ S.- Long. 67° 36′ W.; 140 metres; +5.7 Centigrade, and from the zoarial growth it was at first taken for *C. foveolata* nov. In this specimen, from Cape Horn, the zoarium is cylindrical, and is attached by chitinous radicles. The older zoœcia have large pores over the surface, while in the younger ones they are more pronounced round the borders; and the slightly raised ovicells have radial slit-like pores, indicating its limits.

There is a second specimen from 177 Cape Horn Expedition, between l'île Navarin and l'île Hoste, 270 metres, +7.7 Centigrade. Some specimens in the British Museum, collected by Darwin from Tierra del Fuego, and two others from the Straits of Magellan are this species, but the region round the aperture is striated or finely lined, and there are nearly always two avicularia.

Calcareous sections of the Cape Horn specimen, from the Paris Museum, are identical with those of *C. foveolata* nov. (Pl. V, fig. 2*f*).

Habitat. — Off Patagonia, Lat. 50° 52′ S.- Long. 67° 36′ W.; 140 met.; +5.7 C.; between the islands Navarin and Hoste 270 met.; +7.7 Cent.; Tierra del Fuego; Straits of Magellan.

Exp. Antarct. Belge.

Probably from 623, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.

Bifaxaria denticulata Busk

(Pl. VIII, figs. 14*a*, *b*)

Bifaxaria denticulata Busk. Zool. Chall. Exp., vol. X, pt. XXX, p. 82, pl. XXIV, fig. 3; Waters, Zool. Chall. Exp., Supp. Report, vol. XXXI, pt. LXXIX, p. 15, pl. II, fig. 31.

As the material is limited to four small specimens, but few preparations have been made. In those from 563 there were no polypides, while in that from 309 no ova or embryos were seen, but about 20 tentacles can be counted.

In the Challenger specimens there are two kinds of mandibles, which were rather a puzzle, but the explanation is, that there is an internal as well as external avicularium, and the mandible of this last is wider (fig. 14*a*), and has the lucida near to the distal end, whereas in the internal one the lucida is low down. An internal avicularium has already been alluded to in *Systenopora contracta* nov.

There is a long tubular connection from the distal end of one zoœcium to the proximal

end of the next, and within this tube is a considerable mass of parenchym, often forming stout strands. At the end it is attached to the rosette plates, and there are also two lateral connections to the neighbouring zoœcia. There is a similar long tubular connection in *Tubucellaria opuntioides* Pall., *Porina borealis* Busk, a few other species, and in *Cellaria* generally. In *Porina borealis* there are similar stout parenchym strands. There is a small denticle over the distal rosette plate of *B. denticulata.* The zoœcia may be said to turn to the front and to the two sides and not towards the back ; but in cut sections the base of the proximal ends of the zoœcia are opposite, both laterally and dorsally. This may indicate that it is derived from forms in which the zoœcia were turned in all directions, but this must remain problematic. In other species called *Bifaxaria* by Busk the zoœcia are only lateral. *Bifaxaria* is however only retained provisionally.

Levinsen (1) says that *Bifaxaria denticulata* B. is nearly related to *Porina borealis* B. In consequence I felt, that it was incumbent on me to see how far the northern *Porina borealis* represented the southern *Bifaxaria denticulata* and Mr Levinsen kindly sent me some spirit specimens of *P. borealis,* for the purpose. However from a letter I find that Levinsen had not intended to indicate, that the relationship was as close as I had understood him to mean, and therefore no discussion of their geographical distribution is required.

Whether they will ultimately be placed in the same family, which is all that Mr Levinsen expects, cannot be decided, until we know more upon what characters the families will ultimately be based.

In *Porina borealis* the zoœcia are arranged round an imaginary axis, there is a suboral pore, the calcareous walls contain but very little organic matter, there are pore tubes through this shell wall, and in places these pore tubes are replaced by avicularia, which is unusual in the Bryozoa. These avicularia and those by the aperture have semicircular mandibles.

Habitat. — Challenger Station 320 (South Atlantic, Off the Argentine) 600 fathoms (973 metres).

Exp. Antarct. Belge.
N° 309, Tangles II. Lat. 71° 14′ S.- Long. 89° 14′ W.; 460 met.; +0.3 C.
N° 339, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02 W.; 435 met.; —0.3 C.
N° 565, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.
One specimen from 309 is attached to *Retepora laevigata* nov.

Bifaxaria rustica (d'Orbigny)

(Pl. VIII, figs. 19*a*, *b*)

Pustulopora rustica D'Orbigny, Voyage dans l'Amérique méridionale, p. 22, pl X, figs. 13-15.

Zoarium erect, slightly compressed, branching in one plane, zoœcia opening on the anterior surface only, attached at the base by chitinous radicles. The peristomial openings are nearly round and the region of the aperture is somewhat raised ; the oral aperture however has not been seen. The anterior and dorsal surfaces have long pores or pits, suggesting the genus *Hornera ;* however sections showing the two or four opposite zoœcia prove at once, that

(1) Levinsen, G. M. R., Studies on Bryozoa. (*Vidensk. Medd. fra d. Naturh. Foren. i Kjöbenhavn*, 1902, p. 26.)

it is *Cheilostomata*, and sections of the organic parts have a close resemblance to those of *Bifaxaria denticulata* Busk (see Pl. VIII, fig. 18). On the dorsal surface there are irregular elevations, no doubt corresponding with the position of the zoœcia.

There are no avicularia in the two small specimens, nor are there polypides, the zoœcia being empty, so that but little can be said about the generic position but it is in no way related to *Retepora*. It is however closely allied to *Reteporella myriozoides* Busk (1), though examination of the British Museum specimens shows, that they should be specifically separated while belonging to the same genus.

Habitat. — Falkland Islands « dans le sable de fond » (d'Orb.).

Exp. Antarct. Belge.

N° 348, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W. ; 435 met. ; —0.3 C.

N° 428, Tangles VI. Lat. 71° 19′ S.- Long. 87° 37′ W. ; 436 met. ; —0.2 C.

SMITTIA

From the Antarctic there are many species with a central lyrula, which at present we must place under *Smittia,* although recognising that, as more characters are studied, this group of forms with a suboral denticle will have to be divided into several divisions, and we are not yet clear as to the classificatory value of the lyrula, which supports the operculum. The cardellae or lateral denticles are not of as much value, and lateral denticles occur in a large number of genera though sometimes they are but small. According to Hincks the cardinal character of this genus is the elevated secondary orifice, produced and channelled in front. With this view I cannot agree, and various authors have called attention to the peristomial characters being unsatisfactory. The lower edge of the operculum is straight, or slightly curved inwards, the muscular attachments are usually a ridge on the border and as a rule, but not universally, the operculum is very thin, and is not so easily studied as in most genera.

Jullien, who attached so much importance to surface structure, accepted this genus, containing species in which the surface is perforated all over, others with the pores round the border, and again others which seem to be imperforate. The characters upon which he bases the genus and the family are the lyrula and cardella within the aperture. These are characters interdependant upon the operculum which closes the oral aperture, and while they require further study I accept them as of classificatory value. As Jullien considered that too much value had been attached to the aperture, he does not here seem quite consistent.

Porella, which is but a section of the *Smittidæ*, is well represented in the Arctic but not in the Antarctic.

Smittia marsupium (MacGillivray)

(Pl. IV, fig. 4)

Lepralia marsupium MacGillivray, *Trans. Roy. Soc. Vict.*, vol. IX, p. 136 ; *Zool. of Victoria*, dec. IV, p. 22, pl. XXXV, fig. 4 ; Busk, Zool. Chall. Exp., pt. XXX, p. 147, fig. 44.

Porella marsupium MacGillivray, *Proc. Roy. Soc. Vict.*, vol. XIX, extra page, pl. I, fig. 2 ; ? Hincks, *Ann. Mag. Nat. Hist.*, ser. 5, vol. VIII, p. 64, pl. I, fig. 6 ; Waters, *Quart. Journ. Geol. Soc.*, vol. XXXIX, p. 437 ; ibid., vol. XLIII, p. 62 ; MacGillivray, Tert. Polyzoa of Victoria, p. 91, pl. XII, fig. 9.

Aimulosa australis Jullien, Mission du Cap Horn, p. 59, pl. I, fig. 5, and pl. IX, figs. 3-4.

(1) Zool. Chall. Exp., vol. X, pt. XXX, p. 127, pl. XXIV, fig. 2.

This of course belongs to the *Smittiadæ*, but whether to the group known as *Porella*, or to a group distinguished by the inflated avicularian chamber, is somewhat doubtful. Busk figured the opercula and mandibles, which he curiously thought proved the species to belong to *Lepralia*, and not to *Porella*, whereas in reality the operculum is of the *Smittia* type.

The surface of the zoœcium and of the ovicell is smooth, or very faintly granular with the zoœcia much raised, but without any dividing ridges between them. There are four oral spines and the peristome is a little raised at each side.

In a specimen collected from Cape Adare, by the Borchgrevink Antarctic Expedition, the peristome is much more raised at the sides, but this I do not find in my specimen from Western Port, nor from New Zealand. The Cape Adare specimen has an umbo on the ovicell, but on none do I find radiating lines on the ovicell.

This species passes gradually from quite smooth to granular.

Habitat. — Victoria (MacG.); Bass's Straits (H.); New Zealand (W. and Ham.); South America (B.); Cape Horn (Wat.); Cape Adare; Falkland Island 12 fathoms (20 met.).

Fossil : Muddy Creek and Waurn Ponds (Victoria); New Zealand.

Exp. Antarct. Belge.

N° 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

N° 623 on shells, Tangles VIII. Lat. 70°00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Smittia reticulata (MacG.)

Smittia reticulata Ortmann, Japanische Bry., *Arch. f. Naturgesch.*, 1890, vol. I. p. 44, pl. III, fig. 24; Waters, *Ann. Mag. Nat. Hist.*, ser. 6, vol. IV, pl. III, fig. 22; Levinsen, Danske Dyr., p. 70, pl. VI, fig. 5-9; MacGillivray, Tert. Polyzoa Vict., p. 93, pl. XII, figs 20, 21; Andersson, Bry. Schwed. Exp. (*Zool. Jahr.*, vol. XV, p. 544).

For other synonyms see Miss Jelly's Catalogue.

A specimen from 991 has the avicularia slightly longer than is usual in European *S. reticulata*. From 613 there is a young colony (consisting of four zoœcia, starting from a primary zoœcium bearing 8 spines) which is probably *S. reticulata*.

Habitat. — Arctic, European seas, Mediterranean, Atlantic, Japan, Victoria, New Zealand, Patagonia, Mauritius.

Fossil : Pliocene of Europe. Victoria.

Exp. Antarct. Belge.

N° 991, Swab. VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Smittia marionensis (Busk) var.

(Pl. VIII, fig. 8)

Lepralia marionensis Busk, Brit. Mus. Cat., p. 67, pl. XCVI, figs. 1-2.

Smittia marionensis Busk, Zool. Chall. Exp., vol. X, pt. XXX, p. 152, pl. XVIII, fig. 6.

There are some colonies considered to be this species, in which the surface of the zoœcium is perforated all over, and the avicularium immediately below the peristome is sometimes quite small (as figured), in others it is much longer, but also with a relatively long mandible slightly rounded at the end.

In the British Museum specimens the size of the avicularium is very variable, sometimes being nearly rounded, at others long and spatulate. It may be necessary to call some of the forms varieties. The Antarctic forms resemble *S. reticulata* MacG. in many respects, but differ in having the surface perforated, and seem to be closely allied to *S. oratavensis* Busk, and may be related to *S. antarctica* nov. On a stone from 619 (with *Heteropora claviformis* nov.) there are two colonies, one of which has quite small avicularia, whereas the other has much longer ones, though of the same shape, extending about one third of the length of the zoœcium.

Manzoni gives it as fossil from Castrocaro, but this must be looked upon as doubtful.

Habitat. — Prince Edward Island 80-150 fathoms (130-240 metres); Kerguelen Island 28 fath. (45 metres), Challenger; Victoria (MacG.).

Exp. Antarct. Belge.
Nos 619, 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Smittia Landsborovii form **personata** Hincks

Smittia Landsborovii Johnst, form *personata* Hincks, *Ann. Mag. Nat. Hist.*, ser. 5, vol. XIV, p. 283, pl. IX, fig. 3; Waters, *op. cit.*, ser. 5, vol. XX, p. 195, pl. VI, fig. 23.
Smittia Landsborovii Johnst, var. *purpurea* Hincks, *op. cit.*, vol. VIII. p. 64.
Smittia Jacobensis Busk, Zool. Chall. Exp., vol. X, pt. XXX, p. 153, pl. XIX, fig. 7.
Smittia monacha Jullien, Mission du Cap Horn, p. 52, pl. II, figs. 1-3.

In specimens from 139 and 140 the « bridge » is very distinct, and the same thing occurs in *Smittia monacha* J. in specimens sent to me by Jullien, as well as in other material from Cape Horn and there is no doubt that the Cape Horn *S. monacha* is the var. *personata* of Hincks. At one time I thought this was the same as *S. oculata* MacG., but although they are very closely allied, it would be better to separate them, either as species or varieties. The *S. oculata* has rather larger surface pores and the avicularium is oval, rather than round. The peristome shows the same frontal elevation, though not to the same degree as in *personata*, and the ovicells of *S. oculata* may have several large pores, while in specimens sent to me by Jullien, as *monacha*, there are sometimes only two pores, but as a rule there are several. In both there are calcareous ridges above the pores, and the general characters of the two species are very similar.

We may consider it an open question, whether the forms perforated all over the surface should not be considered as specifically distinct from those with large pores round the border. Hincks however considers this, and the form *porifera*, as merely varieties. Possibly it would have been more correct to have made varieties of *porifera*, rather than of *Landsborovii*. The bridge as a rule only occurs to ovicelligerous zoœcia.

Habitat. — Bass's Straits (H.), Victoria (H.), Cape Verde Islands 100-200 fath., Marion Islands 50-75 fath. (B.), New South Wales (W.), Cape Horn (Jull. & W.).

Exp. Antarct. Belge.
Porto Torro, Ile Navarin, Magellanes, Chili. Jan. 3rd, 1898. 139 & 140. « Sur une souche de *Macrocystis pyrifera* ».

N° 683, Swab. VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 met.; +0.9 C.
The few zoœcia are without ovicells or avicularia.

Smittia crozetensis nom. nov.

Pl. VIII, fig. 15*a*, *b*

Mucronella ventricosa var *multispinata* Busk, Zool. Challenger. Exp., vol. X, pt. XXX. p. 160, pl. XXII, fig. 11.

I have shown in a paper on the Madeira Bryozoa (1), that the *Lepralia multispinata* Busk, from Madeira, is not the same as the var. *multispinata* of the Challenger Expedition, and I am still not at all sure that this is not *Mucronella Peachii* var. *octodentata* of Hincks, although specimens from the Mediterranean are very much smaller; but Hincks (2) considered that they should be separated. The main difference however seems to be that while Hincks described *octodentata* as smooth, this is distinctly granular. For the present, the fact that the Antarctic and Kerguelen Island species are the same is indicated by giving a new name, which however may not be permanent.

The lyrula (denticle) is bifid, or may support projections in various planes. The ovicell is very small and thrown back.

A specimen from 683 has the zoœcia about twice as large as those of *S. ventricosa*, whereas one from 596 has smaller ones than 683, though still materially larger than those of British *S. ventricosa*. There are somewhat larger zoœcia in specimens from 288 and 570 (fig. 15*a*) and they also have a double row of small pores round the border; also in a specimen sent to me by Canon Norman, as a variety of *ventricosa*, there are two rows of pores round the border and six oral spines. In these specimens from 288 and 570 the aperture is directed forwards with a thick border, and the surface is granular.

The *ventricosa-Peachii* group are very widely distributed and it is an open question, whether too many species have not been made. The group is represented fossil in the Tertiaries under various names, among others *Lepralia Grotriana* Reuss, and *Lepralia Hörnesi* Reuss; and at present is widely distributed as *M. Peachii* Johnst., *M. ventricosa* Hass., *M. teres* Hincks, &c.

Habitat. — Prince Edward Islands 80-150 fathoms (130-240 metres); Crozet Island 210 fathoms (340 metres).

Exp. Antarct. Belge.
N°s 277, 288, Dredge I. Lat. 71° 09′ S.- Long. 89° 15′ W.; 460 met.; +0.3 C.
N° 320, Tangles II. Lat. 71° 14′ S.- Long. 89° 14′ W.; 460 met.; +0.3 C.
N° 428, Tangles VI. Lat. 71° 19′ S.- Long. 87° 37′ W.; 436 met.; —0.2 C.
N°s 570, 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.
N°s 619, 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.
N° 820, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W.; 569 met.; +0.8 C.

(1) Bryozoa from Madeira. (*Journ. Roy. Micr. Soc.*, 1899, p. 9.)
(2) *Ann. Mag. Nat. Hist.*, ser. 6, vol. IX, p. 327.

Smittia antarctica sp. nov.

Pl. IV. figs. 1*a-h*

Zoarium bilaminate, calcification fairly solid, irregularly foliaceous, with spreading calcareous base ; attaining at any rate to some inches in size.

Zoœcia elongate, hexagonal, with pores on the surface, except the part below the aperture, in which however there is sometimes an elongate avicularium, directed downwards, and with a spatulate mandible ; the peristome is much raised and deeply cleft in the proximal edge, through which a broad lyrula (denticle) can sometimes be distinguished. This denticle, sometimes has a pore, or opening, in the middle, no doubt caused by growth taking place from the two sides.

The operculum has the lower edge nearly straight, with a muscular ridge placed diagonally in the upper part, near to the border, and also near each lower corner there is a chitinous thickening. The ridges are more pronounced than is usual in *Smittia*, and we seem to approach the *Cellaria* type of operculum. In the ovicellular zoœcia the peristome projects more forwards, the ovicell is somewhat thrown back, and is perforated with very irregular pores. Some pieces show few, or even no avicularia, whereas in other cases they are numerous.

There are oral glands, and at the tip of each of the 19 tentacles there is an expanded sac, containing, when stained, a dark mass (fig. 1*g*). In the tip of my *Smittia ophidiana* (perhaps *marmorea* Hincks), there are somewhat similar bodies, as also in the tips of the tentacles of *Smittia reticulata* MacG. from Sydney, and other *Smittiæ,* but although they have been more generally seen in *Smittia* it is not confined to this genus. In *Retepora* (see page 80) somewhat the same thing occurs and in *Cellepora bispinata* Busk, from New South Wales, the tips of the tentacles, in stained preparations are darker, arising partly from abundant nuclei at the tip. However the lumen in *S. antarctica* widens into a sac, sometimes dark balls (stained) being seen in this sac. Harmer (1), in his paper on the Development of *Tubulipora,* describes vesicles near the tip of the tentacles of *T. plumosa* Thomp., but says, that they are not in the lumen of the tentacle. It would seem, that there is abundant evidence of an excretory process taking place in the tentacle, and Calvet has described this in more detail in *Bugula Sabatieri* Calvet (2).

There are about ten lateral rosette plates in the entire lateral wall, and two distal plates ; in both cases the plates are near the basal wall.

This species, in many respects, resembles the Arctic *Smittia palmata* var. *sinuosa* Andersson (3), to which I also referred in my paper on the « Bryozoa from Franz Josef Land » (p. 72), as varying in the form of the peristome from *Pseudoflustra palmata* Sars. The *sinuosa* is however not strongly calcified, and differs from typical *P. palmata* very considerably, as there is a distinct oral denticle in *sinuosa*, whereas none can be discovered in *P. palmata ;*

(1) *Quart. Journ. Micr. Sc.*, vol. XLI, N. S., p. 115, pl. X. figs. 26, 27.

(2) Bryozoaires Ectoproctes, p. 72.

(3) K. A. Andersson, Bryozoen während der Schwed. Exp. 1898, 1899, 1900..... gesammelt. (*Zool. Jahr.*, vol. XV, 1902, p. 546, pl. XXX, fig. 5.)

also in *sinuosa* the proximal border of the operculum curves upwards, while in the smaller operculum of *P. palmata* it curves downwards, and the operculum of *sinuosa* has a broad band to the distal border. The differences in there being a denticle in one case, and the opercula being of quite a different character are considerable, and would indicate that *sinuosa* may fall into *Smittia*, whereas *P. palmata*, in spite of various similarities in appearance, does not apparently belong to this genus. *Smittia antarctica*, besides being more strongly calcified than *sinuosa*, has larger zoœcia with pores over nearly the whole of the surface, whereas in *palmata* and *sinuosa* they are close to the border.

The relationship of these three species is certainly puzzling, but the *S. antarctica* is a very distinct species, apparently having some points of resemblance with the *Smittia sinuosa* Andersson, which in spite of great similarity of general appearance is found on examination of the minute characters to differ very considerably from *P. palmata*.

There is from Cape Horn a bilaminate species nearly allied to *S. antarctica* in which the peristome is not cleft, but at the base of the peristome there is a large pore just above the avicularium, and the shape of the avicularium is the same as that of *antarctica*. In some cases, however the front of the zoœcium is inflated by an avicularian chamber with a wide and short mandible, a short arc of a circle forming the distal end of the mandible. The ovicell has a few large pores. This species will shortly be described.

Habitat. — Exp. Antarct. Belge.

Nos 618, 619, 683, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Smittia conspicua sp. nov. (1)

(Pl. IV, fig. 3)

Zoarium adnate, with irregularly ovate to hexagonal zoœcia, which in the older parts are almost flat. There is a row of large pores round the border, and the peristome, which is much raised on each side, has a subtriangular opening, and within it there is a broad lyrula directed downwards. There are frequently two pores below the aperture. On the front of the zoœcium, and on a level with the surface, but not close up to the aperture, there is a broad oval avicularium. Ovicell unknown.

This is like *S. Landsborovii* Johnst. in most points, but differs in having the avicularium at a distance from the peristome. This is called *conspicua* from its general resemblance to *Schizoporella inconspicua* of Hincks, but why he gave the name *inconspicua* is not clear.

Habitat. — Exp. Antarct. Belge.

N° 373, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.

Nos 615, 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.8 C.

(1) This is very similar to the *S. ensifera*, just described by Calvet and Jullien in « Bryozoaires provenant des campagnes de l'Hirondelle », 1903, pp. 102 and 149, pl. XII, fig. 4, and pl. XVII, fig. 5. The specimens from the Azores are however much smaller and have large granulations whereas the surface of the Antarctic specimens are nearly smooth. The *S. ensifera* is no doubt the *S. ophidiana* Waters from the Mediterranean.

Smittia tripora sp. nov.

(Pl. IV, figs. 2*a-c*)

There are several specimens having much in common with the *Smittia (Porella) marsupium* of MacGillivray, but the zoœcia are much larger. There is a distinct dividing ridge, and a row of pores round the border, with a few other pores indicating the commencement of a second row. The avicularian chamber is distinct, inflated, in most specimens, with three or more pores round it, and with large avicularian glands in the chamber (fig. 2*c*). The operculum is suborbicular, curving inwards on the lower edge, and has a thickened rim running in on each side reminding us of the operculum of *S. praestans* Hincks, and of the operculum of *S. obstructa* Waters, which however has a complete ridge across. The ovicell is globular, raised, perforated with numerous pores, and in one case with an indistinct area.

This is much like the Japanese *Porella marsupium* var. *japonica* of Ortmann.

In the specimen from N° 618 the surface is very finely granulated, and there is a double row of pores round the border.

Habitat. — Exp. Antarct. Belge.
N° 618, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.
N°s 683, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Smittia praestita sp. nov.

(Pl. VIII, fig. 10*a*, *b*)

Zoarium adnate. Zoœcia distinct, hexagonal, raised towards the oral aperture and the peristome carried up in front into a considerable prolongation, the distal portion of the peristome is not raised and has four articulated spines; at one, or occasionally both sides, high up near to the peristome there is a round avicularium, with a semicircular mandible. Two rows of large pores occur near to the border of the zoœcia, the central portion is imperforate, finely granular. The ovicell is very small, globose, slightly thrown back, extremely finely granular. About 12 pore chambers round the zoœcium.

There are only two specimens and the one from N° 570 is entirely without avicularia, and was at first considered to be *S. praestans* Hincks, as sometimes pieces of *S. praestans* from New Zealand are found with very few avicularia. There are not the areolar ridges as in *S. praestans,* but also in *praestans* there are often two rows of pores and the structure of the aperture is quite similar, while the ovicell in the Antarctic species is smaller and is not areolated. With regard to the avicularia found in specimens N° 596, we know, that the round avicularia of *Schizoporella auriculata* is sometimes replaced by large spatulate ones, so that a similar change would convert *S. praestita* into *S. praestans.*

Besides being so closely allied to *S. praestans* Hincks it is also allied to the Arctic form which I have called *S. Jacksoni* Wat. and they belong to the *S. coccinea* group which occurs in Australia as well as in the northern seas. Levinsen intends to place *S. coccinea* in a new genus *Peristomella,* but as he has not yet diagnosed the genus we cannot discuss it. *Smittia praestita* is allied to *Romancheina Martiali* of Jullien, of which specimens from Cape Horn have

usually the central portion of the frontal wall without pores, as figured by JULLIEN, however there is one piece on *Aspidostoma gigantea* Busk, in which the whole of the frontal surface has pores.

From the Banc des Aiguilles, S. Africa, there are specimens in shape and the position of the pores entirely corresponding with typical *R. Martiali*, but instead of the narrow triangular avicularia, within the peristome, there are avicularia with round or spatulate mandibles high up by the side of the peristome, nearer to the peristome than in *S. praestita* nov. The South African species mentioned, approaches very closely to the New South Wales species considered by me to be a variety of *S. praestans* H. (1), though it has a lyrula while none can be found in the S. African form.

Neither *R. Martiali* Jull., Cape Horn; *S. praestita*, Antarctic; *S. praestans* H., New Zealand; *S. Jacksoni* Waters, Arctic, have a lyrula, though other characters recall *S. coccinea*, and *S. praestita* is left provisionally with *Smittia*. If JULLIEN had taken other characters for his genus *Romancheina* the above might have been grouped together though we must wait until we know what *Peristomella* includes, and the amount of material available for my study of these species has been too small for decision as to the characters upon which a new genus should be based.

HABITAT. — Exp. Antarct. Belge.

N° 570 (without avicularia), Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

N° 596 (with avicularia), Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

Smittia inclusa sp. nov.

Pl. IV, figs. 5*a-f*

Zoarium cylindrical, branching dichotomously, with usually six zoœcia in cross section, namely three full sized and three commencing. Zoœcia elongate, distinct, with a row of fairly large pores surrounding the zoœcia. The peristome is much elevated at the distal end, and at the proximal end there is a groove, leading down to an opening in the denticle, through which it passes. There is occasionally an avicularium with a semicircular mandible at one side just below the peristome. The ovicell is scarcely at all raised, but the portion above the aperture is somewhat inflated and is much larger than in the non ovicelligerous zoœcia.

The zoarium is about 1 millim. in diameter; the lower zoœcia are often quite closed, and the divisions of the zoœcia are only indicated by the row of pores, whereas the younger zoœcia are very distinct and convex. The most interesting point about this species is the groove in the peristome and it is probable that the lyrula is formed by two denticles uniting, however it is not quite clear that this plate should be compared with the lyrula of *Smittia*, so that possibly this may have to be made the type of a new genus. The groove is similar to those in *Retepora* of which I wrote (2) « this pore is frequently the opening of a long tube, which runs down the peristome to the opercular opening ».

(1) Bry. from New South Wales &c. (*Ann. Mag. Nat. Hist.*, s. 6. vol. IV, p. 17, pl. III, figs. 9-11.)
(2) *Journ. Linn. Soc. Zool.*, vol. XXV, p. 256.

The avicularia are rare, and upon some specimens none are seen, for in looking through 43 colonies only four were found, also very few ovicells occur. The ovicell is subject to some variation, and the distal projection seen in the ordinary zoœcia is more pronounced in the ovicelligerous zoœcia, and may turn over the aperture, entirely covering it (fig. 5*a (pr)*). To show all the variations an entire plate would not suffice, but using camera lucida drawings for the shape and position of the zoœcia and then representing characteristic zoœcia, with ovicells and apertures in different positions, it is hoped that the varying conditions will be understood, though I must add it is not possible to give an absolutely correct view of the peristomial tube, as seen when looking down it.

There are two distal rosette plates with numerous pores, and the four lateral plates appear to be very similar, though from the preparations I cannot state the number of pores. Specimens 562, 610, 596 have been examined for polypides, but none have as yet been found, though there are a few buds.

This species is closely allied to *Smittia (Vincularia) exarata* of Reuss [1], and possibly it is that species, but in the fossil it is impossible to see the details of the aperture.

Habitat. — Exp. Antarct. Belge.

Nos 562, 596, 1028, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

Nos 610, 611, 621, 623, 650, 683, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

No 798, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W.; 569 met.; +0.8 C.

Smittia directa sp. nov.

(Pl. IV, fig. 10*a-d*)

Zoarium cylindrical, dichotomising, and branching at short intervals, in different planes.

The zoœcia are distinctly separated by thin raised margins, and the sides are nearly straight. The surface is flat or slightly depressed with numerous fairly large pores, two of which near the top are larger than the others. The part by the aperture is raised, both in the zoœcium bearing the aperture, and in the one above; and the peristomial aperture is nearly round, only sometimes showing a slight groove on the proximal edge. Ovicells unknown.

It is only in broken specimens that the lyrula can be seen, as it is directed downwards at right angles to the axis of the zoœcium (fig. 10*d*). In a few cases there is a pore below the aperture, as in *S. gelida* nov. when the peristome meets over a sinus, and I was perplexed as to whether this might be the basal part of *S. gelida,* but this cannot be as both the zoarium and the zoœcia are larger than in the last species, the branching is more frequent and the surface is flat or depressed, this is always the case in the lower zoœcia, which are blind, having no opening.

(1) *Vincularia exarata* Reuss, « Bryoz. von Crosaro ». (*Denk. Akad. Wissensch. Wien*, vol. XXIX, p. 276, pl. XXXIV, fig. 1.) — *Smittia exarata* Waters, *Quart. Journ. Geol. Soc.*, vol. XLVII, p. 22, pl. III, fig. 6.

This is somewhat like the *Lepralia impressa* of Reuss [1]; and only differs from my *Smittia anceps* [2] from Curdies Creek (S. W. Vict.), in having no oral avicularium, but I now think a mistake was made in considering the fossil to be the *anceps* of MacGillivray.

Habitat. — Exp. Antarct. Belge.
N° 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.; 3 pieces.
N° 991, Tangles VIII. Lat. 70° 00′ S.- Long, 80° 48′ W.; 500 ? met.; +0.9 C.; 1 piece.

Smittia crassatina sp. nov.

Pl. IV, fig. 9; Pl. III, fig. 7)

Zoarium incrusting. Zoœcia very large, not much raised (just under 1mm in length), ovate to hexagonal, distinctly divided by a thin ridge, having moderate sized pores on each side of the ridge; surface with numerous large pores ending in small pits. The rounded oral aperture is surrounded by a thick border or peristome, sinuate on the lower edge, so that on casual examination the species might be taken for *Schizoporella*, there is however a narrow median denticle (lyrula) within the aperture. There are ovicells on specimen 288, but being broken down it is difficult to distinguish the characters, however they are small, much raised and perhaps there has been an area in front.

N° 277 was drawn as *Schizoporella* but further cleaning has shown it be *S. crassatina* with rather large zoœcia.

Habitat. — Exp. Antarct. Belge.
Nos 277 and 288, Dredge (Chalut) I. Lat. 71° 09′ S.- Long. 89° 15′ W.; 460 met.; +0.3 C.
N° 332, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; +0.3 C.
Nos 619, 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.
N° 741, Tangles IX. Lat. 70° 20′ S.- Long. 83° 23′ W.; 459 met.; +0.8 C.

Smittia pileata sp. nov.

(Pl. IV, figs. 7*a*, *b*)

Zoarium incrusting. Zoœcia oval to oblong, slightly raised, with fairly large pores over the surface, below the aperture an umbo, which usually projects over the aperture, but is sometimes free and well below the aperture. The sides of the peristome are often raised, and within it there is a medium sized lyrula, while above usually as a part of the next zoœcium there is an elevation forming a cap. The distal margin of the zoœcium runs in to the aperture as in *Lepralia cruenta* Norman. Ovicell short, raised, perforated by a few pores.

This of course, in some zoœcia, would be pronounced typical *Mucronella,* but we constantly see the artificialness of that genus.

Habitat. — Exp. Antarct. Belge.
N° 619, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

(1) North Italian Bryozoa. (*Quart. Journ. Geol. Soc.*, vol. XLVII, p. 19, pl. II, fig. 15.)
(2) *Quart. Journ. Geol. Soc.*, vol. XXXVII, p. 337, pl. XVIII, fig. 94.

Smittia gelida sp. nov.

(Pl. IV, figs. 6*a-c*)

Zoarium cylindrical, branched. Zoœcia alternate in linear series, hexagonal to subovate, divided by distinct raised margins; surface perforated, in the younger zoœcia raised, in the older ones flat or depressed. Peristome raised except at the proximal edge, where there is a peristomial sinus, within which the narrow lyrula is seen, situated low down. Sometimes the peristome meets, forming a central pore. The ovicell is globular, but not always much raised, with a few large pores on the surface. The cylindrical branches grow from a part of the zoarium which is adnate, and has similar zoœcia, though rather wider and more ovate than those of the erect portion. In the preliminary examination the adnate and erect forms were separated, as two species, but specimens showing the erect form growing out of the adnate one established the identity, which is interesting, as we know of comparatively few cases where growth of an erect form out of an adnate one is proved, although it is suspected in several.

There are 19 tentacles as counted in adnate specimens. Sections of the adnate portion show dark bodies in the tips of the tentacles just as in *S. antarctica* nov., *S. gelida* is much like the fossil from Curdies Creek which I called *S. anceps* MacG. (1), but I now consider the determination was not correct. The fossil has oral avicularia. A close relationship between this and *S. antarctica* nov. is evident, but the zoœcial shape is different, there are no avicularia, and the lyrula is narrower.

Habitat. — Exp. Antarct. Belge.

Nos 610, 615, 621, 623, 650, 683, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 81° 48′ W.; 500 met.; +0.9 C.

Nos 610 and 615 only adnate. Nos 683 and 991 both erect and adnate.

Smittia dentata sp. nov.

(Pl. IV, fig. 8)

Zoarium incrusting, with zoœcia ovate to hexagonal, having large pores round the border, each pore separated by a short ridge, surface smooth or slightly granular. Oral aperture large, with bidentate lyrula and a cardella at each side. Near the lower corner of the aperture, at each side there is a small, tumid avicularium with semicircular mandible. Ovicell unknown. In the general form it much resembles the *Mucronella bicuspis* Hincks, but differs in having a row of pores round the border, instead of the few large punctures of the New Zealand specimens. The fossil *S. biincisa* Waters from South Australia and Victoria is very closely allied to these two, and the *Mucronella serratimargo* Ortmann, from Japan has a similar aperture.

Habitat. — Exp. Antarct. Belge.

No 615, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C. — One piece only, growing on stone.

(1) *Quart. Journ. Geol. Soc.*, vol. XXXVII, p. 337, pl. XVIII, fig. 94.

Smittia reptans sp. nov.

(Pl. IV. fig. 11)

Zoœcia creeping, younger zoœcia growing from each upper corner ; much raised towards the oral aperture, which is situated a short distance below the distal end. The peristome has a proximal groove and is much raised, in a few cases forming a raised tube. The surface is porcellanous, and in some zoœcia minute pores round the edge can be distinguished, also a few minute pores spread over the surface. Ovicells unknown.

The narrow lyrula can seldom be distinguished having only been seen in two or three zoœcia, and if it had not been seen, the species might have been mistaken for *Schizoporella*. The growth and shape is very similar to that of *Hippothoa*, though not as much so as the drawings would suggest, since the zoœcia are about four times the size of *H. divaricata* and instead of being hyaline the walls are thicker and porcellanous. It grows similarly to *Lagenipora Edwardsii* Jullien (1), and to *Mucronella cothurnica* Kirkpatrick from Mauritius (2), and we have uniserial growth in *Schizoporella Alderi* B., various *Beania, Membranipora, Hippothoa* &c. &c.

Habitat. — Exp. Antarct. Belge.
N° 288, Dredge I. Lat. 71° 09′ S.- Long. 89° 15′ W. ; 460 met. ; +0.3 C.
N° 428, Tangles VI. Lat. 71° 19′ S.- Long. 87° 37′ W. ; 436 met. ; —0.2 C.
N° 570, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.
N°s 619, 683, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Escharoides biformata sp. nov.

(Pl. VII. fig. 5)

Zoarium incrusting. Zoœcia ovate, convex, surface finely granular, having pores scattered over the surface, with the pores more numerous round the border. The secondary orifice, in the ordinary zoœcia is rounded on the distal, narrower at the proximal end, and near the proximal end — sometimes within the secondary orifice — there is an avicularium with a triangular mandible ; also frequently there is an avicularium at the side of the secondary aperture. The region of the aperture of the ovicelligerous zoœcia projects forward, and the aperture is very much wider than that of the ordinary zoœcia. The ovicell is short and thrown back.

The only specimen is on a stone, and the condition does not permit of an examination of the primary orifice, but the characters which are available indicate an affinity with *Escharoides Sarsii* Sm. of the Arctic, and it is therefore put under the genus, without an opinion being expressed, that the genus will be permanently retained. I do not find where Milne Edwards has given the generic name though he his credited with it.

Habitat. — Exp. Antarct. Belge.
N° 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 45′ W. ; 500 ? met. ; +0.9 C.

(1) *Bull. Soc. Zool. de France*, vol. VII, 1882, p. (14) 512, pl. XIV, figs. 30, 31.
(2) *Ann. and Mag. Nat. Hist.*, s. 6, vol. I, p. 81, pl. IX, fig. 5.

Cellepora horneroides sp. nov.

(Pl. IV, figs. 12*a-f*)

Zoarium cylindrical, growing from a small solid spreading base, branching in the same plane ; or the branches form more or less cup-like growth, having the zoœcial openings on the outer surface only, and none on the inner. Zoœcia not separated on the surface, which has small linear depressions, and it may be called fibro-reticulate ; also there are pores scattered over the surface, showing a tubular depression leading to them, besides which there are a very few semicircular avicularia on the surface of the zoœcia.

The visible, or peristomial aperture, is horse-shoe shaped, contracting towards the proximal end and just below the aperture, or sometimes within it, there is a small avicularium with an obtuse triangular mandible. The avicularium forms a triangular tooth projecting into the aperture, but this tooth is not to be compared with the lyrula of *Smittia*, being much above the oral aperture. The nearly round oral aperture is closed by an operculum, having muscular attachments a distance from the edge, and the sinus of the aperture is Schizoporellidan. Although the peristomial opening has so entirely the appearance of that of *Smittia*, this is quite different from the oral aperture, and in fact the operculum is very similar in size, shape and characters to that of *Cellepora dichotoma* var. *attenuata* Alder. The ovicell is very slightly raised, and is only distinctly seen when the walls are transparent, as in spirit or balsam preparations. The zoœcia are connected by several long tubes with their neighbours, in this particular resembling a large number of *Celleporæ*. There are 18-20 tentacles, and in N° 741 there are ovaria attached to the walls of the zoœcia, and embryos in the ovicell.

This is a very interesting species, through having the zoœcia only on the one surface, which is also the case in a cylindrical form, collected by the Challenger from the West Indies, and named by me *Porina proboscidea,* when I compared the surface to that of *Filisparsa.*

Whether we should for the time being, call this Antarctic form *Schizoporella* or *Cellepora* is somewhat doubtful, for it belongs to a group, which has some representatives among what we now call *Cellepora* or *Osthimosia*, and some among *Schizoporella*, and when a revision of these two genera is made, a genus will have to be created, embracing some forms now placed with *Osthimosia,* and some now with *Schizoporella.*

Habitat. — Exp. Antarct. Belge.

N°s 242, 938, Tangles I. Lat. 70° 48′ S.- Long. 91° 54′ W. ; 410 met. ; +0.6 C.

N°s 561, 567, 570, 571, 596, 922, 1012, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W. ; 480 met. ; +0.8 C.

N° 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

N° 741, Tangles IX. Lat. 70° 20′ S.- Long. 83° 23′ W. ; 459 met. ; +0.8 C.

Osthimosia signata (Busk)

(Pl. VII, fig. 4)

Cellepora signata Busk, Zool. Challenger Exp., vol. X, pt. XXX, p. 203, pl. XXX, fig. 3 ; pl. XXXVI, fig. 14.

Zoarium cylindrical ; zoœcia smooth, flask-shaped, ventricose in the lower part, contracted towards the distal end ; peristome raised in a wing-like process, on each side of the

aperture, continued in the distal part to a rostral process carrying an avicularium with small triangular mandibles. On the front of the zoœcium, below the aperture, there is a small semicircular avicularian chamber, round which there are large pores irregularly placed, and a few semicircular avicularia are irregularly situated on the zoœcia. There is also a large vicarious avicularium with broadly spatulate mandible. Ovicells unknown. Only small fragments were found, so that no dissections have been possible. I should not have ventured to place it under *O. signata* from Busk's figures, but an examination of the Challenger specimens show that both *O. signata* B. and *C. canaliculata* B. have the winged-like process on the peristome. The specimen is however too small to speak with absolute certainty as to its position. It apparently belongs to the *Osthimosia eatonensis* group, but the zoœcia are very much larger, and it is also closely related to *Cellepora canaliculata* Busk.

Habitat. — Challenger Station, 304 (Patagonia). Lat. 46° 53′ S.- Long. 75° 11′ W. ; 45 fathoms (73 metres).

Exp. Antarct. Belge.
N° 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W. ; 500 ? met. ; +0.9 C.

Osthimosa clavata sp. nov.

Pl. VII, figs. 1*a-g*

Zoarium erect, forming thick cylindrical branches, the lower part of which is dark, while the ends are clear, white, porcellanous ; the extremities are clavate. The zoœcia are globular, imperforate, smooth, bearing an avicularium on a rostrum at the distal end of the aperture, and there are a few small round avicularia scattered about, also some vicarious avicularia with very short thin spatulate mandibles. The operculum is about 0.12^{mm} wide with the muscular attachments 0.06^{mm} apart. The ovicells are not very distinct, as they are merely a greater inflation of the distal portion of the zoœcium, however where a view into the ovicell is obtained, it is seen to be widely open and it cannot be closed by the operculum ; there is a wide area to some ovicells but not to all.

The number of tentacles is 18, and there are ova and testes with spermatozoa in the zoœcia, but no oral glands are found. The ovaria are often much compressed, having one or two cells with large nuclei.

This is very much like the *Osthimosia (Cellepora) eatonensis* Busk ([1]), but the two are considered to be distinct, for the growth of this Antarctic form is peculiar, and the short vicarious avicularium differs from the long one of *O. eatonensis* B. with its thick mandible.

A small specimen from N° 615, which I think is this species, has the semicircular avicularia more abundant, especially round the aperture. This is a young growth on stone and is porcellanous.

(1) *Osthimosia eatonensis* Busk was subsequently described by Jullien as *Osthimosia evexa* Jull. In Busk's description of the Challenger *O. eatonensis* he does not mention the ovicells, but they occur from Station 149 D. being widely open with a flattened area ; from St. 315 they are widely open, imperforate, with a line but the area is not very distinct ; from 303 (which Sir John Murray thinks may be 308) there are similar globose ovicells.

In *O. clavata* the muscles are attached to the operculum in a pit, instead of to a projection as is usually the case.

Habitat. — Exp. Antarct. Belge.
N°s 343, 1047, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.
N° 428, Tangles VI. Lat. 71° 19′ S.- Long. 87° 37′ W.; 436 met.; —0.2 C.
N° 615, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.09 C.

ORTHOPORA gen. nov.

In the *Orthopora compacta* sp. nov. the lower edge of the oral aperture and of the operculum is straight, and the muscular attachments are close to the distal edge of the operculum. The ovicell is placed proximally to the oral aperture as in *Turritigera stellata,* and probably in a few other species placed now under *Cellepora*, and on account of the position of the ovicell, it has seemed necessary to form a new genus, but as only one species is known, much cannot be said about it, nor can we be sure that it will be permanently retained.

Orthopora compacta sp. nov.

(Pl. V, figs. 4*a-i*)

This is allied to *Turritigera,* in having the ovicell situated proximally to the oral aperture, which is the most distinguishing character of *T. stellata* B., although it was not appreciated when first described, for the « tumid prominence » referred to by Busk is the ovicell. The zoarium is erect, branching, cylindrical. The zoœcia are porcellanous, inflated ; and above the oral aperture there is a long process bearing an avicularium, with a triangular mandible. The calcareous tube leading from the avicularium is very distinctly seen when the avicularian process is broken away. In many *Cellepora* the avicularian tubes are in the wall of the zoœcia or peristome, but here they form a projection into the peristome, and the same structure is seen in *Turritigera stellata* B.

The operculum is straight below, and the muscular attachments are quite at the distal end (fig. 4*b*) so that from the position of the muscular attachments it could be distinguished from all other species, with which I am acquainted. There are occasionally on the surface of the zoœcium one or two small triangular avicularia, also sometimes two similar ones on the ovicell, and they may occur on the oral avicularian process. There are a few vicarious avicularia with spatulate mandibles. Sections show a marked peculiarity in the tentacular sheath, which in most species is quite thin, showing a few nuclei at intervals, as figured by Calvet, Levinsen, and others but in *O. compacta* it is three or four times the usual thickness, and shows the darkly stained longitudinal muscular band. The parenchym, with nucleated cells is found on each side of the sheath. The sheath of *Cellepora bispinata* B. is also very thick.

There are 24 tentacles and no oral glands were found. In *Lagenipora granum* Hincks there are 12 tentacles ; in *Cellepora pumicosa* B. 15-20 ; in *C. caminata* Waters 16 ; in *C. sardonica* Waters 13 ; in *C. verruculata* Sm. 14 ; in *C. incrassata* Sm. 17 ; in *C. ventricosa* Lorenz 21 ; in *Osthimosa cvexa* Jull. there are 10 (fide Jullien) ; in *Lagenipora Costazii* Aud. 12 ; in *Cellepora bispinata* B. there are 16 ; in *Osthimosia clavata* nov. 18 ; *C. horneroides* nov. 18-20. The *O. compacta* is very similar to *Cellepora solida* Busk, and at first was thought to be identical, but upon

an examination of the British Museum CHALLENGER specimen, the operculum was found to have a different shape (see Pl. V, fig. 5). BUSK calls the operculum suborbicular, and figures it as Pl. XXIX, fig. 12*a*, but nothing of the kind is found in BUSK's preparation, whereas there are several opercula as given in my figure 5. Some mistake has been made in the « Challenger Report » which I have not fathomed.

From the Cape Horn Expedition, Dredge, N° 32, Lat. 53° 13′ S.- Long. 68° 31′ W., 97 met., +6°.6 C., there are specimens of *Cellepora* growing from a very small base, which gradually becomes wider, making the colony club-shaped. The growth and appearance is so similar to that of *Orthopora compacta*, that I had no doubt as to its being the same, until I made preparations, and then the operculum showed, that in the aperture there was a wide round sinus, further the mandible is characteristic, having a very narrow, elongate lucida. The lower edge of the aperture frequently appears straight, which is difficult to understand, as the lower edge of the operculum always has the round projection, but the sinus of the aperture must be concealed by calcareous growth in front of it. Sections show that there are only 13 to 14 tentacles in the *Cellepora* under consideration, whereas *O. compacta* has 24. The Cape Horn specimen will probably be called *C. petiolata* nov.

HABITAT. — Exp. Antarct. Belge.
N° 343, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.
N° 428, Tangles VI. Lat. 71° 19′ S.- Long. 87° 37′ W.; 436 met.; —0.2 C.
N° 613, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Turritigera stellata Busk

(Pl. V, fig. 3*a-c*; Pl. VIII, fig. 13)

Turritigera stellata BUSK, Zool. Challenger Exp., vol. X, pt. XXX, p. 130, pl. XXIV, fig. 1; WATERS, *op. cit.*, vol. XXXI, pt. LXXIX, p. 22, pl. I, figs. 22, 25.

This is evidently one of the most abundant of the Antarctic species, and while most of the specimens are young and show but slight branching, there are more fully developed ones, showing that the complete growth is reticulate, which was not the case in the CHALLENGER specimens examined.

This species has the peculiarity, pointed out in my « Supplementary Challenger Report », of having the ovicell placed proximally to the oral aperture, instead of distally, as in other Chilostomata, with the exception of *Orthopora compacta* nov., and probably two or three species at present considered to be *Cellepora*.

The thin operculum is Schizoporellidan with the muscular attachment some distance from the border of the operculum. Round the aperture there are avicularia on cylindrical processes, but the number varies from three to six, and I do not find any regularity as to the time of appearance or size as mentioned by BUSK. The secondary aperture is often closed by a thin dome-shaped calcareous cover, as mentioned in my « Supplementary Report ».

The zoœcial surface has elongate pores, which in alcohol or balsam preparations are seen to be the ends of tubes which run longitudinally as in *Hornera*, and there are also raised avicularia, with triangular mandibles scattered here and there. The dorsal surface is quite similar to the anterior and cannot be called rugose.

To each zoœcium there are several long tubular connections, often about the length of a zoœcium, and they arise from near the distal end of a zoœcium passing to the proximal end of the next younger one, though sometimes one of these tubes may skip a zoœcium and join the following one (fig. 13). There are very few connections to the lateral neighbouring zoœcia. In *Tubucellaria, Cellaria* &c. there is one long connecting tube, but a number as in *T. stellata* is unusual.

There are 18 tentacles, which are narrow, and the tentacular sheath is normal, whereas it is very thick in *Orthopora compacta* nov. which belongs to an allied genus, both having the ovicells proximal instead of distal. No oral glands were found, though in N° 611 there are buds as well as complete polypides. In specimen N° 621 the zoœcial cavity is crowded with testes and spermatozoa, and sometimes in the same zoarium there are small ovaria.

Habitat. — Challenger Station 320 (off Argentine) 600 fath. (970 met.), and Station 142 (Cape of Good Hope) 150 fath. (240 met.) ; Cape Horn « Entre les missions et le Détroit de Magellan » (Mus. d'hist. nat. Paris).

Exp. Antarct. Belge.

N° 309 (2 specimens), Tangles II. Lat. 71° 14′ S.- Long. 89° 14′ W.; 460 met.; +0.3 C.

N°s 346 (1 sp.), 1047 (1 sp.), Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0,3 C.

N°s 564 (2 sp.), 922 (2 sp.), 1012, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

N°s 611 (30 sp.), 613 (on *Orthopora compacta*), 619, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

N°s 621 (2 sp.), 683 (28 sp. some on *Cellarinella foveolata*), Tangles VIII. d° d°.

N° 752 (1 sp.), Tangles IX. Lat. 70° 20′ S.- Long. 83° 23′ W.; 459 met.; +0.8 C.

N°s 799 (1 sp.), 800, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W.; 569 met.; +0.8 C.

RETEPORA

The Antarctic *Reteporæ* seem to belong to two related groups of this genus, and in general character there is much to recall the fossils of the Australian Tertiaries. Three species are related to the *R. sinuosa* of Kirkpatrick, and it is noticeable that the *monilifera* group is unrepresented in this collection, apparently having had but a limited distribution, and as a rule the distribution of species of *Retepora* is but limited.

As I have previously said [1], although there does not seem to be any one character found in all *Reteporæ,* yet it seems to be a natural group, as in all, some or other, of the zoœcial distinctive characters occur, and we may here mention that there is very generally, and often on both surfaces, a small elliptical avicularium, with a thin mandible, and this form of avicularium might be called a Reteporidan avicularium.

In nearly all *Reteporæ* there is on the dorsal surface a thick calcareous layer, which when incinerated, readily separates from the front or zoœcial layer (see Pl. VI, fig. 6*a*) and on the

(1) On Mediterranean and New Zealand Retepora &c. (*Linn. Soc. Journ. Zool.*, vol. XXV, p. 255.)

surface of the dorsal layer there are vibices, which are lines without any relation to the zoœcia, not being merely surface lines but extending through the dorsal layer. Fig. 6*a* taken from a preparation of *R. crassa* B. shows this structure which is general. It will be seen, that the interior of these vibical divisions is formed of parallel lines, and from the broken surface (Pl. VI, figs. 6*a, b*) it would appear as if the neighbouring areas dovetail into one another.

Levinsen [1] considers the oral bow, which I have previously alluded to as a « shelf », is of great classificatory value, and says it occurs in different families, and is general in *Reteporidæ*. The genus is placed by Levinsen in his *Camarostega,* and the ovicell is hyperstomial.

Hincks [2] has correctly described the base of *Retepora,* but I cannot agree with him in his description of the order of its formation, as of course from one zoœcium grow the zoœcia from which the colony is further developed and in a very early stage, the zoœcia throw out the expanded crust referred to. A similar mistake has been made concerning the radicles of other rooted forms, for fresh radicles are being constantly formed as the colony grows ; and in the same way the basal part of *Retepora* increases as strength is required. The attachment of a considerable number of the Chilostomatous Bryozoa is similar, being formed by a subsequent growth in no way resembling the zoœcia ; but there are some species of Bryozoa, in which at first the zoarium is adnate, having zoœcia like those in the erect portion, which of course grows from the adnate part, as seen in *Smittia gelida* nov. Sometimes *Retepora* throws out one or more fresh attachments, and when this is to a body near to the zoarium, then the calcareous growth is similar to that of the base of the *Reteporæ* generally. This is seen in *R. hippocrepis* nov. (Pl. VI, fig. 10*a*).

No general consideration of *Retepora* would be complete without taking into account a massive bilaminate species without any reticulation, occurring off South Africa and which came into my hands through Miss Jelly's kindness, after my paper on *Retepora* [3] was published, and since then I have intended to describe it. However I now give a figure of one zoœcium, and the operculum (Pl. VI, figs. 8*a, b, c, d*) hoping sometime to give fuller figures. It will be seen that it is of the *R. fissa* type having a fissured raised ovicell, the zoœcia are distinctly separated, and to each zoœcium there are four or more small raised circular avicularia, with semicircular mandibles ; below the aperture there is a small labial avicularium, with semicircular mandible ; there is a peristomial slit, and on the surface of the zoœcia there are numerous large pits as well as the avicularia. The operculum is wide below, and becomes narrower towards the distal end, being similar in shape to the operculum of *R. protecta* sp. nov.

Busk also refers to a bilaminate form in his « Challenger Report », p. 114, but he says it belongs to the *R. tessellata* group, and it does not seem probable that he could have considered the S. African form as having chitinous organs similar to those of *R. tessellata.* Busk says that the specimen is in the Oxford Museum, though unfortunately he does not state where it was from. I went to Oxford, for the purpose of seeing this interesting species, but it could not be found.

A most interesting point in connection with my South African species is that *R. granulata*

(1) Studies on Bryozoa. (*Vidensk. Medd. fra d. Naturh. Foren., Kjöbenhavn,* 1902, p. 19.)

(2) Hincks, British Marine Polyzoa, p. 389.

(3) *Linn. Soc. Journ. Zool.,* vol. XXV. pp. 255-272, pl. 6-7,

MacG., from Port Phillip Heads, has exactly similar zoœcia and ovicells ; and also the opercula are just the same shape. MacGillivray says the young zoœcia of *R. granulata* have a fissure in the ovicell, which is afterwards closed. The South African form is not in all parts bilaminate, but unilaminate parts coalesce, and thus become bilaminate. In the unilaminate parts there are, on the dorsal surface, vibices and small avicularia, with semicircular mandibles, as in the Australian *R. granulata* MacG.

We are not now requiring proof, that for classification we must look principally to the zoœcial characters, and that zoarial ones, when they are used, must be dealt with very cautiously, though had such a striking case of identity of all the minute characters, as in the Australian reticulate *R. granulata* MacG. and in the bilaminate *R. bilaminata* Waters (just described), been recognised and understood two generations ago, how much more advanced we should now have been.

A point, that has come before me in considering this species is mentioned for what it is worth. So far as I am able to judge from my own collection, and from what I have seen, there is no part of the world where there are so many massive and solid Bryozoa as South Africa, and where genera generally delicate, are found with thick calcareous growth, as examples may be mentioned, *Tennysonia stellata* Busk ; large species of *Heteropora*, solid bilaminate *Steganoporella Buskii* Harmer ; bilaminate *Schizoporella bimunita* Hincks ; *S. porelliformis* mss., a large bilaminate form ; large Adeona ; *Mucronella contorta* Busk ; *Chaperia capense* B. ; *Membranipora elizabethiensis* Waters allied to the small *M. tubigera* Busk ; *Chaperia annulus* var. *bilaminata* Waters. In this respect the Antarctic forms are quite different, as there are no very massive species ; however from Patagonia there are some ; among others *Aspidostoma gigantea* B. attains to a great size and is sometimes reticulate.

The known *Reteporæ* from S. America are *R. magellensis* Busk, and an allied species, which I propose to call *R. spatulifera*, and also *R. altisulcata* Kirkpatrick, all belonging to the same group. This group is not apparently represented from the Antarctic. *R. cellulosa* L. has been mentioned by Busk and Ridley from South America, but there is every probability, that they were dealing with another species. Ridley refers to Busk's fig. 7, Pl. CXXIII of the British Museum Catalogue, but Busk neither in the text, nor in the explanation of the plates refers to fig. 7 so that we do not know what species it represents, but it may possibly be *R. magellensis* Busk.

The specimen, which I propose to call *R. spatulifera* instead of forming a net work, is composed of narrow strap-shaped branches, occasionally anastomosing at varying distances. In the young zoœcia there is a broad spine at each side of the aperture, but in the older zoœcia it is more delicate. Except in the zoarial form and in the spines this corresponds in all respects with *R. magellensis* Busk.

Retepora is not known from the Cretaceous, or any earlier formation, for though the name has been used for some Paleozoic fossils these were in most cases *Fenestellidæ*. From the lower Tertiaries, the number of species mentioned is small, and some of these cannot be again recognised, on account of the insufficient description and figures furnished. *R. cellulosa* (L.-Smitt) has been given as from lower Miocene or upper Eocene, but this is very doubtful, whereas *R. elegans* Reuss, and *R. rubeschi* Reuss, from the lower Tertiaries, may be considered good species.

Some of Michelin's species are not *Retepora* but *Hornera*, and none could be recognised

from the figures and descriptions, as unreliable characters were used. From the Miocene of N. America it occurs as *Phidolophora* Gabb. and Horn. In the Pliocene of England, Italy &c. there are various species of *Retepora ;* and a number have been described from the upper Tertiaries of Australia by MacGillivray and others. In all probability the genus has never before reached so high a stage of developement, it is universally distributed, and is evidently abundant in both polar regions. The distribution of the species of *Retepora* is as a rule very limited, more so than that of any other large genus.

The number of tentacles are :

R. protecta nov. 12.	*R. hippocrepis* nov. 11.	*R. Couchii* H. 12.
R. frigida nov. 14.	*R. laevigata* nov. 15.	*R. cellulosa* L. 12.
R. antarctica nov. 14-15.	*R. lepralioides* nov. 13-14.	*R. elongata* Sm. 15-16.

Retepora antarctica sp. nov.

(Pl. VI, figs. 1*a-k*)

Zoarium reticulate, forming flat expansions with fairly large meshes. The fenestræ are about the same width as the branches, which as a rule are about 0.6^{mm} wide.

One piece from N° 620 is nearly flat and measures about 45$^{m.m}$ × 30^{mm}.

Zoœcia rhomboidal, separated on the anterior surface by distinct slightly raised lines, with the peristome considerably elevated at each side, and usually a sinus to the secondary triangular aperture. Anterior and posterior surface somewhat granular ; with small elliptical avicularia on the front of the zoœcia, sometimes depressed, occurring in some pieces generally to each zoœcium, or even there may be a second avicularium, while in other pieces the avicularia are only found on a small proportion of the zoœcia. In some specimens there are a few avicularia, with broadly triangular mandibles, at one side of the proximal border of the peristome ; and very rarely there is a large raised transverse triangular avicularium, with long triangular mandibles (fig. 1*c*). There are on some young zoœcia 4 oral spines, and in the interior of the zoœcium there are two calcareous projections for the attachment of the operculum (see fig. 1*h*). The operculum becomes much wider at the proximal edge. The ovicell has no slit or other markings, except where the zoœcial dividing lines extend over it ; they often contain embryos. On the dorsal surface the vibices are irregular and there are a few elliptical avicularia. The oral glands are well developed, and the number of tentacles is 14-15.

There is a large dark mass in some of the tentacles, but I have never found more than one such tentacle in a zoœcium, and it may occur in the tip, when histolysis has commenced at the extremity, and near it the remaining cells are few and not distinct, while lower down they are but slightly changed. In some cases however there is in these stained sections a dark mass about the middle of the tentacle, and close to it all the cells have disappeared, while by the extremity they are in their usual places. Dark bodies in the tips of *Smittia gelida* nov. &c. have been already referred to, but the two cases are not quite similar, as in *S. gelida* the tips, of practically all the tentacles, contain these bodies, whereas in the present case there are only a very limited number of such tentacles, and never more than one such to any zoœcium. Specimens in different conditions of growth must be studied, before we can be sure what specific differences there are.

The opercula and mandibles are of the *R. cellulosa* type, being somewhat similar to those of *R. Couchii* H., but perhaps the nearest relationship is with *R. avicularis* MacG., and with the fossil variety *R. rimata* Waters, from which it differs in the shape of the avicularia. *R. magellensis* Busk (collected by the Challenger off the Argentine, and also known from the Falklands and Cape Horn) also differs in having small semicircular avicularia on the anterior and dorsal surface, whereas in *R. antarctica* they are elliptical, further in *R. magellensis* the labial semicircular avicularia are constant, and the two species can be distinguished by means of the ovicells. Busk's description of *R. magellensis* in the « Challenger Report » requires correction, as in the Challenger specimens there are distinct vibices and also numerous semicircular avicularia on the dorsal surface. Unfortunately Busk does not seem to have incinerated, or boiled in caustic any of the *Reteporæ,* and thus sometimes overlooked vibices and small avicularia.

Habitat. — Exp. Antarct. Belge.

N° 309, Tangles II. Lat. 71° 14′ S.- Long. 89° 14′ W.; 460 met.; +0.3 C.

N°s 345, 1047, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.

N°s 608, 620, 621, 683, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 580 met.; +0.9 C.

Retepora protecta sp. nov.

(Pl. VI, figs. 2*a-e*)

The zoarium is cup-shaped, with rather small fenestræ about 1.0^mm^-1.4^mm^ long, and about 0.8^mm^ wide. There is one nearly flat piece from 620, about 35^mm^ × 20^mm^.

The zoœcia are rhomboidal, separated by narrow lines, and but slightly convex ; surface faintly pitted with the edges of these shallow pits straight, thus forming a kind of net work. The peristome in front is irregularly notched, and often is raised as a plate, which may even turn forwards at right angles to the axis of the zoarium. There is a fissure or pore at the side of this plate, but it is only formed by the junction of the opposite walls of the peristome, and this will be the labial fissure or pore, which in most species, where it occurs, is median. The distal portion of the peristome also sometimes extends beyond the aperture. In young zoœcia there are 6 spines, but in the older ones there may be one delicate spine on each side, though as a rule spines are absent. On the front of the zoœcium there is usually one small elliptical avicularium. The dorsal surface has irregular vibices, and round the edge of the fenestræ there are numerous small avicularia. The ovicell is not raised, and frequently it is not readily distinguished, there is a straight mark on the front, but this does not seem to be a fissure. There are 12 tentacles, and also suboral glands, and in the specimens N° 242 there are ova and testes with abundant spermatozoa.

Except in a badly preserved dry specimen, from N° 683 the shape of the zoarium cannot be recognised, in this however it arises from a broad base, and is cup-shaped. The meshes are smaller in this specimen, than in the others, but the identity is established, although it is badly preserved. There is also a small stout specimen from N° 309 (Pl. VI, fig. 9) which shows neither reticulation nor anastomoses and which I at first labelled *R. porcellana* MacG. It is not in good condition for detail examination, but the opercula and other zoœcial characters correspond with those of the reticulate *R. protecta ;* and at present we may consider it *R. protecta* var. *crassa*.

R. protecta is allied to *R. porcellana* MacG., but the zoarium of *protecta* is less solid, with smaller fenestræ, and there are no labial avicularia.

Habitat. — Exp. Antarct. Belge.
N° 242, Tangles I. Lat. 70° 48′ S.- Long. 91° 54′ W.; 410 met.; +0.6 C.
N° 309, Tangles II. Lat. 71° 14′ S.- Long. 89° 14′ W.; 460 met.; +0.3 C. (var. *crassa*).
N° 339, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.
N°s 620, 683, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Retepora frigida sp. nov.

(Pl. VI, figs. 4*a-f*)

Zoarium large, as judged from the fragmentary specimens, which are only slightly curved, thus indicating a large colony ; one flat piece is $25^{mm} \times 15^{mm}$. Fenestræ larger than those of *R. protecta* sp. nov. being about 2.4^{mm} to 3.6^{mm} long. and about 0.8^{mm} to 1.6^{mm} wide.

Zoœcia indistinctly separated, surface smooth, with elliptical avicularia to some of the zoœcia, and an occasional gigantic, raised avicularium, having a triangular mandible with elongate beak. The oral aperture, as shown by the operculum, is nearly straight below, and the distal edge is more than a half circle. The labial pore is to one side, and is formed by calcareous growth on each side meeting over it ; the plate at the proximal edge of the aperture is below the surface, and is notched, whereas in *R. protecta* it is erect ; at each side there is a jointed spine.

The ovicell is almost concealed, only showing as slightly elevated above the aperture, and is entire, though in one or two cases there is a faint mark, reminding us of the ovicellular slit of *R. cellulosa* &c. The dorsal surface is smooth, divided irregularly by vibices, and has numerous elliptical avicularia. There are about 14 tentacles, the glands are long, and there are testes with spermatozoa.

The structure is very similar to that of *R. protecta* nov. in several points, but the fenestræ are larger, the surface is smooth, and instead of having a raised plate in front of the aperture, it is well within the aperture, and there are large, raised, triangular avicularia. There is also considerable similarity to *R. laevigata* nov., but the opercula are quite different.

Habitat. — Exp. Antarct. Belge.
N°s 339, 345, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.

Retepora laevigata sp. nov.

(Pl. VI, figs. 5*a-d*)

Zoarium cup-shaped, fenestræ large, branches narrow. Zoœcia smooth, indistinct, without divisional lines, distal end not raised, peristomial aperture with wide sinus within which are seen the two teeth meeting and forming a pore, on the surface there are scattered small semicircular avicularia, but often none are to be found upon a branch. There are six spines in the younger zoœcia, but they are not found in the older zoœcia. The ovicells are not raised, and while there is a mark down the front I do not think it is a fissure.

On the dorsal surface there are few and very delicate vibices, on some branches none

are distinguishable, and there are, here and there, small semicircular avicularia, also fenestral avicularia, with thin spatulate mandibles, and a few similar ones near the border of the fenestræ. These appear to be the elliptical avicularia enlarged. There are 15 tentacles.

The above description is of a specimen from N° 322, and there is also one from N° 428 (dry) which has larger meshes about $3.6^{mm} \times 2^{mm}$ quite corresponding with Busk's figure of *R. gigantea,* but it is smooth and has but few of the semicircular avicularia on the anterior surface, and no labial avicularia. It would be interesting to compare a larger series of *R. gigantea* B. and *R. laevigata* sp. nov. As to specimen N° 428 there is considerable uncertainty, and unfortunately the opercula are wanting.

Habitat. — Exp. Antarct. Belge.
N°s 309, 320 (1 piece each), Tangles II. Lat. 71° 14′ S.- Long. 89° 14′ W.; 460 met.; +0.3 C.
N° 322 (1 piece), Tangles III. Lat. 71° 24′ S.- Long. 89° 12′ W., 460 met.; +0.3 C.
N° 428 (1 piece), Tangles VI. Lat. 71° 19′ S.- Long. 87° 37′ W., 436 met.; —0.2 C.

Retepora lepralioides sp. nov.

(Pl. VI, figs. 3*a-d*)

Judging from the largest piece, measuring about $30^{mm} \times$ about 10^{mm} which is not very much curved, the zoarium evidently attains to a considerable size. The fenestræ are large and usually rather wider than the branches, the average length of the fenestræ being about 3^{mm}.

The zoœcia are elongate, smooth, with small elliptical avicularia on the front, and to a few zoœcia there are large raised beaked avicularia directed forwards, the mandibles are triangular, elongate at the end. There are also large fenestral avicularia directed towards the interior of the fenestræ, visible both from the back and the front, and with similar mandibles to those of the large avicularia on the zoœcia. The secondary aperture is but little above the oral aperture, and has a broad sinus, formed by the sides of the peristome being raised. The oral aperture is nearly straight below, with the sides also nearly straight, and is longer than broad; the two oral spines are only seen in some zoœcia.

The ovicell is globular, much raised, fairly open in front, with in some cases a median fissure. The anterior zoœcial divisions extend to the front of the ovicells, and in some ovicells, only these divisional lines are seen, while in others the fissure can be distinguished.

Dorsal surface divided by vibices and with numerous small elliptical avicularia.

There are 13-14 tentacles and long suboral glands, as well as avicularian glands; there are a few ovaria and testes with spermatozoa.

This has many points of similarity with *R. antarctica* sp. nov., but the zoœcia are longer, and there are a number of large avicularia directed forwards, whereas in *R. antarctica*, the few large avicularia are turned sideways, and may be replaced by small avicularia within the aperture. The raised globular ovicell is another distinguishing character, but most important of all, is the difference in the shape of the oral aperture and the operculum.

Habitat. — Exp. Antarct. Belge.
N° 742, Tangles IX. Lat. 70° 20′ S.- Long. 83° 23′ W.; 459 met.; +0.8 C.
2 pieces in alcohol but the smaller is probably broken off from the larger.
N° 1032, do do do only fragments.

Retepora gelida sp. nov.

(Pl. VI, figs. 7*a-d*)

Zoaria with fairly large meshes, having the branches as a rule wider than the fenestræ, though they vary much in width ; there are large fenestral avicularia with triangular mandibles. The shape of the zoarium is unknown. The zoœcia are rhomboidal, distinct, separated by raised lines, faintly granular, with a large, scarcely raised, avicularium directed transversely or downwards, having a thin characteristic mandible which has a small lucida close to the proximal end. The peristome is not much elevated, and has the border is most cases irregularly serrate or nodulated, and sometimes, but not generally, the peristome is raised at the distal end. The operculum is short with the sides straight, the proximal border also straight and the lateral borders are thick.

The ovicell is subimmersed and has an irregular mark on the front, the wall being thinner here, and occasionally on this there is a broad line with the wall still thinner, but there does not seem to be a fissure.

The dorsal surface is divided by vibices and there are elliptical avicularia.

Habitat. — Exp. Antarct. Belge.

N° 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met. ; +0.9 C.

Retepora hippocrepis sp. nov.

(Pl. VI, figs. 10*a-g* and figure in text)

Zoarium very irregularly cup-shaped, with a solid base. The largest specimen is very unequal in the axes, the longest axis being about 70^{mm}, and the shortest about 20^{mm}, and the growth cannot be said to be wavy or undulating. The fenestræ are fairly large, averaging about $2^{mm} \times 0.6^{mm}$ and the branches are about as wide as the fenestræ. Fenestral avicularia occur to nearly all the fenestrae.

The zoœcia are not always distinctly indicated, but there are raised dividing lines to most of the younger zoœcia, the shape is elongate, oval, surface smooth ; below the aperture is a long, stout, solid, calcareous, spinous process, these do not usually support an avicularium, but in one or two cases there is a minute semicircular one directed towards the oral aperture, and occasionally on the other side of the spine, there may be growing by it and partially attached to it, a large raised avicularium with triangular mandible. On the surface of the zoœcium in various positions, there are the tumid avicularian chambers of a small avicularium, with semicircular mandibles, and besides these there are a few triangular avicularia, similar to the fenestral avicularia, usually placed transversely or diagonally directed upwards.

The oral aperture is nearly straight below, and contracted on each side towards the lower part, while the condyles in the aperture are smaller than those of *R. antarctica* nov. The ovicells are globular, much raised and fairly widely open below, never closed by the operculum, nor does the operculum usually close the ovicells in *Retepora ;* on the front of the ovicell there is the mark of a thinner part, either semicircular or more contracted, and often in the middle is a wide line, which however does not seem to be a fissure. The dorsal surface is divided

by vibices and there are numerous elliptical avicularia. The number of tentacles is 11 and the oral glands are exceptionally long.

Just under the operculum there is on each side a short tube, arising from the fleshy mass below the operculum, to which the oral glands are attached, and the question now is are these the excretory openings of these two glands. The ends of the tubes become thicker and were at first taken for the base of spines. Further sections must be prepared and a re-examination of other sections made, but I may add, that though able to find these tubes in thin sections they are best seen in thick sections, which I distinguish as « cuts » and such are often the most instructive.

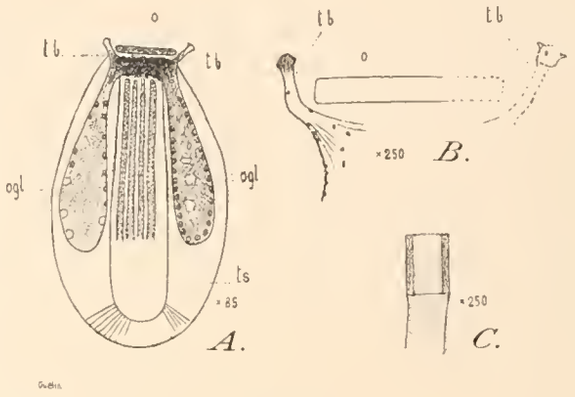

Fig. 3. — *Retepora hippocrepis* nov.

A. Section of zoœcium × 85, showing the operculum (*o*), below which is the fleshy mass, with a tubular process from each side. To this fleshy mass the gigantic oral glands (*ogl*) are also attached.

B Section × 250, showing the tubular process (*tb*) below the operculum (*o*).

C. Section of joint of oral spine.

These tubes were only found quite recently, in fact, when I considered the memoir practically finished, but their occurrence is a most important fact which must be further studied and cleared up. In *R. hippocrepis* I have not been able to find any spines, though in allied genera there are usually 2 or 3, which however are often only found in some parts of the zoarium. In one section there is a tube which unmistakably looks like the joint of a spine and I have been led by this to ask if there is any relationship to spines. Now in a form of *Lepralia Pallasiana*, which is the *L. Otto-Mulleriana* of Moll, there are several spines and from the fleshy mass under the operculum (to which here also the oral glands are attached) there is a small organic protuberance passing to each spine. This suggests that the oral spines, which have received but very little attention, should be carefully examined to see if they are in any way functional.

The *R. hippocrepis* nov., *R. sinuosa* Kirkpatrick, from Victoria, *R. gelida* nov., and *R. lepralioides* nov. all seem to have an operculum of the *Lepralia* type, and these will form a group of *Reteporæ* to which perhaps *R. Novae Zelandiae* Waters should be added.

Habitat. — Exp. Antarct. Belge.
Nos 568, 1012, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.
No 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

CTENOSTOMATA

Alcyonidium antarcticum sp. nov.

(Pl. VII, figs. 7*a-h*)

Zoarium growing over the end of the spine of an echinoderm, forming a single layer. The surface is smooth, only indistinctly showing the zoœcia, and the thin cortex contains but little extraneous matter. Out of the four specimens two have the zoœcia hexagonal, with the orifices raised and pouting, whereas the other two have the zoœcia narrower and the orifices

project but very slightly. No sections have been cut of the stouter form with projecting orifices, but it is presumed, that there is only one species, and that the difference arises from growing on a stouter spine, but this is not an absolute certainty ; in both cases the zoœcia are under 1^{mm} long.

There are about 24-27 tentacles which is a larger number than in most *Alcyonidia*, though *A. albidum* Alder, has 25, according to Prouho ; *A. variegatum* Prouho 28 or more (Prouho) ; *A. flustroides* Busk 24-27 (Waters) ; *A. flabelliforme* Kirkpatrick 26-28 (Waters). The number of tentacles in other species is *A. gelatinosum* L. 15-17 ; *A. hirsutum* Flem. 15-17 (Hincks) ; *A. mamillatum* Alder 16-18 (Hincks) ; *A. mytili* Dalyell 15-18 (Hincks), 19 (Waters) ; *A. parasiticum* Flem. 15-16 (Hincks) ; *A. Brucei* Calvet 16-18 (C.) ; *A. cellarioides* Calvet 20 (C.).

The ovaria are at the base of the zoœcia, and consist of a large number of small ovarian cells, of which the largest met with, will be about one quarter the size of those I am figuring in my «Arctic paper» of *A. gelatinosum*, and also of another Mediterranean species. No doubt the nature, size, shape and position of the ovaria will have to be used in the classification of the *Alcyonidiidæ*.

The zoœcia are smaller than those of *A. flustroides* B. and about the size of *A. gelatinosum* L. The intertentacular organ is distinctly seen in sections and there are spermatozoa in the same zoœcia as the ovaria.

A large flabelliform specimen of *Alcyonidium* was brought back by the Southern Cross Expedition under the command of Borchgrevink, and has been named *A. flabelliforme* by Kirkpatrick. The *A. flustroides* B. is from S. Africa and Hincks mentions *A. gelatinosum*, from Natal, but otherwise the genus is unknown in the southern hemisphere.

Habitat. — Exp. Antarct. Belge.
Nos 744, 1032, Tangles IX. Lat. 70° 20′ S.- Long. 83° 23′ W.; 459 met.; +0.8 C.

Suborder **CYCLOSTOMATA**

Cyclostomata from the Antarctic give us much less assistance in the interesting question of distribution, than the more highly differentiated Cheilostomata. *Stomatopora, Hornera* and *Entalophora,* or at any rate close allies, have lived on since Paleozoic times, being now generally distributed, while the Antarctic species vary but little from those now living in all parts of the world. *Lichenopora* is at present universally distributed, and occurs in the Cretaceous system.

The most interesting species is *Heteropora claviformis* nov. which has been called a new species, although there are some fossils very similar in shape, and there is little else by which to separate it; however, this is the first time that sections of the soft parts of any of the group have been cut, and although the preservation is most unfavorable, we find a polypide, similar to that of other Cyclostomata, and the closures are distinctly shown. *Heteropora* is now known recent from Japan, New Zealand, and the North Pacific ; it was abundant in the Tertiaries and Cretaceous, and apparently the family was well represented in Paleozoic times, but it is as yet difficult to bring Paleozoic fossils into line with Cainozoic, and still more so with recent groups.

We may say with certainty that there are at least 15 species of Cyclostomata, in the Antarctic collection, nearly all of which are indentical with, or closely allied to, widely distributed species, but as few have ovicells, and many are in an unsatisfactory state of preservation, we cannot generalise on the Cyclostomata, and to attempt to give them names, for future comparison is a most unsatisfactory task.

STOMATOPORA

The genus has been abundant and also widely distributed from Jurassic times to the present, and is represented in Arctic and Antarctic seas as well as in intervening regions.

According to Ulrich *Stomatopora dichotoma* « Lamx. » occurs from the Trenton beds to the present time, and *S. inflata* Hall occurs in the Cincinnati group of beds ; also other monoserial and some multiserial forms occur in the Paleozoic formations.

Gregory and Urlich would separate the monoserial species as *Stomatopora* from the multiserial forms, which they consider to be *Proboscina,* but this is a retrograde step, which cannot be accepted by those who are aiming towards a natural classification, unless some fresh characters supporting the change should be discovered. In this genus we see uniserial forms become bi-triserial, and further in a large number of genera both uniserial and multiserial growth occurs, as for example we may mention *Membranipora,* with *M. pilosa,* and *M. monostachys* both sometimes uniserial ; then *M. catenularia* may occur in both conditions ; in *Smittia* there is in this collection *S. reptans* nov., in *Hippothoa* and *Beania* there are both growths, again in *Alcyonidium* there is *A. disjunctum* Hincks, a uniserial form.

Paleontology is not advanced by classification, in which convenience is the first consideration, for though divisions are sometimes necessary, for arrangement of material, before satisfactory characters are known, yet we must endeavour to find fresh characters to reveal the classification nature has made for us.

Stomatopora dichotoma (d'Orb.)

Criserpia dichotoma d'Orbigny, Voyage dans l'Amérique méridionale, p 19, pl. IX. figs. 7-13.
Proboscina dichotoma d'Orbigny, Paléontologie française, p. 847.

This is well figured by d'Orbigny and would seem to be the species subsequently described as *S.* (*Alecto*) *dilatans* Johnst., and has been thus mentioned by Busk, Alder, Norman, Lorenz, Sequenza, Waters, but I now consider the name *dilatans*, should be dropped for *dichotoma,* though the ovicell not having yet been described, there will be some uncertainty, until further specimens enable us to learn more about the range of variation in the species. *S. repens* S. Wood is closely allied, and it may well be that these two will have to be united.

The zoœcial tubes are about 0.14^{mm} wide, whereas in *S. divergens* they are about 0.09^{mm} internal measurement. A specimen from Cape Horn, which Jullien had labelled *T. pedata* Jull. is probably *S. dichotoma.* The ends of the zoœcia are round, measuring internally 0.14^{mm}.

Habitat. — Exp. Antarct. Belge.
Nos 570, 591, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

Stomatopora major Johnston varietas

(Pl. VIII, fig. 16)

There is, from N° 570, a small worn colony, much like the European *S. major* Johnst. At the side of the zoarium there are small parallel tubes, the zoœcia are alternate, and the zoœcial tube appears to contract at the end, the internal diameter of the end being about 0.12^{mm}. The zoarium is about twice the width of that of *S. divergens* nov. being a much stouter species.

Habitat. — Exp. Antarct. Belge.
N° 570, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

Stomatopora eburnea (d'Orbigny)

(Pl. IX, figs. 7*a-b*)

Alecto eburnea d'Orbigny. Voyage dans l'Amérique méridionale, p. 20, pl. IX, figs. 14-16.

The specimen from the Antarctic grows on a stone, with the ends of the zoœcial tubes erect, but the adnate portion frequently extends at the sides of the zoarium, forming a lateral crust, and in this respect it differs from d'Orbigny's species, as figured, but d'Orbigny's specimen shows much the same structure, and the internal diameter of the zoœcia is about 0.14^{mm}, while that of the Antarctic specimen is sometimes as much as 0.17^{mm}. The dots on the surface, when magnified about 100 times, appear dark, no doubt caused by the contents of the pore tubes.

This is much like *S. granulata* M. Ed., in which however the zoœcium has not usually a long erect end. There is also a uniserial species from N° 288 and N° 683, much larger than either *S. antartica* or *S. eburnea*, having the internal diameter of the zoœcia near the end about 0.2^{mm}.

Habitat. — Falkland Islands (d'Orb.).
Exp. Antarct. Belge.
N° 800, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W.; 569 met.; +0.8 C.

Stomatopora ? incrassata Smitt

(Pl. IX, figs. 8*a*, *b*)

From N° 348 there is a specimen with wide branches, creeping on a stone, and at irregular intervals erect branches grow, having zoœcial openings all round. One such erect branch measures about 1^{mm} in diameter, while the internal diameter of the zoœcia is 0.21^{mm}., and in this specimen there are but few isolated zoœcial openings on the creeping portion, whereas in a specimen from N° 991 they are more common. From small broken pieces it is difficult to form a judgment as to the perfect colony, but the appearance is that of *Entalophora* growing from a common creeping base. This is thought to be the *S. incrassata* of Smitt, and there are similar fasciculate growths from Australia and New Zealand. One from New Zealand has smaller erect branches with about three zoœcial tubes in section, much resembling *Filifascigera*

dichotoma d'Orb. (Pal. fr., Crét., p. 685, pl. 744, figs. 1-3), but these small specimens, without ovicells, cannot be determined with certainty.

Habitat. — Arctic and British.
Exp. Antarct. Belge.
N° 348, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.
N° 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Stomatopora divergens sp. nov.

(Pl. IX, figs. 6*a*, *b*, *c*)

The zoarium arises from a discoid zoœcium like the majority of the Cyclostomata, then above this, after one or more zoœcia, two ligulate branches are formed in opposite directions, and at right angles to the primary zoœcium.

The zoœcia, which are contracted towards the end are alternate, with the ends free, but do not extend over the base of the zoarium, and there is only one zoœcium to a series. The zoarium is about 0.6^{mm} wide, and the zoœcia are about 0.09^{mm} at the end. The punctures are fairly large and distinct on N° 596, but less numerous on N° 570.

The ovicells occur as distinct raised subcircular swellings, about the middle line of the zoarium, and near the centre a short erect, tube projects. In the two ovicells found on N° 570 this tube has the appearance of being a zoœcial tube, passing through the ovicell, and no other opening is seen on the ovicell. The pores on the ovicell are much more frequent than on the zoœcia. Whether this should be placed with *Stomatopora,* or *Idmonea,* may be considered an open question.

Habitat. — Exp. Antarct. Belge.
N°s 570, 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.
N° 619, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Stomatopora antarctica sp. nov.

(Pl. IX, fig. 10)

Zoarium uniserial, narrow, with branches at right angles, and usually at long intervals, given off either from about the middle or the upper part of the side of the zoœcium. The zoœcia are long, and the zoœcial chamber is, in spirit specimens, visible through the finely punctured wall, while at the sides there are two or three parallel lines, dividing the basal portion into narrow tubular spaces. The ends of the zoœcia are erect for a short distance. Long creeping threads of this *Stomatopora* are found without branches, and one unbranched piece on a stone is 20^{mm} long.

As a rule in *Stomatopora* the branches are dichotomous, the rectangular growth of this species being unusual ; but it occurs in a few cases, as for instance in the Cenomanian fossil *Stomatopora (Alecto) linearis* d'Orb. (1), which is very similar to the present form, though in the fossil the zoœcia are much shorter.

(1) Pal. franç., Crét., p. 838, pl. 629, figs. 5-8.

Habitat. — Exp. Antarct. Belge.
N° 288, Dredge I. Lat. 71° 09′ S.- Long. 89° 15′ W.; 460 met.; +0.3 C.
N° 392, Eel trap I. Lat. 71° 15′ S.- Long. 87° 39′ W.; 435 met.; —0.3 C.
N° 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.
N°s 623, 683, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.
N° 820, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W.; 569 met.; +0.8 C.

Diastopora solida sp. nov.

(Pl. IX, fig. 11)

From N° 373 there are several dead pieces, separated from the base upon which they grew, and seeing that in all the pieces the zoœcia are parallel without showing any radiating curvature, it is clear, that the zoarium must grow to a very exceptional size. The zoœcia have very thick walls, and the pores passing through the walls are very distinct, as is well seen in spirit specimens. The ends of the zoœcia are broken away, and were but slightly raised, but near to the aperture the zoœcial tube is about 0.13^{mm} inside measure, which is larger than obtains in *Diastopora* generally. The closures are fairly numerous, there being sometimes two in the same zoœcial tube.

None of the *Diastopora obelia* group are found in the southern hemisphere. There are, however, several specimens of *Diastopora* from Cape Horn, unmentioned by Jullien, but they are more delicate, with the zoœcial tube about half the diameter of those of *D. solida* and they are either *D. concinna* MacG. or closely allied. The ovicell is a round inflation with the ovicellular tube turned towards the centre of the zoarium, and the funnel which occurs in *D. concinna* is not found, nor are any tubule closures, but they may have been broken off.

Habitat. — Exp. Antarct. Belge.
N° 373, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.

Diastopora sp.

From N° 570 there is a young flabelliform worn colony, in which the tubes do not project, and it might be the *D. suborbicularis* Hincks, which occurs in European seas, and also, according to MacGillivray, in Australia. It is not as stout as *D. solida*, though in many respects similar, the interior diameter of the zoœcia being about 0.8^{mm}.

Idmonea atlantica Forbes

(Pl. IX, fig. 5)

There are some pieces of *Idmonea* without ovicells, which seem to belong to *I. atlantica*, but where the ovicells are wanting, there is always some uncertainly in the determination. The series of zoœcia are about 0.8^{mm} apart, and the external diameter of the zoœcial tube is about 0.14^{mm}. A specimen from Cape Horn (Mus. d'hist. nat. Paris) has the zoœcial tubes about the same size, but the series are 0.5^{mm}-0.6^{mm} apart. A specimen from 46, Franz Josef

Land, has series about 1^{mm} apart, whereas I have a specimen from Iceland, so named, and one from Station 49 of the CHALLENGER, with the series about 0.6^{mm} apart. The small fragment from N° 991 is rather stouter than the others, but I think it is certainly the same species.

HABITAT. — It occurs frequently in the Arctic, British, Mediterranean and N. Atlantic seas, and has also been found in Australia by MACGILLIVRAY &c. According to BUSK (Chall. Report) it occurs off the Kerguelen Islands, the Cape of Good Hope, and off Tristan d'Acunha, in the South Atlantic but some of these determinations were made from poor specimens ; Cape Horn as mentioned above.

It has been found fossil in the Australian Tertiaries, in the Pliocene of England, Italy &c. According to MANZONI it also occurs in the Miocene of Austria, but the *I. gracillima* of REUSS from the North Italian Bartonian beds, I now consider should be called *I. concava* Reuss, though it has sometimes been placed with *I. atlantica*.

Exp. Antarct. Belge.

N°s 608, 621, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80°48′ W.; 500 ? met.; +0.9 C.

Filisparsa superba (Jullien)

Tervia superba JULLIEN, Dragages du Travailleur. (*Bull. Soc. Zool. Fr.*, vol. VII, p. 4, pl. XVII, figs. 74, 75.)
? *Proboscina incrassata* (pars) SMITT, Krit. Fört. öfver. Skand. Hafs-Bry , 1866, p. 402.

From N° 991 there are two small erect specimens, with the zoœcial openings on the one face, though on the dorsal surface the zoœcial tubes are equally distinct, and extend for a great length. The specimens are too small for the determination to be quite satisfactory.

Whether the lineated dorsal surface, formed by smaller tubes is a character of generic importance is uncertain. In *Idmonea* it is general, also occurring on what I have considered to be *Filisparsa irregularis* of MENEGHINI, as well as on *Filisparsa tubulosa* Busk ; and when this structure is absent, as in the present form, there seems to be a closer approach to *Tubulipora*.

The genus *Tervia* Jullien seems to be the same as *Filisparsa* d'Orbigny.

The zoœcial tubes, in the Antarctic specimens, project free for a considerable distance, and sometimes the ends are in pairs.

HABITAT. — Exp. Antarct. Belge.

N° 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Entalophora proboscidea M. Edwards

(Pl. IX, figs. 4*a*, *b*)

For synonyms see Miss JELLY's Catalogue : *Entalophora raripora*.

Entalophora proboscidea PERGENS, Révision des Bryozaires du Crétacé, figurés par d'Orbigny (*Bull. Soc. Belge de Géol.*, vol. III, 1889, p. 359) ; PERGENS, Nouveaux Bryozoaires Cyclostome du Crétacé. (*Bull. Soc. Belge de Géol.*, vol. IV, 1890, p. 278, pl. XI, fig. 6.)

Entalophora virgula (Hag.) GREGORY, Catalogue of Cretaceous Bryozoa, p. 218, pl. X, figs. 1-4, pl. XI, figs. 16, 18.

Entalophora raripora CALVET, (Bryozoaires marins de la région de Cette. (*Inst. de Zool. de Montpellier et Stat. zool. de Cette*, 1902, p. 82.) Bryozoaires marins des côtes de Corse. (*Inst. de Zool. de Montpellier*, 1902, p. 41.)

The Antarctic specimens are thicker than most of the Mediterranean ones, and the interior diameter of the zoœcia is about 0.16^{mm}-0.18^{mm}. In one specimen there is a piriform

ovicell, caused apparently by the growth of one zoœcium. PERGENS [1] describes and figures the ovicell in a cretaceous specimen, as sacciforme, and BUSK figured one in the « Challenger Report », as a slight swelling of the zoœcium, perhaps this was an early stage. GREGORY speaking of the ovicells of the fossils says piriform or subconical.

The pore tubes in N° 683 are more or less diagonal, while in older specimens the pore tubes are hardly noticeable.

I and others have used the specific name *raripora* d'Orb., but as D'ORBIGNY gave so many names to this species, according to the beds from which it came, it is perhaps unadvisable to retain it on that account ; further GREGORY has shown that the name *virgula* was given by HAGENOW in 1840, though it does not seem to have been figured then. The insufficient description makes it perhaps advisable, at present to use the name *proboscidea*, so as to avoid confusion.

GREGORY thinks there is a difference between the recent *E. proboscidea* and the fossil *E. virgula* as he says, that « in the living « species » the zoœcia are more numerous in the proximal parts of the zoarium », but in looking through a large number of specimens from Naples this is not found to be a constant, or even a general character, in fact sometimes the zoœcia are less numerous in the proximal parts. In recent specimens of this species, there is a not inconsiderable range of variation, and we must be prepared for the same thing in fossils.

The most important measurement in *Entalophora* is the interior of the zoœcial tube, which remains the same for a considerable distance. When the aperture is different this should also be measured. In *E. proboscidea* the diameter of the tube is as a rule about 0.16^{mm}-0.18^{mm} and this is the size I have found in English and Belgian chalk specimens, in tertiary, and in recent specimens from both hemispheres. By a slip GREGORY reverses the measurements of the zoœcia, and of the aperture, on pages 221 and 222, « Catalogue of Cretaceous Bryozoa ».

From Cape Horn there is a small specimen, which I consider is *E. proboscidea,* and from the same locality *E. regularis* Busk occurs.

HABITAT. — Mediterranean, N. Atlantic, Australia, New Zealand, Kerguelen.

Fossil : European Tertiaries, Cretaceous and Jurassic formations ; Tertiary of Australia, and New Zealand.

Exp. Antarct. Belge.

N° 1012, Tangles VII. Lat. 70° 23′ N.- Long. 82° 47′ W.; 480 met.; +0.8 C.

N°s 621, 683, 991, Tangles VIII. Lat. 70° 00′ N.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

Tubulipora organisans d'Orbigny

Tubulipora organisans D'ORBIGNY, Voyage dans l'Amérique méridionale, p. 19, pl. IX. figs. 1-3 ; JULLIEN, Mission scient. Cap Horn, p. 82.

Tubulipora organizans BUSK, Zool. Kerguelen (*Phil. Trans.*, CLXVIII, p. 193, Pl. X, figs. 20-25 ; RIDLEY, *Proceedings of the Zool. Soc.*, 1881. p. 58.

From N°s 139, 140 there are two or three specimens, in which the zoarium consists of broad strap-like growths, with alternate uniserial rows of much elevated, long zoœcia attached to one another, while here and there we get groups of two, three or four zoœcia together, but as

(1) Nouveaux Bryozoaires Cyclostomes du Crétacé. (*Bull. Soc. belge de Géol.*, vol. IV, p. 278, pl. XI, fig. 6.)

a rule the series are continuous. The ovicells spread over a great part of the zoarium, but the ovicellular opening has not yet been found. The figure 1 of D'ORBIGNY would suggest, that there were series of zoœcia on each side of a median line, though figure 2 shows the zoœcia in bundles of three. The zoarial growth of BUSK's figure 20, shows what he describes as « narrow, ligulate, dichotomously dividing branches », — « composed of short irregular series of tubes », and is as BUSK says, closely allied to *T. serpens* L. The denticulation of the primary zoœcium, mentioned by BUSK and JULLIEN, occurs in several other species. The internal measurement of the end of the zoœcial tube of D'ORBIGNY's specimen, and of specimens from Cape Horn is 0.14^{mm}.

From specimens sent to me by JULLIEN as *T. organisans* it seemed probable that he had more than one species before him, when describing the species, and in the Paris collection there are some specimens more like *T. serpens* L. and also a nearly circular disk-like species, which is probably *T. flabellaris* Fab. The zoœcia are larger and thicker than in *T. organisans,* the ends measure 0.19^{mm}, the ovicells are circular, and the oœciostome is wide and funnel-shaped.

HABITAT. — Falkland Islands (D'ORB.); Kerguelen (BUSK); Straits of Magellan 6 fathoms (10 met.) (RIDLEY); Baie Orange (on seaweeds &c.).

Exp. Antarct. Belge.

N°s 139, 140. Porto Torro, ile Navarin, Magellanes, Chili. Jan. 3rd, 1898.

Hornera antarctica sp. nov.

(Pl. IX, figs. 1*a-b*)

Zoarium slender, in one plane, or spreading out horizontally from a short stem, branches dichotomising, or at right angles. The small lateral branches at right angles to the main branches, with projecting tubular zoœcia at the ends, occur frequently in the older parts of the zoarium.

The zoœcia are not enclosed in rhomboidal spaces, but on both the anterior and dorsal surfaces there are fine sulci, with moderate sized pores in the sulci. The orifices are exserted, and the lateral ones may often reach a considerable length, in a few cases the length is equal to the diameter of the zoarium, the interior diameter of the zoœcial tube is about 0.1^{mm}.

The ovicells are on the dorsal surface, irregularly ovate, deeply pitted. The dorsal surface is granular, and sulcate, while along the line of the sulci there are pores smaller than those of Arctic *H. lichenoides* L. There are 8-9 tentacles, but in the specimens decalcified there were but few complete polypides.

Not many zoaria have ovicells, and in those cut it is apparent that most of the embryos have left the ovicells, the « protoplasmic reticulum » having contracted in consequence, but there are some full sized ones left, besides the earlier stages in various parts of the protoplasmic reticulum. I give a fuller description of the embryos of the Arctic *Hornera lichenoides* in my forthcoming paper on the Cyclostomata of the Franz-Josef Land, and as the state of preservation was better in those specimens I would merely state, that while the number of embryos in *Diastopora intricaria* Sm. is considerable, being over one hundred, it

is much less in *Hornera lichenoides,* and is not estimated to exceed ten. OSTROUMOFF (1) says the larvæ of *Hornera* are the largest of the marine Ectoproct Bryozoa, with which he is acquainted, measuring 0.48^{mm} : in size downwards he says, are *Hornera, Tubulipora, Frondipora, Lichenopora, Crisia,* which last are only 0.7^{mm}.

The *H. antarctica* belongs to the *Hornera lichenoides* group, and at first I named it *H. ramosa* MacG. (2), as it agrees with that species in its slender form, and in the way in which the branches arise often at right angles, but it differs from that species in not having the zoœcia enclosed in rhomboidal spaces, and the large « punctations or vacuoles » are wanting. In *H. lichenoides* there are a few large pits or « punctations » instead of the moderate sized pores, and there is a large semilunar pit, placed distally above the zoœcial tube, with larger pits by the border of the zoœcium. The ridges passing at each side of the zoœcia, and forming the rhomboidal spaces, are not very marked in *H. lichenoides* whereas in *H. frondiculata* they are very pronounced, and further there is a large opening some little distance above the projecting zoœcial tube. In *H. frondiculata,* the zoœcial tube is wanting on the distal part ; and only projects on the proximal, that is to say a deep notch is cut away on the upper part, whereas in other mentioned *Horneræ* the tube is entire, and we certainly seem to have at least three closely allied but distinct species. Figures of typical *H. frondiculata* Lamx. from the Mediterranean and of *H. lichenoides* L. from Franz Josef Land are given for comparison, as many of the published figures do not give the characteristic minute structure. The growing ends of *Hornera antarctica* (fig. 1*i*) have a smooth surface with small pores, and then they look like *Entalophora,* until subsequent growth forms the pits and rugose structure. The dorsal wall of *Hornera* is thick forming what has been called in fossils an epitheca, but it is in no way different in structure from the thinner walls, and has similar pore tubes through it.

I cannot agree with MACGILLIVRAY in thinking that *H. frondiculata* ought possibly to be referred to *H. lichenoides.* However, a specimen from Naples is much like the *H. lichenoides,* having similar dorsal ovicells, and at first it was named *lichenoides,* but I propose to separate it as *mediterranea,* though it may be the *H. serrata* of MENEGHINI, a name however previously employed by REUSS. It has the zoœcia irregularly placed, the outer zoœcia are much the longest, the inner ones are not much raised, and the border is entire, the zoarial growth is similar to that of *H. lichenoides,* the diameter of the interior of the zoœcial tube is about 0.12^{mm}, being somewhat larger than in *lichenoides* or *antarctica,* in both of which the tubes are internally about 0.1^{mm}.

The *Hornera verrucosa* Reuss from the Septarienthon is very similar to *H. antarctica.*

Hornera occurs, fairly abundantly, in the tertiary beds of Europe and Australia, it occurs also in the Cretaceous often called *Reteporidea* &c. It has been recognised that the Paleozoic *Thamniscus* closely resembles *Hornera,* and it is difficult to see upon what grounds such a species as *T. ramulosa* Ulrich (3) can be separated from *Hornera.* According to ULRICH *Thamniscus* commences in the Niagara, with one species, followed by two in the lower Helderberg, then continues through the various Devonian and Carboniferous groups, culminating in the Permian.

(1) Zur Entwickelungsgeschichte der Cyclostomen Seebryozoen, p. 180. (*Mitt. Zool. Stat. zu Neapel,* vol. VII.)

(2) Description of New or Little Known Polyzoa, pt. XII. (*Trans. Roy. Soc. Vict.,* 1886, p. 3, pl. I, fig. 4.)

(3) ULRICH Paleontology of Illinois « Bryozoa ». (*Geological Survey of Illinois,* vol. VIII, p. 610, pl. LXII, figs. 4-4*b*.)

In my paper on the Bryozoa from Franz Josef Land (p. 62) reference is made to the *Hornera lichenoides* L. said to have been dredged by the EREBUS and TERROR, from Lat. 74° S.- Long. 172° E., 330 fathoms on which *Cribrilina punctata* Hass. was growing, and with which there was also *Escharoides Sarsii* Sm. The piece of *Hornera lichenoides* is quite similar to Arctic specimens, and does not resemble specimens of *H. antarctica* so that the opinion expressed, that these very characteristic Arctic species were not collected in the Antarctic, but that some mistake has been made in labelling, seems now much more probable, after an examination of an Antarctic collection, than it did when written. The evidence seems to justify our saying that a mistake has certainly been made.

This form occurs from Cape Horn in the material brought back by the Romanche, but JULLIEN does not mention any similar *Hornera*, so that no doubt he had not seen this material.

HABITAT. — Cape Horn (W.).
Exp. Antarct. Belge.
N° 565, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.
N°s 613, 683, 991, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.
N° 800, Tangles X. Lat. 70° 15′ S.- Long. 84° 06′ W.; 569 met.; +0.8 C.

Suborder **RECTANGULATA** Waters

In 1887 (1) I proposed that the *Cyclostomata* should be divided into two subdivisions, the *Parallelata* in which the surface of the zoarium is to a considerable extent, formed of the lateral walls of the zoœcia, as in *Crisia, Entalophora, Diastopora, Tubulipora.* This is much the same as the suborder *Tubulata* of GREGORY, except that he recognises the *Articulata*, while I should not attach so much importance to articulation, for although *Crisia* is usually articulated, there are fossil forms of *Crisia* unarticulated. The second division was the *Rectangulata* in which the zoœcia and cancelli open for the most part at right angles to the axis, or surface of the zoarium, or subcolony, of which *Heteropora* and *Lichenopora* may be taken as types.

GREGORY has pointed out, that this is much the same as the Order *Trepostomata* of ULRICH ; but the early stages of *Lichenopora*, and the larva of *Lichenopora* show so much similarity with characteristic *Cyclostomata*, that I should hesitate to place them in separate orders, at present. GREGORY however makes a suborder *Cancellata,* which in his Jurassic Catalogue includes the *Discoporellidæ* (p. 34) by this is meant the *Lichenoporidæ,* and he has previously spoken of cancelli in *Lichenopora* (p. 12) so that here his *Cancellata* would include most of the *Rectangulata.* In the Jurassic Catalogue, where he first diagnosed the *Cancellata*, he says p. 39 « composed of simple zoœcia separated by cancelli » and goes on to say « for diagnosis see part III », but there being no *Cancellata* to catalogue the diagnosis has apparently been omitted; and the diagnosis in the Cretaceous Catalogue does not at all correspond with that previously given, for in this later catalogue (p. 359) he speaks of « tubular zoœcia with cancellate walls », which presumably would mean perforate walls. In the first diagnosis the cancelli were a zoarial character, as understood by BUSK and others, now they are zoœcial ; and *Hornera,* which in the Jurassic Catalogue was placed under *Tubulata*, is now in the Cretaceous Catalogue

(1) Tert. Cyclost. Bryozoa from New Zealand. (*Quart. Journ. Geol. Soc.*, vol. XLIII, p. 337).

placed under *Cancellata*, and really made the type, whereas before *Lichenopora* was the type; so that both the definition, and the genera included in the suborder *Cancellata* have been quite changed. When we are able to form satisfactory suborders, it seems most improbable that *Lichenopora* and *Hornera* will be in the same.

Although unable to explain how this confusion has arisen, and which at first I thought was due to a slip in writing, it would seem that GREGORY has not understood the structure of what I have called the pore tubes, and in speaking of his figure of the section of *Hornera* (p. 361), which is not very satisfactory for elucidating the point in question, he refers to fine canals, and says they are the « pores intermediares » of D'ORBIGNY, and the « cavités intersquelettiques » of PERGENS, and may be regarded as branched *maculæ*. When GREGORY first used the name *maculæ* (a term, which had already been differently employed in relation to Bryozoa, and must be dropped in this sense) he clearly meant the pore tubes. He says (Cret. Cat., p. 360) : « the cancellous character of the walls is due to the presence in them of a series of maculæ » and further on « they correspond in parts with the « pores d'origelles » of JULLIEN ».

The pore tubes are closed by a membrane at each end, and the protoplasmic and cellular contents are indirectly in communication with the sea water at the one end, and with the zoœcial chamber at the other, where a disk like rosette plate, with one pore, prevents direct contact, but vital changes are taking place through these tubes.

Similar pores are general throughout the Cyclostomata, and the Cheilostomata; also shorter pores occur in the interior walls of the Cyclostomata.

We should indeed be glad to see a man of GREGORY's undoubted abilities devote himself entirely to the study of the Bryozoa, but sometimes angel visits stir up all that has been done without establishing order, and many cases might be mentioned where classification has been left in a much more hopeless condition than it was before; already we have a sufficient number of dead classifications, made by those who have swooped down on the Bryozoa for a short visit. However talented our friends are, they must not be too hasty, and it can only be by devoting themselves to the work for a long time, that they can give us the real help towards correct classification, which we should like to have from them.

Lichenopora fimbriata (Busk)

Pl. VIII. fig. 20

Discoporella fimbriata BUSK, Brit. Mus. Cat., pt. III, p. 32, pl. XXVII, figs. 1-4.
Lichenopora fimbriata BUSK. Polyzoa of Kerguelen Islands. (*Phil. Trans*, vol. 168, p. 194 (7) ; Zool. Chall. Exp., vol. XVII, pt. L, p. 26.
Disporella spinulosa JULLIEN, Mission scientifique du Cap Horn, p. 83.

The one young specimen from N° 596 is no doubt the *L. fimbriata* of BUSK, but I am not at all sure that it ought to be separated from *L. hispida* Flem. and at any rate they are closely allied. It belongs to the *L. ciliata* group.

Although I have examined several specimens of the *L. spinulosa* Jullien from Cape Horn, in no case have I seen ovicells, and the determination of *Lichenopora* when the ovicells are unknown is very difficult and often doubtful. There are in the southern hemisphere several species in which the end of the zoœcium is divided, and in many there are spines on the surface of the zoœcial tube as *L. ciliata* B.; *L. canaliculata* B. = *grignonensis* B. = *venabulum* Jullien;

L. echinata MacG. ; *L. fimbriata* B. ; *L. tridentata* Haswell ; *L. Wilsoni* MacG. In what is perhaps the commonest species, and should be called *L. echinata* the ovicell is an inflation of the central portion, in which there are numerous fairly small perforations, and in the older parts small ridges formed by minute trabeculæ, not distinguishable when but slightly magnified (see *Linn. Soc. Journ. Zool.*, vol. XX, pl. XV, fig. 3). This occurs from Victoria and Tristan d'Acunha. In *L. canaliculata* the ovicell also covers the central portion, without spreading within the arms, but a coarse network is formed by large trabeculæ similar to those shown in *L. victoriensis* (*loc. cit.*, pl. XV, fig. 4) and the walls within the network are perforated by pores (see *Ann. Mag. Nat. Hist.*, s. 5, vol. XX, pl. VII, fig. 4). This occurs from Kerguelen, Victoria, and New South Wales. The basal wall of the ovicell, is in *Lichenopora* usually formed by a large network closed by a perforated layer, as shown at the left hand side of my figure 3, pl. XV, *loc. cit.*

Besides the above mentioned *Lichenoporæ*, common southern species are *L. Holdsworthii* Busk, from Victoria, N. S. Wales, S. Africa, Ceylon, Tahiti ; *L. neozelandiæ* Busk, New Zealand, Australia; *L. californica* (d'Orb.-Busk), New Zealand, Australia, California.

The form of ovicell, which I figured (*Ann. Mag. Nat. Hist.*, s. 5, vol. XX, pl. VII, fig. 5) is peculiar, and having only seen the one specimen it is doubtful whether it should be placed under *L. ciliata* B.

In the Antarctic specimen N° 596 there is an inflation near the summit of the cone, which is no doubt the ovicell, and a round opening without a tube is the opening of the oviduct. There are between the zoœcia a few distant pores smaller than the zoœcial tubes.

Jullien makes even a new family *Galeidæ*, for *Lichenopora* in which the zoœcial tubes are prolonged « sur une partie seulement de leur orifice », but his description is rather puzzling, as he then says « soit entière soit découpée », but the zoœcial tube varies so much in different parts of the same colony, that we cannot always use the shape of the projecting portion, even as a generic character, and the family *Galeidæ* is superfluous.

Habitat. — Off Chili, 13 and 96 fathoms (21 and 155 met.) ; Tierra del Fuego ; Cape Horn 40 fath. (65 met.) ; Tasmania (B.) ; Kerguelen (B.) ; Tristan d'Acunha 100-150 fath. (160-245 met.) (B.) ; Victoria (MacG.).

Exp. Antarct. Belge.

N° 596, Tangles VII. Lat. 70° 23′ S.- Long. 82° 47′ W.; 480 met.; +0.8 C.

Lichenopora octoradiata sp. nov.

(Pl. IX, figs. 9*a-d*)

The zoarium is very solid and much raised, with the base narrower than the disk. There are a number of biserial rays, formed by a few zoœcia, and in a well developed specimen there are eight main rays, with indications of the commencement of another series. The rays do not extend to the border of the zoarium, nor are the zoœcia round the border of the disk elevated, while in the centre of the zoarium the openings are round and vary in size.

This has many of the characters of *Defrancia* d'Orb., but with the limited and somewhat worn specimens, it is difficult to decide upon the generic position.

Habitat. — Exp. Antarct. Belge.
N° 277, Dredge I. Lat. 71° 09′ S.- Long. 89° 15′ W.; 460 met.; +0.3 C.
N° 373, Tangles IV. Lat. 71° 18′ S.- Long. 88° 02′ W.; 435 met.; —0.3 C.

Heteropora claviformis sp. nov.

(Pl. VII, figs. 8*a-d*)

The stud-like zoarium grows from a spreading base, then contracts, forming a wide stalk, which spreads out again, with the upper surface convex.

The zoœcia open both to the upper and to the lateral surfaces with round apertures, varying in size, and between these larger openings there are smaller round ones or cancelli, but there is no sign of any radial arrangement. On the walls between the zoœcia there are minute elevations (8*b*). The internal pores of the zoœcial tubes are usually in transverse lines and deeply sunk, giving the beaded appearance to the wall when broken (8*a*).

There is only one perfect specimen and one broken one, so that it has not been possible to make a complete examination, however a section cut shows the polypides in situ, though histolysis had commenced, but part of the cellular structure of the tentacles and other organs is distinguishable. In these sections, near the end of the zoœcial tube, there is a membrane across it, which is what I have so often referred to as the « closure ». The parenchym extends up to this, and also on to its external surface, but above this closure the zoœcial tube is filled with mud. The closure before preparation has of course been calcareous. The section being longitudinal the tentacles cannot be counted but there appear to be about twelve.

This in some particulars is like *Domopora*, and we know too little about *Heteropora* to judge how the group may ultimately be divided up. In *Domopora stellata* Goldf. from Shetland, a few of the terminal zoœcia are closed by four or five calcareous rays, reminding us of the rays in *Actinosoma* (1). Busk mentions rays in *H. clavata* Goldfuss, but these should not be confounded with the closures.

A specimen, from the Bancs des Aiguilles (S. Africa), Lat. 34° 57′ S.- Long. 19° 55′ E., 75 met., in the Museum d'histoire naturelle, Paris, has the zoarium exactly the same shape, but smaller, being under 5^{mm} in diameter, whereas the Antarctic specimen is about 7^{mm}, the zoœcial walls are thinner giving a more angular shape to the openings, but lower down the zoœcial tube contracts and becomes round. The zoœcia on the side of the zoarium, that is on the upper part of the stalk of the zoarium, have a longitudinal direction and the zoœcia are indicated externally by being slightly raised, but on the lower part of the zoarium this is not the case, as the surface is divided into irregular divisions closed by a punctured wall. In the more robust Antarctic specimen the zoœcial tubes are only indicated for short distances, and openings are seen at intervals on all parts of the stalk. It seems right to consider the S. African and Antarctic as the same species, although the greater solidity of the second causes certain different appearances.

I have, in vain, made various efforts to obtain spirit specimens of *Heteropora pelliculata* Waters, or other *Heteropora* from which I could cut sections, as a better knowledge of the

(1) Young, *Geol. Mag.*, n. s., vol. I, 1874; Waters, *Trans. Manch. Geol. Soc.*, vol. XIV, pl. I, fig. 1.

anatomy is much to be desired, but although we have not yet learnt anything about the ovicells and some other organs, there have been no grounds for doubting that the recent *Heteropora* were Cyclostomatous Bryozoa. The pores between the tubes, the closures, the rays, the cancelli are all so similar to what are constantly found in *Lichenopora* that we have here the nearest relationship of any well studied family. ORTMANN (1) who found *H. pelliculata* Waters in the Japan Seas, says he has been doubtful as to *Heteropora* being Bryozoa, since Dr DÖDERLEIN pointed out to him that the thin covering membrane consisted of three-rayed sponge spicules. I think it is hardly necessary to say that the membrane over the Japan specimens which I described was nothing of the kind.

GREGORY (Catalogue of the Cretaceous Bryozoa, vol. I, p. 404) thinks, that the living species referred to *Heteropora,* probably belong to his suborder *Dactylethrata.* Until we know more about the anatomy it will be impossible to be sure about the position, but without entering into the validity of the suborders of GREGORY, I must emphatically state, that supported by sections I have prepared of Jurassic, Cretaceous, and Tertiary fossils, there is no doubt of there being in all these formations, fossils closely related to the recent *Heteropora,* and probably of the same genus. That there are many fossils similar in form to *Heteropora,* which will have to be separated, is of course probable.

Many paleontologists have undoubtedly attached too much importance to the spaces between the zoœcial tubes, for, while they must always be a valuable specific character, undue weight should not be given to them, as there is at present no reason for considering, that they contained special organs.

HABITAT. — Bancs des Aiguilles (S. Africa), Lat. 34° 57′ S.- Long. 19° 55′ E.; 75 met. Exp. Antarct. Belge.
N° 619, Tangles VIII. Lat. 70° 00′ S.- Long. 80° 48′ W.; 500 ? met.; +0.9 C.

ENTOPROCTA

Barentsia discreta (Busk)

(Pl. VII, figs. 6*a-f*; Pl. VIII, figs. 17*a-c*)

Ascopodaria discreta BUSK, Zool. Chall. Exp., vol. XVII, pt. L, p. 44, pl. X, figs. 6-12.
Pedicellina australis JULLIEN (non RIDLEY), Mission scientifique du Cap Horn, p. 13.

Five specimens from N° 951 are undoubtedly this species, but there is not the material for making a sufficient number of sections for study. The polypides are rather larger than those mentioned by BUSK but in *Pedicellinidæ* the range of variation in size is considerable. The total length is 3-4^{mm} whereas *B. gracilis* from Naples and from Lizard Island, off Queensland is about 1-2^{mm}, and the *nodosa* variety from Naples is about the same size, namely 1-2^{mm}. JULLIEN says *B. australis* J. is 3^{mm} long and has 12-14 tentacles, whereas BUSK gives 16-20 tentacles. Some specimens in JULLIEN's collection are identical in size with those from N° 951, the nodules are quite similar and there does not seem any reason for doubt as to both the specimens brought by the BELGICA, and JULLIEN's being the *discreta* of BUSK. There are nodules on the pedicels

(1) Die Japanische Bryozoen. (*Arch. f. Naturgesch.,* 1890, p. 66.)

of some specimens, and then the pedicel is not continuous in the same plane, which would suggest injury, but this is not borne out by other nodose species. As some of the pedicels have these internodes and others are continuous we have here ample grounds for banishing the genus *Gonypodaria* of EHLERS [1] as some zoœcia on the same colony would be *Barentsia,* and others *Gonypodaria.* In the *B. gracilis,* var. *nodosa* Lomas [2], in the same way, some stalks are entire and others nodulated; and doubtless other generic names are superfluous.

The structure of the internode is similar to that of the « barrel-shaped cylinders », and figures are given of sections of these cylinders, as they differ from published descriptions of other species. The walls of the pedicel are a firm, thick, dark chitin continuing over the upper part of the barrel, and although the membrane continues down the side of the barrel the wall is without any chitinous deposit (*cx*). Within this is a broad contractile layer (*cl*) followed by a layer of large cells (*ct*) within which is the parenchym tissue.

At the junction of the pedicel and the barrel there is on each side a chitinous projection, which will form the equivalent of the rosette plate, but doubtless also serves for muscular attachments, and this is no doubt what EHLERS figures on Pl. II, fig. 22, while similar contractions also occur in the muscular internodes of *B. discreta.* This contraction is added to the drawing of fig. 17*c* from another section. The same structure is shown by Miss A. ROBERTSON [3] in her figure of *Gonypodaria ramosa* Robertson.

Pedicellina and *Barentsia* have been found in the northern seas, Australia and S. America, but have only been mentioned within the tropics by KIRKPATRICK who described *P. laxa* from Torres Straits. However I have had material sent to me, by my nephew Ernest J. H. WATERS of Sydney, collected by him from Lizard Island off Queensland, in which there are specimens of *Barentsia gracilis* Sars. In the same material, besides *Scrupocellaria cervicornis* Busk, *Loxosoma* occurred, and I believe it has not been previously found within the tropics and possibly not in the southern hemisphere.

It may be well to call attention to the, fact that the « spirally ringed flexible joint » uniting the polypides to the pedicel is subject to variation, and there being here no thick chitinous walls the contractions cause the rings. In one case the junction (fig. 6*f*) with the hard chitinous wall of the pedicel is very similar to that of *Ascopodaria fruticosa* Busk (Challenger Report, pl. IX, fig. 2).

HABITAT. — Tristan d'Acunha 100-150 fath. (B.); Tizard Bank, China Sea 27 fath. (KIRKPATRICK); Ile Hoste, Baie Orange, Cap Horn 26 fath. (40 met.) (JULL.).

Exp. Antarct. Belge.

N° 951. Fixés sur *Priene cancellata* (Lamx.), N° 118. Baie du Torrent, Ile Londonderry, Canal Français, Magellanes Chili. Dec. 18th, 1897.

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NOTE. — Since the remarks on the number of species (p. 10) were printed there has been reason for considering that the number of fossils is only 10 as subsequently shown on pp. 18, 19.

(1) E. EHLERS, Zur Kenntniss der Pedicellineen. (*Abh. d. k. Gesellsch. d. Wissensch. zu Göttingen*, vol. XXXVI, p. 144.)

(2) *Proc. Lit. Phil. Soc. Liverpool*, vol. XL, p. 190, pl. III, fig. 2, 1886.

(3) *Proc. California Acad. of Sc.*, vol. II, N° 4, pl. XVI, figs. 15, 16.

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EXPLANATION OF PLATES

PLATE I

Fig. 1*a*. *Catenicella frigida* sp. nov. × 25. From N° 617.
1*b*. *do* *do* Lateral surface, × 25.
1*c*. *do* *do* Magnified about three times.
1*d*. *do* *do* × 8. Showing a zoœcium attached by a chitinous tube to the older zoœcium. From N° 623.
2*a*. *Brettia longa* sp. nov. Anterior surface. × 25. From N° 621.
2*b*. *do* *do* Posterior surface. × 25. From N° 623.
3*a*. *Bugula reticulata* Busk, var. spinosa, nov. × 25. From N° 610.
3*b*. *do* *do* do Upper portion of the same zoarium as Fig. 3*a*. *(v)* vermiform body, *(bb)* brown body, *(rp)* rosette plates seen through the front wall. × 25.
3*c*. *do* *do* Avicularium. × 85.
3*d*. *do* *do* Dorsal surface showing radicle originating at a bifurcation, also small radicular chambers *(a)*, from which however radicles are seldom found growing. × 25. From N° 610.
4*a*. *Bugula bicornis* Busk. Showing lateral branches with short zoœcia also pair of vermiform bodies *(v)*. × 25. From N° 608.
4*b*. *do* *do* Dorsal surface, showing branch starting by the side of the long zoœcium. *(r)* rosette plate. × 25. From N° 608.
4*c*. *do* *do* Mandible × 85.
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4*f*. *do* *do* Vermiform body with parenchym by the side. × 750.
4*g*. *do* *do* Longitudinal section of the walls of the same. × 750.
4*h*. *do* *do* Large round avicularium seen from the front. × 85.
4*i*. *do* *do* The same seen laterally. × 85.
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5*a*. *Scrupocellaria antarctica* sp. nov. × 25. From N° 347.
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6*b*. *do* *do* Dorsal surface, showing radicles. × 25.

Fig. 7. *Beania Hyadesi* Jull. Dorsal surface. × 25. From N° 1068.
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8*b*. *do* *do* Mandible. × 85.
8*c*. *do* *do* Section showing parietal muscles. × 25.
8*d*. *do* *do* Inflated zoœcium seen from the side. × 25.
8*e*. *do* *do* Dorsal surface. × 25.
9*a*. *Bugula tricornis* sp. nov. Dorsal surface. × 12. From N° 616.
9*b*. *do* *do* Anterior surface × 25 (See Pl. VIII, fig. 3).
9*c, d*. *do* *do* Avicularia. × 85.

PLATE II

Fig. 1*a*. *Flustra flagellata* sp. nov. × 12. From N° 991.
1*b*. *do* *do* Base of vibraculum. × 250.
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3. *Chaperia cylindracea* Busk, var. protecta, nov. × 25. From N° 591.
4. *Membranipora strigosa* sp. nov. × 25. From N° 745.
5. *Chaperia patulosa* sp. nov. × 25. From N° 596.
6. *Membranipora irregularis* d'Orb. × 25. From N° 619.
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7*b*. *do* *do* Operculum. × 85.
7*c*. *do* *do* Mandible. × 85. From Cape Horn.
8. *Micropora coreacea* Esper. Operculum. × 85. From Hastings.
9*a*. *Cellaria Dennanti* MacG. × 25. From N° 683.
9*b*. *do* *do* Mandible. × 25. Attention is called to this being magnified only 25 times, whereas I have usually drawn opercula and mandibles × 85 or 250. From N° 282.
9*c*. *do* *do* Opercula. × 85.
9*d*. *do* *do* Section of tentacles. × 750.
9*e*. *do* *do* Section showing the large avicularian chamber, also the outer membranes united at certain points only, and between which there has been a calcareous deposit; the basal portions of the intermediate zoœcia are shown at *(c)*. In the lower zoœcium the full number of tentacles is not shown. × 85.
9*f*. *do* *do* Natural size. From N° 611 (see also Pl. VIII, fig. 6).
10*a*. *Cellaria Malvinensis* Busk. Mandible. × 85. From N° 1068 (see also Pl. VIII, fig. 7).
10*b*. *do* *do* Operculum × 85.
11. *Cellaria lata* sp. nov. × 25. From N° 1012.
12. *Cellaria dubia* Busk. × 25. From N° 1012.
13*a*. *Megapora hyalina* sp. nov. × about 50. From N° 392.
13*b*. *do* *do* × 25.

Fig. 14*a, b*. *Cribrilina projecta* sp. nov. × 25. *(b)* mandible. × 85. From N° 569.
14*c*. *do* *do* Section of zoœcium. *(om)* outer membrane. *(im)* inner membrane divided in the distal part. *(con)* connexion with the neighbouring zoœcium.
14*d*. *do* *do* Outer membrane showing discontinuity, and the spaces containing cellular structure, also the spinous protuberances × 250.
15*a*. *Membranipora incrustans* Waters. × 25. From N° 596.
15*b*. *do* *do* var. grandis. × 25. From N° 392.
15*c*. *do* *do* do Avicularium.
16. *Microporella proxima* sp. nov. × 25. From N° 820. The ovicell is added from specimen 570. Operculum × 85.
17. *Microporella trinervis* sp. nov. × 25. From N° 391.

PLATE III

Fig. 1*a*. *Microporella divaricata* Canu. × 25. From N° 991.
1*b*. *do* *do* Operculum × 85.
1*c*. *do* *do* × 12.
2*a, b*. *Microporella parvipora* sp. nov. × 25. *(b.)* Operculum × 85. From N° 596.
3*a*. *Microporella exigua* sp. nov. × 25. From N° 570.
3*b*. *do* *do* × 85.
4*a*. *Microporella Malusii* Aud. × 50. From N° 139.
4*b*. *do* *do* × 25.
4*c, d*. *do* *do* frontal pores. × 250.
5*a*. *Cyclicopora polaris* sp. nov. bilaminate form. × 25. From N° 991.
5*b*. *do* *do* Operculum. × 85.
5*c*. *do* *do* Lateral wall showing rosette plates.
5*d*. *do* *do* Distal wall showing rosette plates.
5*e*. *do* *do* Adnate form. × 25. From N° 991.
5*f*. *do* *do* Operculum. × 85.
6. *Schizoporella simplex* d'Orb. × 25. From N° 332.
7. *Smittia crassatina* sp. nov. × 25. From N° 277. (see Plate IV, fig. 9.)
8*a*. *Hippothoa distans* MacG. × 25. From N° 596.
8*b*. *do* *do* Ordinary zoœcia. × 50. From N° 596.
8*c*. *do* *do* Ovicelligerous zoœcia. × 50. From N° 597.
8*d*. *do* *do* Opercula. × 85 and 250.
8*e*. *do* *do* From Sydney, N. S. Wales. × 25.
8*f*. *do* *do* Ordinary zoœcium. × 50.
8*g*. *do* *do* Section showing chambers at the side of the zoœcium, the parenchym contents of which are connected both the zoœcium and to the lateral processes. × 85.
9*a*. *Lepralia frigida* sp. nov. × 25. From N° 1250.
9*b*. *do* *do* Operculum. × 85.

Fig. 10. *Schizoporella Eatoni* Busk. Operculum. × 85. From Cape Adare (« Southern Cross » Expedition).

11*a*. *Schizoporella hosteensis* Jullien. × 25. From N° 596. Showing the primary zoœcium, and in the zoœcium on the right the calcification round the aperture is not complete.

11*b*. *do* *do* × 25. From N° 619.

11*c*. *do* *do* Operculum. × 85.

12*a*. *Schizoporella gelida* sp. nov. × 25. From N° 332.

12*b*. *do* *do* Interior, showing condyles (denticles). × 25.

12*c*. *do* *do* Operculum. × 85.

13. *Megapora ringens* Busk. Operculum. × 85. From Shetland.

PLATE IV

Fig. 1*a*. *Smittia antarctica* sp. nov. × 25. From N° 683.

1*b*. *do* *do* Operculum. × 85.

1*c*. *do* *do* Mandible. × 85.

1*d*. *do* *do* Natural size.

1*e*. *do* *do* Transverse section showing rosette plates. × 25.

1*f*. *do* *do* Longitudinal section. × 12. Showing rosette plates.

1*g*. *do* *do* Extremity of tentacles. × 500. Showing sac containing darkly stained mass. From N° 618.

1*h*. *do* *do* Section showing aperture *(ap)*; tentacular sheath *(ts)*; and gland-like bodies *(gl)*. × 85.

2*a*. *Smittia tripora* sp. nov. × 25. From N° 683.

2*b*. *do* *do* Operculum × 85.

2*c*. *do* *do* Section showing aperture with operculum; and below it the avicularium glands, with the mandible above the glands. × 85.

3. *Smittia conspicua* sp. nov. × 25. From N° 683.

4. *Smittia marsupium* MacG. × 25. From N° 596.

5*a*. *Smittia inclusa* sp. nov. × 25. Showing ovicells, and the projections *(p)* over the aperture, which in the ovicelligerous zoœcia may be entirely hidden, as in the lower zoœcium on the right hand side. From N° 683.

5*b*. *do* *do* Natural size.

5*c*. *do* *do* Mandibles. × 85.

5*d*. *do* *do* Transverse section. × 12.

5*e*. *do* *do* Longitudinal section. × 12.

5*f*. *do* *do* Extremity of zoarium. × 12.

6*a*. *Smittia gelida* sp. nov. × 25. From N° 683.

6*b*. *do* *do* Natural size.

6*c*. *do* *do* × 25. Tranverse section.

Fig. 7*a*. *Smittia pileata* sp. nov. × 25. From N° 619.
7*b*. *do* *do* Operculum × 85.
8. *Smittia dentata* sp. nov. × 25. From N° 615.
9. *Smittia crassatina* sp. nov. × 25. From N° 288 (Pl. III, fig. 7).
10*a*. *Smittia directa* sp. nov. × 12. From N° 683.
10*b*. *do* *do* Zoœcium. × 25.
10*c*. *do* *do* Natural size.
10*d*. *do* *do* Transverse section of one zoœcium, showing *(rp)* rosette plates; *(ly)* lyrula. × 25.
11. *Smittia repens* sp. nov. × 12. From N° 428.
12*a*. *Cellepora horneroides* sp. nov. Natural size.
12*b*. *do* *do* Dorsal surface. × 12. From N° 567.
12*c*. *do* *do* Aperture and avicularium. × 85.
12*d*. *do* *do* Anterior surface. × 25.
12*e*. *do* *do* Operculum. × 85.
12*f*. *do* *do* Mandible. × 250, and × 85.

PLATE V

Fig. 1*a*. *Systenopora contracta* sp. nov. × 25. From N° 683.
1*b*. *do* *do* Natural size.
1*c*, *d*, *e*, *f*. *do* *do* Avicularian mandibles, *(c)* oral, *(d, e)* zoœcial, *(f)* internal. × 85.
1*g*. *do* *do* Transverse calcareous section. × 12. From N° 621.
1*h*. *do* *do* Transverse calcareous section of one zoœcium showing the rosette plate, over which there are the pair of irregular processes. × 25. From N° 216.
1*i*. *do* *do* The processes more magnified.
1*k*. *do* *do* The interior as seen in thick section, prepared in order to show the interior triangular avicularia by the side of the aperture. The ovicells are also seen. × 25.
1*l*. *do* *do* Section showing the oral aperture with the interior avicularium *(av)*, the external one *(ex)*, and the ovicell *(o)*. × 25.
1*m*. *do* *do* Decalcified sections cut through the shorter axis, showing a reticulate connection between the two layers of zoœcia. × 25. From N° 612.
1*n*. *do* *do* Longitudinal section showing the lateral wall, with the lateral rosette plates, ovicell *(o)*, and the processes *(sp)* over the distal rosette plates. × 12.
1*o*. *do* *do* Rosette plate. × 85.
1*p*. *do* *do* Embryo showing layer of cilia separated from the surface. × 150. From N° 612.

Fig. 2*a*. *Cellarinella foveolata* sp. nov. Younger part. × 25. From N° 683.
2*b*. *do* *do* Older part. × 25. From N° 683.
2*c*. *do* *do* Mandible. × 85.
2*d*. *do* *do* Natural size. From N° 609.
2*e*. *do* *do* Natural size, nodulated form. From N° 743.
2*f*. *do* *do* Calcareous section showing the underside of the distal rosette plate. × 25. From N° 683.
2*g*. *do* *do* Section showing the rosette plate from above, protected by a pair of spinous processes. × 85.
2*h*. *do* *do* The spinous processes seen in longitudinal section. × 25 and 85.
3*a*. *Turritigera stellata* Busk. × 3. From N° 611.
3*b*. *do* *do* *(b)* Operculum. × 83. *(c)* Mandible. × 85. *(c)* do. × 250.
3*d*. *do* *do* Avicularium from the surface of the zoœcium. × 85.
3*e*. *do* *do* Anterior surface. × 25.
4*a*. *Orthopora compacta* sp. nov. × 12. From N° 343. *(b)* Operculum. × 85. *(c)* Mandible from small avicularium on the zoœcium. × 85. *(d)* Rostral mandible. × 85. *(e)* Mandible of vicarious avicularium. × 85.
4*f*. *do* *do* Natural size.
4*g*. *do* *do* Section through a zoœcium showing tentacles, ovaria and ova, and the wall of the compensating chamber. × 85. From N° 342.
4*h*. *do* *do* Ovarium. × 250.
4*i*. *do* *do* Wall of the tentacular sheath. × 750.
5. *Cellepora ? solida* Busk. Operculum, from the British Museum preparation. Challenger Station N° 160. × 85.

PLATE VI

Fig. 1*a*. *Retepora antarctica* sp. nov. × 25. From N° 608.
1*b*. *do* *do* Dorsal surface. × 6. with broken surface *(bk)*, showing the divisions of the zoœcia.
1*c*. *do* *do* Showing large raised avicularium. From N° 620.
1*d*. *do* *do* Tentacles showing dark mass in tip. ×500. From N° 608.
1*e*. *do* *do* Mandible. × 85.
1*f*. *do* *do* Operculum. × 85.
1*g*. *do* *do* Avicularium. × 85.
1*h*. *do* *do* Calcareous section showing the internal *(aa)* « condyles » (teeth) near the base of the operculum, also the lateral rosette plate with « watch-glass » cover. × 85.
1*i*. *do* *do* Avicularian chamber, with branches leading to the proximal end of the zoœcium.
1*k*. *do* *do* Zoœcium showing the oral glands *(gl)*; and also the lateral muscles.

Fig. 2*a*. *Retepora protecta* sp. nov. × 25 From N° 620.
2*b*. *do* *do* Dorsal surface × 6.
2*c*. *do* *do* Operculum. × 85.
2*d*. *do* *do* Mandible. × 85.
2*e*. *do* *do* Avicularium. × 85.
3*a*. *Retepora lepralioides* sp. nov. × 25. From N° 742.
3*b*. *do* *do* Dorsal surface. × 6.
3*c*. *do* *do* Operculum. × 85.
3*d*. *do* *do* Avicularium. × 85.
4*a*. *Retepora frigida* sp. nov. × 25. From N° 345.
4*b*. *do* *do* Dorsal surface. × 6.
4*c*. *do* *do* Aperture. × about 85.
4*d*. *do* *do* Operculum. × 85.
4*e*. *do* *do* Mandibles. × 85.
4*f*. *do* *do* Ovicell. × 85.
5*a*. *Retepora lævigata* sp. nov. × 25. From N° 322.
5*b*. *do* *do* Natural size.
5*c*. *do* *do* Aperture showing the teeth at a lower level. × 85.
5*d*. *do* *do* Operculum × 85.
6*a*. Calcareous section of Retepora showing the zoœcial and dorsal layer, with the lines of the vibices also visible. *(a)* suboral pore entering the zoœcial chamber considerably lower down than the aperture; *(ov)* ovicell; *(av)* avicularium chamber; *(v)* vibices. This is typical Retepora, but is practically drawn from *R. crassa* Busk. Challenger specimen. × 25.
6*b*. The same section, showing a break at the line of the vibices. × 250.
7*a*. *Retepora gelida* sp. nov. × 25. From N° 683.
7*b*. *do* *do* Dorsal surface. × 6.
7*c*. *do* *do* Operculum × 85.
7*d*. *do* *do* Mandibles. × 85.
8*a*. *Retepora bilaminata* nov. × 25. From S. Africa.
8*b*. *do* *do* Aperture. × 85.
8*c*. *do* *do* Operculum × 85.
8*d*. *do* *do* Mandible. × 250.
9. *Retepora projecta*, var. *crassa* nov. Natural size. From N° 309.
10*a*. *Retepora hippocrepis* sp. nov. Natural size. From N° 568.
10*b*. *do* *do* Anterior surface. × 25. From N° 568.
10*c*. *de* *do* Dorsal surface. × 6.
10*d*. *do* *do* Operculum. × 85.
10*e,f,g*. *do* *do* Mandibles. × 85.

PLATE VII

Fig. 1*a*. *Osthimosia clavata* sp. nov. × 25. From N° 428.
1*b*. *do* *do* Natural size.

Fig. 1*c*. *Osthimosia clavata* sp. nov. Operculum. × 85. From N° 343.
1*d*, *e*. *do* *do* Mandibles. × 85. From N° 343.
1*f*. *do* *do* Ovarium. × 250. From N° 343.
1*g*. *do* *do* Vicarious mandible. × 85. From N° 1047.
2*a*. *Osthimosia evexa* Jullien. Mandibles. × 85. From specimens determined by Jullien from Cape Horn.
2*b*. *do* *do* Operculum × 85.
3. *Hippothoa divaricata* Lamx. × 25. From N° 596.
4. *Cellepora signata* Busk. × 25. From N° 991.
5. *Escharoides biformata* sp. nov. × 25. From N° 683.
6*a*, *b*, *c*, *d*. *Barentsia discreta* Busk. × 10. From N° 951.
6*e*, *f*. *do* *do* Junction of the polypide with the pedicel. × 85.
7*a*. *Alcyonidium antarcticum* sp. nov. Showing base of the tentacles with intertentacular organ. × 500. From N° 774.
7*b*. *do* *do* Section of zoœcium showing ovaria. × 250. The same zoœcium less magnified is seen in fig. 7*h*.
7*c*. *do* *do* with wide zoœcia. × about 3.
7*d*. *do* *do* do × 25.
7*e*. *do* *do* with narrower zoœcia. × about 3.
7*f*. *do* *do* Longitudinal section showing ovaria; tentacular organ &c. *(ov)* ovaria; *(sp)* testes and spermatozoa; *(ap)* aperture. × 85.
7*g*. *do* *do* Tentacular organ as seen in fig. 7*f*. × 250.
7*h*. *do* *do* Transverse section. × 85.
8*a*. *Heteropora claviformis* sp. nov. Longitudinal decalcified section. × 85. From N° 619.
8*b*. *do* *do* Surface. × 25.
8*c*. *do* *do* Broken colony. × about 3.
8*d*. *do* *do* Natural size.

PLATE VIII

Fig. 1*a*. *Scrupocellaria funiculata* MacG. × 25. From N° 877.
1*b*. *do* *do* Scutum. × 85.
2*a*. *Scrupocellaria antarctica* nov. × 25. From N° 347. Showing the denticle *(dt)* within the zoœcium near its base and close to the rosette plate (see Pl. I, figs. 5*a*-*e*).
2*b*. *do* *do* × 85.
3. *Bugula tricornis* Busk. Mandible seen from above × 100. Showing the equivalent of the cross bar. From N° 616.
4*a*. *Cellaria Dennanti* MacG. × 25. From N° 242. Showing ovicellar and mandibular openings (see Pl. II, figs. 9*a*-*f*).
5. *Cellaria malvinensis* Busk. × 85. From New Zealand.
6*a*. *Cellarinella nodulata* sp. nov. × 25. From N° 623.
6*b*. *do* *do* Natural size.
6*c*. *do* *do* Mandibles. × 85.

Fig. 7*a*. *Beania magellanica* Busk. × 150. From N° 1068. Section of avicularium showing the parietal muscles.

7*b*. *do* *do* × 150. Seen from the front. *(a)* Cross bar.

7*c*. *do* *do* Section of base of mandible. × 250.

8. *Smittia marionensis* Busk var. × 25. From N° 683.

9. *Lepralia frigida* sp. nov. From N° 288. Decalcified, showing the connecting tubes from zoœcium to zoœcium.

10*a*. *Smittia praestita* sp. nov. × 25. From N° 596.

10*b*. *do* *do* Mandible. × 250. From N° 596.

11*a*. *Lepralia galeata* Busk. Operculum. × 85. From N° 139.

11*b*. *do* *do* Mandible. × 250.

12*a*. *Cellarinella dubia* sp. nov. × 5. Probably from N° 623.

12*b*. *do* *do* × 25.

13. *Turritigera stellata* Busk. Decalcified showing connecting tubes from zoœcium to zoœcium.

14*a*. *Bifaxaria denticulata* Busk. Mandible. × 85.

14*b*. *do* *do* Mandible. × 85. From Stat. 320 Challenger Exp.

15*a*. *Smittia crozetensis* nom. nov. × 25. From N° 683, large form.

15*b*. *do* *do* × 25. From N° 596, small form.

16. *Stomatopora major* Johnst. × 10. From N° 570.

17*a*. *Barentsia discreta* Busk. × 500. From N° 751. Tangential section of the basal barrel-shaped cylinders, showing an external wall *(ex.)*, contracticle layer *(ct.)*, large celled layer *(cl.)* (see Pl. VI, figs. 6*a-f*).

17*b*. *do* *do* Junction of pedicel with the polypide. × 85.

17*c*. *do* *do* × 250. Section through the middle of the barrel-shaped cylinder and the lower part of the pedicel, showing the chitinous wall, the contractile layer, the large celled layer, and the protoplasmic contents, also the contractions at the base of the pedicel.

18. *Bifaxaria denticulata* Busk. × 85. Section showing four zoœcia, and the pore tubes *(pt.)* also the commencements of new zoœcia *(zc.)*.

19*a*. *Bifaxaria rustica* d'Orb. × 25. From N° 428.

19*b*. *do* *do* × 2.

20. *Lichenopora fimbriata* Busk. × 85. From N° 595.

21. *Schizoporella polymorpha* Busk. Operculum. × 85. Simon's Bay, South Africa, Challenger.

22. *Schizoporella linearis* Hass. Operculum. × 85. Naples.

23. *Schizoporella (Buffonella) rimosa* Jull. Operculum. × 85. Cape Horn.

24. *Schizoporella Cecilii* Aud. Operculum. × 85. Naples.

25. *Schizoporella arrogata* Waters. Operculum. × 85. Naples.

PLATE IX

Fig. 1*a*. *Hornera antarctica* sp. nov. Anterior surface. × 12. From N° 683.
1*b*. *do* *do* Dorsal surface. × 12. From N° 683.
1*c*. *do* *do* Anterior surface. × 25. From N° 683.
1*d*. *do* *do* Dorsal surface showing ovicell. × 25. From N° 613.
1*e*. *do* *do* Anterior surface showing short branches. From N° 613, but a different colony to the last.
1*f*. *do* *do* × 2. Same specimen as Fig. 1*e*. *(ov)* ovicells.
1*g*, *h*. *do* *do* Natural size. From N° 613.
1*i*. *do* *do* Growing end before any of the pits are formed. × 25. From N° 613.
1*k*. *do* *do* Transverse section showing stem with zoœcial chambers cut across, and also the ovicellular chamber, from which apparently many embryos have been ejected, leaving the tissue lining the wall of the ovicell contracted, but the embryo (fig. 1*l*) is in the middle of the particular tissue and there are others at *a*, *b*, *c*. From N° 613.
2. *Hornera lichenoides* Linn. × 25. From Franz-Josef Land, Lat. 77° 55′ N. - Long. 53° 16′ E.
3. *Hornera frondiculata* Lamx. × 25. From Naples.
4*a*. *Entalophora proboscidea* M. Ed. × 12. From N° 683.
4*b*. *do* *do* × 12. From N° 621.
5. *Idmonea atlantica* Forbes. × 12. From N° 608.
6*a*. *Stomatopora divergens* sp. nov. × 25. From N° 596.
6*b*. *do* *do* Showing two ovicells *(ov)*. × 10. From N° 570.
6*c*. *do* *do* Ovicell. × 25.
7*a*. *Stomatopora eburnea* d'Orb. × 4. From N° 800.
7*b*. *do* *do* × 25.
8*a*. *Stomatopora ? incrassata* Smitt. × 4. From N° 348.
8*b*. *do* *do* × 12. From N° 348.
9*a*. *Lichenopora octoradiata* sp. nov. × 10. From N° 277.
9*b*, *c*. *do* *do* Another colony. Natural size.
9*d*. *do* *do* Lateral view. × 3.
10*a*. *Stomatopora antarctica* sp. nov. × 15. From N° 820.
10*b*. *do* *do* Another colony. Natural size.
11. *Diastopora solida* sp. nov. × 25. From N° 373.


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5a
5b
5c
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4e
5e
4f
4h
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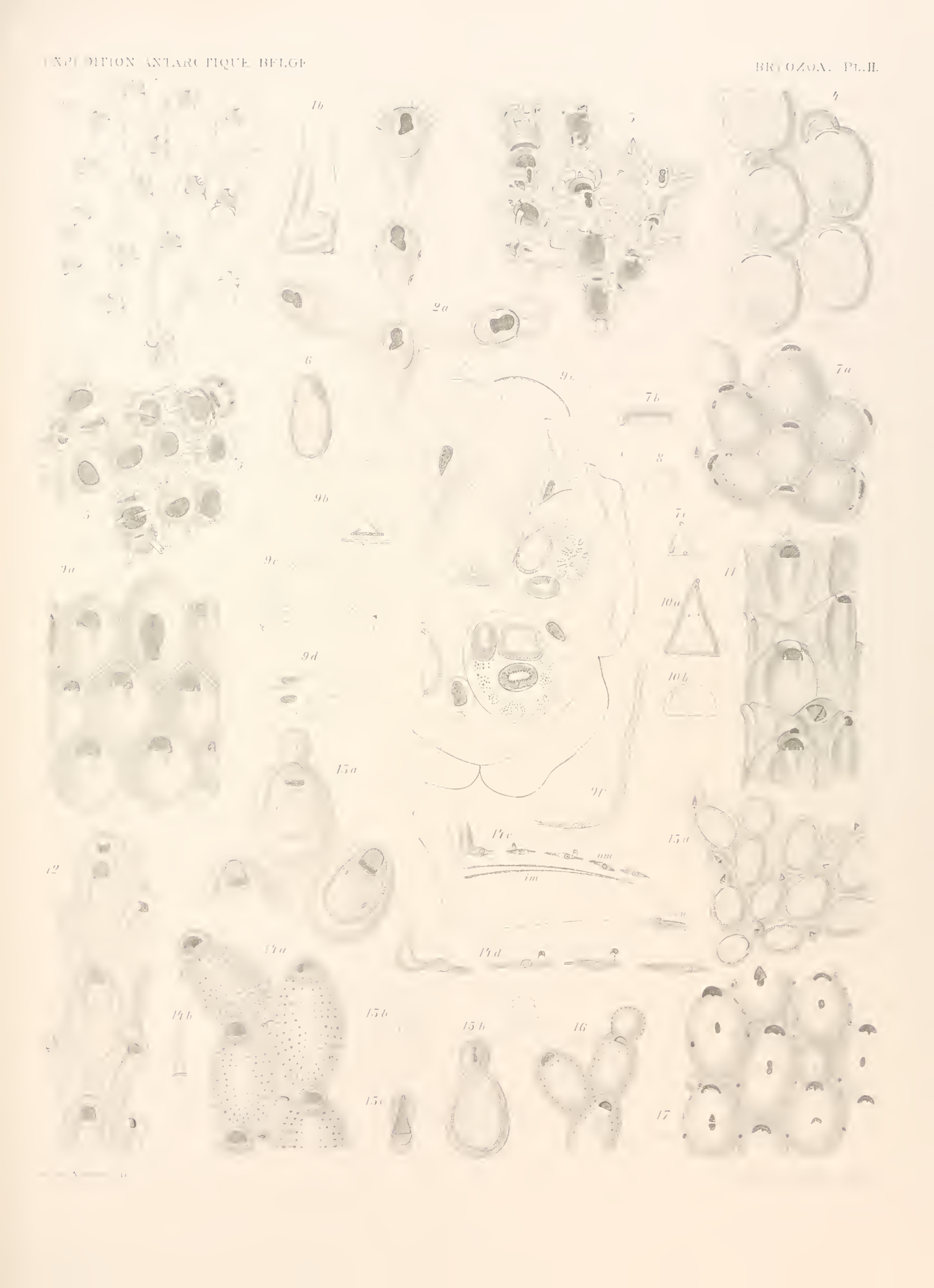
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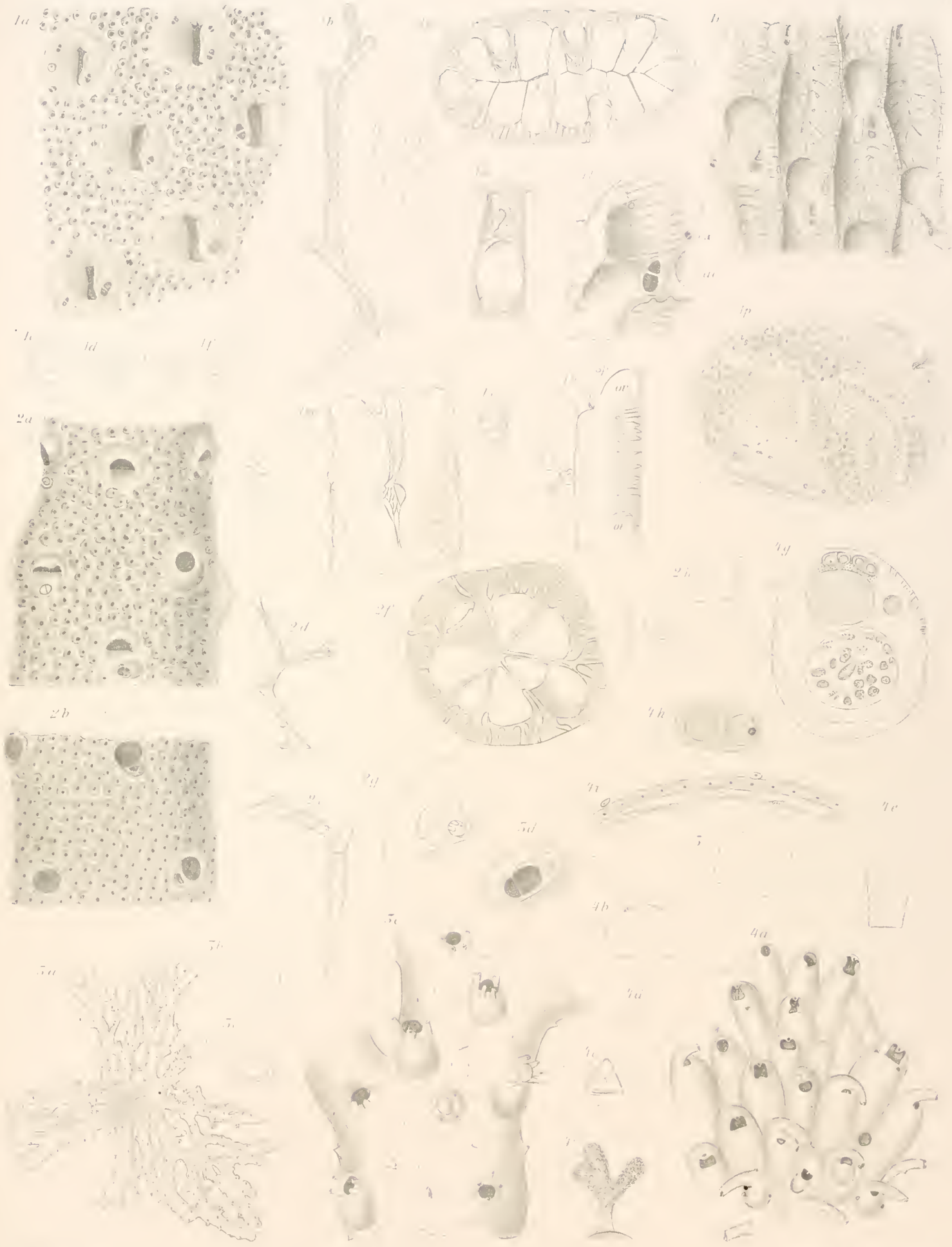
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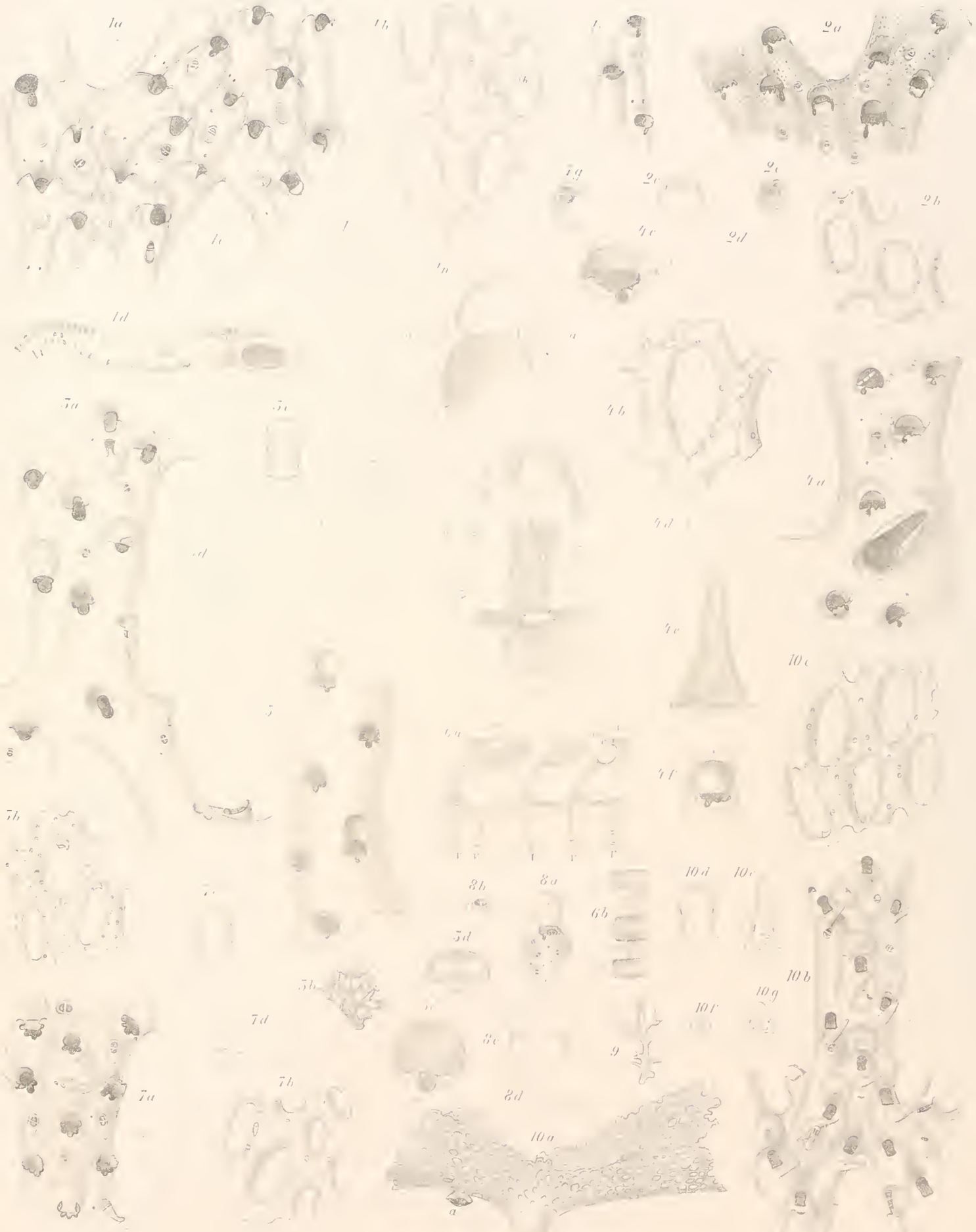
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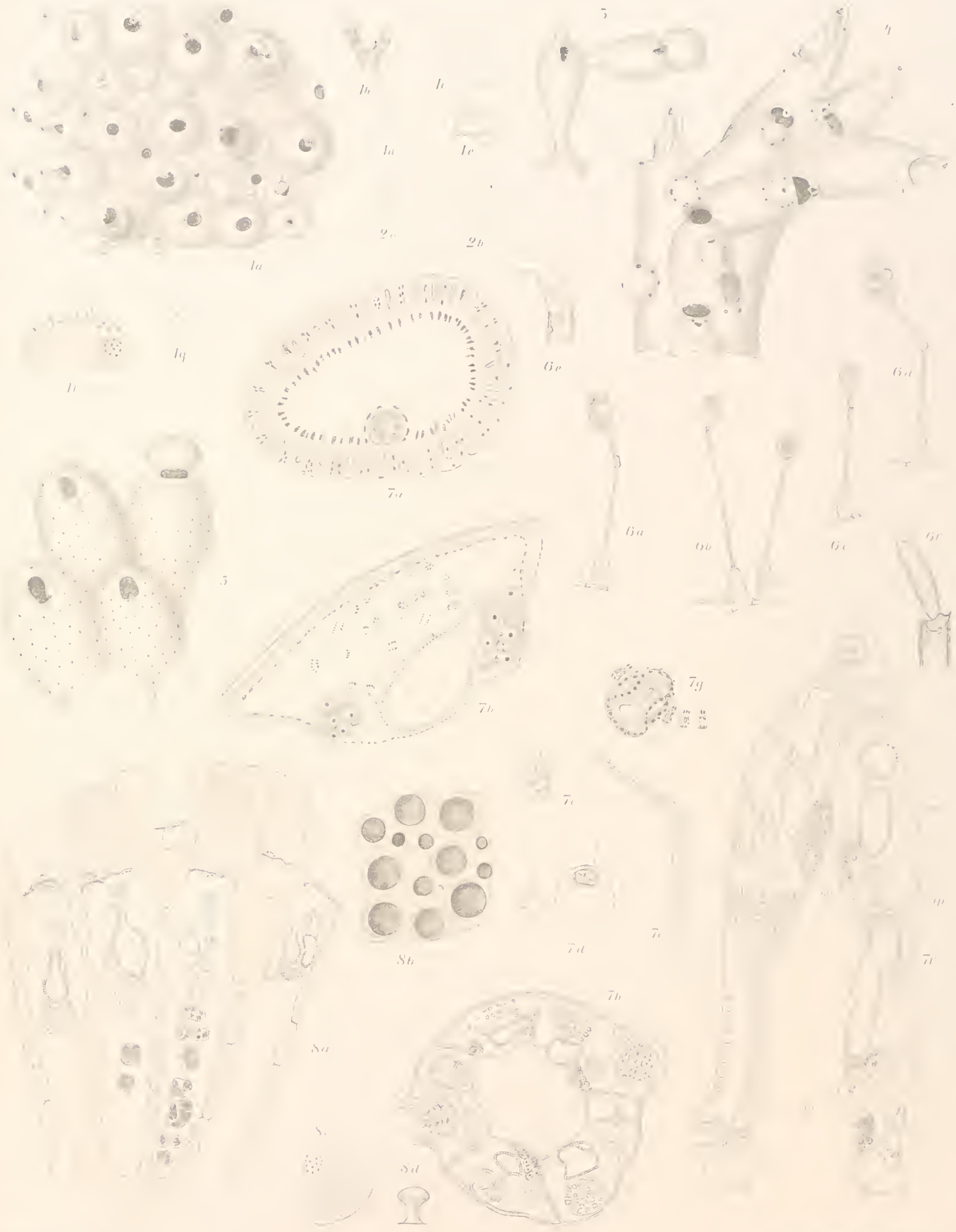
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