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I.—Bryozoa from New South Wales

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THE ANNALS
AND
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[SIXTH SERIES.]

"..... per litora spargite museum,
Naiades, et circum vitreos considite fontes:
Police virginæ teneros hic carpite flores:
Floribus et pictum, diveæ, replete canistrum.
At vos, o Nymphæ Craterides, ite sub undas;
Ite, recurvato variata corallia truncō
Vallite muscosis e rupibus, et mihi conchas
Ferte, Deæ pelagi, et pingui conchyliæ succo."
N. Parthenii Giannettasii Ecl. 1.

No. 19. JULY 1889.

I.—*Bryozoa from New South Wales.*
By ARTHUR WM. WATERS.

[Plates I.-III.]

PART IV.

SINCE I published in this periodical* descriptions of New South Wales Bryozoa sent to me by Mr. Brazier, of Sydney, I have received another box-full, and have to thank him for his kindness in sending it to me for description. This last box contains exclusively encrusting species obtained off Green Point, Port Jackson, in dredging-expeditions undertaken for conchological purposes.

There are several species not previously found in the colony and much better specimens of one or two forms described in my previous papers, thus enabling me to give particulars relating to the structure. This is especially the case with *Microporella inversa*.

As already suggested in my Supplementary 'Challenger' Report, I propose to drop the genus *Mucronella*, for the classi-

* Ser. 5, vol. xx. pp. 81, 181, and 253.

fication of *Smittia* and the allied genera as *Mucronella* and *Porella* has never seemed to me satisfactory. On this account comparative drawings of the apertures of a series are given.

Until the weak points in our present classification are weeded out but slight progress can be made in our knowledge of geographical distribution, and all complete descriptions and working out of structures are helping towards this, while premature alterations are to be avoided.

In *Schizoporella* as now understood there are a number of forms with the true aperture emarginate and having a distinct sinus, such as *S. Ceciliae*; then there are others where the lower part of the aperture is subtriangular, with lateral denticles, such as *S. lata*, MacG., *S. ambita*, W., &c., and these should probably be separated.

Since my last paper Mr. Whitelegge has published an important communication on some Australian Bryozoa*, dealing principally with the *Lunulites* group, and it is to be hoped that he will continue to use his opportunities to add to our knowledge of the structure of the Australian Bryozoa.

Mr. Whitelegge has favoured me with further specimens of "*Flabellopora*" *elegans*, d'Orb., and I feel no doubt as to the correctness of my identification. Probably Mr. Whitelegge will not mind my pointing out a fact of which he is now aware, namely that d'Orbigny only described *Flabellopora elegans* as recent and not fossil.

I have been informed that the locality mentioned ('Annals,' 1887, xx. p. 193) as Raton, New Guinea, should be Katow, the manuscript label with the specimen having been misread.

In my Supplementary 'Challenger' Report *Retepora jacksoniensis*, B., and *R. victoriensis*, MacG., are united.

Membranipora corbula, Hincks.

This species, mentioned in my previous paper, also occurs from Green Point. There is great variation in the size of the oral spines, so that sometimes the difference is not very marked between these and the spines over the front of the zoecium. The ovicell is frequently umbonate—in fact it may sometimes be described as a spinous umbo. I have a badly preserved specimen among some things from New Zealand (probably Napier), and in this the ovicell is also umbonate. *M. corbula* and *M. armata* are so similar that it may be doubted whether they are more than two extreme forms of the same thing.

* Proc. Linn. Soc. N. S. Wales, ser. 2, vol. ii. p. 337; also reprinted in the 'Annals,' ser. 6, vol. i. p. 13.

Membranipora pyrula, Hincks.

Membranipora pyrula, Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. viii. p. 31, pl. i. fig. 2; MacGillivray, Zool. Vict. dec. xiii. p. 103, pl. cxxvii. fig. 1.
Membranipora lineata, MacGillivray, Zool. Vict. dec. iii. p. 34, pl. xxvi. fig. 3.

The spines in the Green Point specimen are not so stout as those figured by MacGillivray in the thirteenth decade, but somewhat stouter than those figured by Hincks.

Hab. Bass's Straits, Victoria; Green Point, Port Jackson.

Membranipora levata, Hincks.

Membranipora levata, Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. x. p. 467, pl. xix. figs. 6, 6a.

The ovicell may be smooth or the umbo may form a keel. *M. irregularis*, B., as figured by Smitt in his 'Floridan Bryozoa,' is similar in shape and general characters, but the avicularia are wanting.

Loc. Houston Stewart Channel, 15–20 fath., and Cumshewa, British Columbia; Green Point, Port Jackson.

Membranipora lineata, L., var. (Pl. II. fig. 16.)

There are specimens from Green Point which differ from the typical *lineata* in having a small round globular ovicell without any rib. In one specimen the zoecia are connected by tubes forming an areolated space, and on some of these interzoecial connexions there are small triangular avicularia. Similar connexions occur in *M. circumclathrata*, H., in *M. acuta*, H., and sometimes in *M. lineata*, L.

The present form differs from *M. circumclathrata* in having small avicularia instead of large prominent ones. It is very much like *M. pectinata*, MacG., but its zoecia could not be described as large.

Membranipora cervicornis, Busk (non Haswell).

Membranipora cervicornis, Waters, Quart. Journ. Geol. Soc. vol. xlivi. p. 47, which see for synonyms.

In the specimen from Green Point the spines have all been worn off, but the shape of the opercular opening, together with the widely open ovicell, suffice for the determination.

Loc. Living; Victoria; South Australia; Bass's Straits;

New South Wales. Fossil: Mt. Gambier (South Australia); Napier (New Zealand).

Beania quadricornuta, Hincks.

Diachoris quadricornuta, Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. xv. p. 245, pl. ix. fig. 2.

Diachoris maxilla, Jullien, Bryozoaires du Cap Horn, p. 74, pl. vii. fig. 3, pl. xi. fig. 4.

In my specimens from Victoria and New South Wales the number of supraoral spines is variable, there being frequently two long ones besides the four short ones.

Hab. Victoria; Cape Horn; Green Point, Port Jackson.

Beania hirtissima, var. *conferta*, MacG.

(Pl. II. figs. 12-14.)

Beania conferta, MacGillivray, Trans. Roy. Soc. Victoria, vol. xxii. p. 130, pl. i. fig. 5.

In specimens from Green Point the zoarium forms a thick mat over the shell or stone upon which it grows. The zoocia are semierect and the very stout oral spines are in marked contrast to the finer row of spines curved over the front of the zoecia or those at their sides. The position of these spines is, however, the same as in both the typical *hirtissima* and the form *robusta* from Naples *, though in these the distal spines are but very slightly larger than the frontal and lateral ones. There are usually about ten stout oral spines, and the frontal and lateral spines only occur on the distal half of the zoocia. There are very numerous small radical tubes, in this respect differing from the *B. conferta* described by MacGillivray. The ovicell occurs as an inflation on the dorsal surface behind the aperture (fig. 14). The distal portion of the operculum is double.

The distal end of the zoecium being erect and all the connexions occurring in the proximal half support MacGillivray's view that *Diachoris* should be merged in *Beania*.

It will be seen that a similar erect growth of part of the zoecium obtains also in *Diachoris crotali*, B.

This is the only *Beania* in which I am sure of having seen an ovicell. One is described by Busk in *Diachoris crotali* as "small, conical, superior," and a small conical protuberance is figured; and this occurs in specimens in my collection; but

* *B. hirtissima*, var. *robusta*, H., and var. *cylindrica*, H., both occur in the Bay of Naples, and the *B. hirtissima* var. *typica* is found at Rapallo, North Italy.

I have not been able to satisfy myself as to its signification. In no other case does an ovicell seem to have been described.

Cribrilina clithridiata, Waters. (Pl. I. figs. 6-9.)

Cribrilina clithridiata, Waters, Ann. & Mag. Nat. Hist. ser. 5, vol. xx. p. 187, pl. v. fig. 6, pl. vi. fig. 2.

In the material from Green Point there are several specimens with ovicells which are globose, large, much raised, with a large mark on each side, called a "pyriform fossa" by Hincks and a "large stigma" by Busk, being similar to the ovicells of *C. philomela* and *C. figuraris*. On the upper part of the ovicellar elevation, though above the ovicellar chamber, there are six marks or papillæ similar to those on the front of the zoœcium. The aperture of the ovicelligerous cells is subquadangular, exactly similar to that of the ordinary zoœcia of *C. figuraris*, and this is a point which should be kept clearly in view when considering the classificatory position.

When *C. clithridiata* is decalcified there are conspicuous marks on the front, like the fenestræ of the *Catenicellæ* (much as in *C. ventricosa*), and the central area is thicker, forming a kind of shield; but there are no other marks, whereas in *C. figuraris* (fig. 10), *C. latimarginata*, &c. when decalcified there are marks corresponding to the rows of punctures in the calcareous wall. The "fenestræ" are of course under the papillæ at the end of the ridges.

Cribrilina radiata, Moll.

For synonyms see Hincks, Brit. Mar. Polyzoa, p. 185.

A specimen from Green Point is a typical *C. radiata*, in shape and size similar to specimens from Naples. There are five ribs on each side and a central one below. The ovicell has a keel.

MacGillivray mentions the species in his 'Catalogue of Marine Polyzoa of Victoria,' p. 22; but it does not appear to have had any other notice from the Australian area.

Microporella coscinopora, var. *armata*, Waters.
(Pl. I. figs. 1-5.)

Microporella coscinopora, var. *armata*, Waters, Quart. Journ. Geol. Soc. vol. xxxvii. p. 331, pl. xv. fig. 25; 'Challenger' Suppl. Rep. p. 39.

Microporella coscinopora, var. *mucronata*, Waters, Quart. Journ. Geol. Soc. vol. xli. p. 295.

Eschara sulcata, M.-Edw. Ann. des Sci. Nat. 2^e sér. tom. vi. p. 43, pl. v. fig. 2.

Eschara mucronata, MacG. Zool. of Vict. dec. v. p. 43, pl. xlvi. figs. 6, 7.

Adeonellopsis latipuncta, MacG. Trans. Roy. Soc. Vict. vol. xxii. p. 134, pl. ii. fig. 5.

A specimen from Green Point, Port Jackson, is a flat piece, evidently part of a large foliaceous growth, and is the *A. latipuncta* of MacGillivray. Broad and narrow pieces from Port Phillip in my collection show that the width must not be made a specific character; and the 'Challenger' dredged fragments of three sizes from Station 162, of which the narrower one is only .2 millim. in diameter. A branched specimen from Green Point is the *Adeonellopsis australis* of MacGillivray; but in the size of the oral aperture, the form of the chitinous elements, and the other zoocial characters I cannot find any difference from the above and do not think that the broad and narrow forms should be separated.

In the Green Point "latipuncta" specimen there is always the central avicularium directed upwards and usually one small one at the side of the aperture, sometimes two; but there is seldom one below the cribriform area. In many of the Australian specimens, both recent and fossil, there is in different parts of the same colony considerable variation with regard to the avicularia. In the typical Miocene *M. coscinopora* there is only a central avicularium, but the zoocial characters are generally similar.

Loc. Living: Port Phillip (Victoria); 'Challenger,' Station 162, 38–40 fath.; Green Point, Port Jackson. Fossil: Curdie's Creek, Muddy Creek (Victoria); River-Murray Cliffs (South Australia).

Microporella inversa, Waters. (Pl. I. figs. 11, 12.)

Porina inversa, Waters, Ann. & Mag. Nat. Hist. ser. 5, vol. xx. p. 190, pl. iv. fig. 23, pl. v. fig. 5; Whitelegge, Proc. Linn. Soc. N. S. Wales, ser. 2, vol. ii. p. 680.

Much better specimens received from Green Point have revealed several points not seen in the specimens previously described. The pores on the front are distinctly stellate, as can be readily seen in mature zoecia, though not distinguished in old cells without preparation, and the formation of these stellate pores is instructive.

At first raised tubes are formed (fig. 11, left-hand upper zoecium), and in a later stage the stellate closure grows on the top (fig. 11, right-hand zoecium); but as calcareous growth progresses the teeth are at the base of a round

depression (fig. 11, lower zoecium), and in these mature zoecia there are, as seen in calcined specimens, deep grooves between the stellate pores, starting from large pores near the borders of the zoecia. One of these grooves seems usually to start from the upper lateral pore on the one side and pass above the suboral pore to the lateral pore on the other side, as shown in the left-hand zoecium of fig. 11. Decalcification shows distinct tubes occupying the place of these grooves. The interior membrane of the zoocial wall is perforated by the suboral pore, but not by the others.

As already pointed out, the operculum is the reverse of the usual shape, and when writing the previous description I naturally concluded that it was hinged on the distal edge and not at the proximal, as in other Bryozoa; but not having very good specimens, I merely presumed it, and it would seem to me that what I wrote suggests this; but it does not seem to have been so understood by Mr. Whitelegge, who, having had the opportunity of examining fresh specimens, points out that the aperture is of the same shape as in other Bryozoa, but reversed. I have certainly no objection to its being put in this way, but do not appreciate that it is different from what I said; and the name *inversa* was chosen on account of this reversal of shape, so that Mr. Whitelegge's and my own description seem quite the same though expressed in a different way.

Dr. Jullien * described a species as *Inversiula nutrix* about the same time that I published my description; and at first I thought they might be identical. The general appearance is so similar that they might readily be mistaken; but the individual characters must be examined, and then a material difference is found in the shape of the oral aperture, which in *I. nutrix* is nearly round but somewhat flattened on both the distal and proximal edges, and I am inclined to think that the operculum is here also reversed in position. I cannot speak on this point with certainty, as I have only been able to examine a very minute fragment, and have not made dissections. Dr. Jullien only possessed a small piece, but generously sent me a little bit of it for examination.

The suboral pore of *Inversiula nutrix* I should describe as round, with a tooth in the lower part, as in many Microporellidae. One suboral pore without any such tooth is quite round, and the difference in this character in Jullien's species and mine does not seem of any generic importance.

In *M. inversa* I have only seen the small semicircular

* 'Mission du Cap Horn,' Bryozoaires, p. 44, pl. iv. fig. 8.

mandibles in decalcified specimens, and the apertures in the avicularia of *Inversiula nutrix* are of the same shape. The operculum of *I. nutrix* is very thick round the border, reminding us of the operculum of *Diporula verrucosa*.

Although specifically very distinct, Jullien's species from South America and mine from New South Wales seem to fall into the same genus, and probably the New South Wales species will have to be called *Inversiula inversa*. I am now unable to understand why I placed mine with *Porina*, but when describing it said that I thought it would have to be made the type of a new genus.

Micropora elongata, Hincks. (Pl. I. figs. 21, 22.)

Steganoporella elongata, Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. vi. p. 380, pl. xvi. fig. 4.

Micropora variperforata, Waters, Quart. Journ. Geol. Soc. vol. xliii. p. 51, pl. viii. fig. 27.

From Green Point there are a few zoœcia in shape and every particular exactly resembling Mr. Hincks's figure and description of *S. elongata*; but on the same shell there is another colony in which the surface has numerous similar large perforations (opesiules) and similar avicularia, but the zoœcia shorter and wider. In the more typical specimens there is a well-marked "opesiule" at each upper corner, but in some cases it cannot be made out, and in others there are more than one on each side.

The number of opesiules has been shown to be variable in this and in *Micropora lepida*, Hincks. Dr. Jullien, however, would use the form of the opesiules as the chief generic character, making out of the Microporidæ the genera *Gargantua*, J., *Calpensia*, J., *Andreella*, J., *Woodipora*, J., *Verminaria*, J., *Peneclausa*, J., *Thalamoporella*, Hincks, *Manzonella*, J., *Pergensia*, J., *Setosella*, Hincks. Surely genus manufacturing never has gone and never will go further than this; and as Dr. Jullien has called attention to many anatomical points of importance, it is much to be regretted that he should be so hasty in his generalizations on classification.

In its typical form this does not seem at all like *M. coriacea*; but when a series is examined there is found to be little difference. In older cells of *M. coriacea* the surface of the front wall seems almost closed, whereas in the younger zoœcia the perforations are distinctly seen, and in some zoœcia of *M. elongata* the pores are not large and distinct.

Schizoporella auriculata, Hass.

Loc. Living : European seas ; Madeira ; Azores ; Gulf of St. Lawrence ; Victoria ; Green Point, Port Jackson, New South Wales. Fossil : Pliocene of Italy and Sicily ; Mount Gambier and Bairnsdale (Australia) ; Napier and Tommy Gully (New Zealand).

Schizoporella auriculata, Hass., var.

There is also a *Schizoporella* which in most cases has only a round avicularium below the aperture ; but in a few zoœcia there are besides two avicularia, one at each side of the aperture, as in *S. sanguinea*, Norman, var. (Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. vi. p. 382). The pores are small slits ; and should it be requisite to give it a name, *fissipora* would be appropriate ; but as there are no ovicells, it is for the present left as a variety of *auriculata*.

Schizoporella Ceciliæ, Aud.

Mr. Hincks (Ann. & Mag. Nat. Hist. ser. 5, vol. xix. p. 302) hesitates to identify this with Heller's *Lepralia Perugiana*, as he considers that has an avicularium ; but Mr. Hincks is mistaken in supposing that Heller alludes to an avicularium ; what he described was the "appendage" of the operculum as a "kleines, gelbes Zähnchen."

Loc. Britain ; Mediterranean ; Red Sea ; Japan ; Queen Charlotte Islands (British Columbia) ; Victoria ; Green Point, Port Jackson. Fossil : River-Murray Cliffs (South Australia).

Schizoporella biserialis, Hincks. (Pl. II. fig. 11.)

Schizoporella biserialis, Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. xv. p. 250, pl. vii. fig. 3.

In a specimen from Green Point the shape and size of the zoœcia, the sculpturing, and the ovicells are just the same as in the New Zealand specimens ; but there are numerous spines arising from the distal end of the zoœcium, often as many as forty or fifty, and these do not seem to be arranged in series, though one might at first take them for three rows.

The pores on the surface of the zoœcia in the specimens from both localities are internally slightly denticulated. *Schizoporella arachnoides*, MacG., is probably nearly related to this ; but the zoœcia are smaller, the ovicell is elongate, there are not the large pores on the surface of the zoœcia, and there is only a single row of oral spines.

Schizoporella mucronata, Smitt. (Pl. II. fig. 9.)

Hippothoa mucronata, Smitt, Floridan Bryozoa, p. 45, pl. viii. fig. 169.

In the Green Point specimen there is a semicircular raised ridge below the aperture. The aperture is about 0·12 millim. wide, and on the operculum there is a very distinct, elongate, semitransparent area. In young cells there is a row of pores round the edge of the zoecium; the ovicell is small, raised, globular, but seldom mucronate.

S. simplex, Johnst. (*S. Johnstonei*, Ridley), dredged by the 'Challenger' between Fayal and Pico, has a similar ridge below the aperture in the ovicelligerous cells, and these are very similar to cells of the present Australian specimens; but the species differ in the first only having the ridge on ovicelligerous zoecia.

Loc. Florida, 29 fath.; Green Point, Port Jackson.

Schizoporella filocincta, Rss. (Pl. I. figs. 17, 18.)

Lepralia filocincta, Reuss, "Bry. Oest.-Ung. Mioc." Denkschr. Ak. Wissensch. Wien, vol. xxxiii. p. 178, pl. viii. fig. 4.

Schizoporella filocincta, Pergens, "Bry. du Tasmadjan," Bull. Soc. Malac. de Belgique, vol. xxii. p. 14.

Zoarium incrusting. Central zoecia erect, the outer ones decumbent; shell thick, with a few larger pores. The oral aperture is large, clithridiate. There are a few semicircular avicularia between the zoecia, but they do not occur generally. The ovicells are wide and short, not very much raised, covered with pores similar to those on the surface of the zoecia.

At first I thought this was *Cellepora megasoma* of MacGillivray, as it corresponds with some of the figures, and it is not impossible that this is what MacGillivray first described under that name.

Loc. Living: Green Point, Port Jackson. Fossil: Miocene of Forchtenau and Belgrade.

Schizoporella lata, MacG.

Schizoporella lata, MacG. Trans. Roy. Soc. Vict. vol. xix. p. 132, pl. i. fig. 7; Zool. Vict. dec. xiv. p. 145, pl. cxxxviii. fig. 2.

This differs from *S. ambita*, Waters, in having a much narrower ovicell, evenly punctured, and in having a small triangular avicularium immediately below the aperture. *S. lata* is very much like *Lepralia tenella*, Rss.

Loc. Port Phillip (Victoria); Green Point, Port Jackson.

Schizoporella subimmersa, var. nov.
(Pl. II. figs. 10, 10 a, b, c.)

This is much like MacGillivray's description and figure of *Lepralia subimmersa*, but does not correspond with Hincks's more recent figure. The operculum of the ovicelligerous cells is somewhat larger than that of the ordinary zoœcia, and forms a wide curve on the lower border. The ovicell is deeply immersed.

From the avicularian chamber there is a lateral tube on each side (see fig. 10 a, a zoœcium decalcified). The same thing is often seen in the avicularian chambers of *Retepora*. In some of the older zoœcia the opercula are whitish, in consequence of a slight subsequent calcareous deposit.

Loc. Victoria ; Green Point.

Schizoporella ambita, sp. nov. (Pl. II. fig. 7.)

This occurs from Green Point and is in many points similar to *S. lata*, MacG., also abundant from the same locality ; but the differences in the ovicells and avicularia enable them to be distinguished.

Zoarium incrusting. Zoœcia ovate, distinct, with moderate-sized deep pores on the front, a small round avicularium immediately below the aperture. Oral aperture suborbicular, with the proximal edge subtriangular. Ovicell wide, raised, the front flat, with numerous pores, the rest of the ovicell imperforate.

This I have from Naples with and without the small round avicularium ; and a specimen from Port Western, Victoria, sent to me as *S. lata*? has the characteristic ovicells and avicularia.

Probably this has been placed with *S. pertusa*.

In some cases a calcareous growth in the older zoœcia forms a kind of lip in the lower part of the aperture.

Schizoporella lœvigata, sp. nov. (Pl. II. fig. 8.)

Zoarium incrusting. Zoœcia small, separated by an indistinct division, surface smooth. Avicularium tumid, directed forwards, mandible round with a central lucida and the distal end dentate ; in the older cells the avicularium occupies nearly the whole of the front of the zoœcium. The oral aperture is nearly orbicular, the sinus (?) being formed by an arc nearly the width of the aperture, and on each side there is a minute denticle.

Ovicell short, much raised, situated considerably above the aperture, widely open, and not closed by the operculum.

This is allied to *S. tumida*, but the avicularian chamber is lower down and does not spread out near the aperture. It is also allied to *S. Ridleyi*, MacG., which has recently been redescribed by Jullien as *Aimulosia australis*, J.

Loc. Green Point, Port Jackson.

Schizoporella sydneyensis, sp. nov.

There is only a small piece of this *Schizoporella* without ovicells. Zoarium incrusting. Zoecia hexagonal, separated by a distinct raised ridge; the distal portion of the zoecium is much depressed, the aperture wide (0·13 millim.), the lower border of the oral aperture widely emarginate. In young zoecia there is a thick ridge below the aperture, but in older ones the two ends are raised and form a stout blunt spine at each side below the aperture. The front wall of the zoecium is coarsely perforated.

The zoecia are very similar in several characters to those of *Eschara mortisaga*, Stol. (Bry. von Latdorf, p. 86, pl. ii. fig. 6).

This specimen was first noticed after the plates were drawn, and if the opportunity occurs should be figured at some future time.

Since writing the above I have had the opportunity of examining, in Miss Jelly's collection, older and larger colonies of what is no doubt the same thing; but in these the front of zoecium is not depressed, and sometimes besides the pair of tubercular spines there are others on the front of the zoecium. These specimens were determined as *S. vitrea*, MacG., and although the front of the zoecium is distinctly perforated, and not "granulated," most of the characters correspond with those given by MacGillivray, but his figures and descriptions are insufficient.

In my 'Challenger' Suppl. Report I considered that the *incisa* of Busk was the *vitrea* of MacG.; but I may have been misled by insufficient figures, and in the uncertainty it will be best for the present to allow the name *sydneyensis* to stand.

Lepralia vestita, Hincks, var. *australis*. (Pl. I. fig. 19.)

Lepralia vestita, Waters, Ann. & Mag. Nat. Hist. ser. 5, vol. xx. p. 194, pl. vi. fig. 21.

Since writing my previous paper I have had the opportunity of further examining Tahiti specimens, and think that the New South Wales form should be separated as a variety. The operculum of the typical *L. vestita* is shown in fig. 20.

In the Tahiti form there is more of a peristome than in the variety, and some zoecia have a broad avicularium at the side of the peristome which does not occur in the specimens from Green Point, where the variety is common.

Lepralia lonchaea, B., is so closely allied to the typical *L. vestita* that I doubt whether it should be separated.

Lepralia elimata, Waters.

In young zoecia from Green Point there are supraoral spines.

Lepralia rectilineata, Hincks.

Lepralia rectilineata, Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. xi. p. 201, pl. vii. fig. 5; Waters, Quart. Journ. Geol. Soc. vol. xlili. p. 60, pl. vii. fig. 16, pl. viii. figs. 34, 35, 36.

There are only two or three zoecia from Green Point; but there is no mistaking their identity with the New Zealand form.

Loc. Living: New Zealand; Green Point. Fossil: New Zealand.

Lepralia depressa, Busk. (Pl. I. figs. 13-16.)

Lepralia depressa, Busk, Cat. Mar. Polyzoa, p. 75, pl. xci. figs. 3, 4. *Escharella rostrigera*, Smitt, Floridan Bryozoa, Sv. Vet.-Ak. Handl. n. ser. xi. p. 57, pl. x. figs. 203-205.

This was not recognized as identical with Mr. Busk's *L. depressa* until I had an opportunity of examining the British Museum specimens.

The bright red zoarium is encrusting. Zoecia irregularly rectangular, distinctly separated, with pores round the border. Oral aperture with straight sides and triangular proximal end, a small round avicularium at each side; sometimes an umbo on the middle of the zoecium, and from decalcified preparations this umbo appears to be sometimes perforate. The ovicelligerous cells have the aperture (0·13 millim.) much larger than that of the other cells (0·09 millim.); there is often an avicularium above the ovicelligerous aperture, and the distal end of these zoecia is somewhat raised.

Smitt gives the avicularia of various shapes.

The ordinary and ovicelligerous zoecia are now known to have different or larger apertures in several genera, as, for instance, in *Cribrina clithrediata*, *Schizoporella hyalina*, *S. jacksoniensis*, B., *Lepralia bistata*, W., *Monoporella waipu-*

kerensis, W., *Micropora*, *Adeonella*, *Adeona*, *Steganoporella*, *Catenicella*, and many others.

Loc. Ægean Sea (B.) ; Florida, 35–43 fath. (Sm.) ; Green Point, Port Jackson.

Lepralia Poissonii, Aud., var. (Pl. II. fig. 17.)

For synonyms and localities see "Tert. Chil. Bryozoa from New Zealand," Quart. Journ. Geol. Soc. vol. xlivi. p. 59.

A specimen from Green Point is thickly calcified and has the ovicells immersed, showing, however, a round ovicellar area on a level with the wall of the zoecium. In *L. Poissonii*, as previously described, the ovicell is always raised, and it may be a question whether the specimen under notice should be considered a variety or whether the difference arises from a stronger calcification of older cells. The ovicells in the Chilostomata generally are subject to considerable variation with age, and great care must be exercised when using the ovicell for purposes of classification.

SMITTIA.

I have several times expressed my conviction that the classification of the family Escharidæ of Hincks would require modification when better understood, and have considered that some of the names were only used provisionally.

A considerable section possesses three teeth, which, following Jullien, we may call a central "lyrula," and two lateral "cardellæ." So far as I have had the opportunity of examination, the opercula of all of these, instead of being hard and horny, as in the majority of the Bryozoa, are soft and membranous. The method of teasing out in water, which I have found far the best for the separation of the opercula generally, is not here suitable, as the opercula cannot be removed without risk of altering their shape, and glycerine is in this case useful, though as a rule it should be avoided. This thinness of the operculum may not be found on further examination to be universal, but at the same time the probability of the value of this as a diagnostic character is pointed out.

I give under the present generic names figures of the teeth of a number of forms magnified about fifty times, and believe that they should be placed with the genus *Smittia*, dropping the genus *Mucronella*. Most of the *Mucronellæ* would come in here, but a few would come under *Lepralia*, for the so-called mucro has evidently represented various structures. In

Mucronella præstans, H., the whole front of the peristome is raised; in *M. porosa*, H., there seems to be no true mucro; and in *M. contorta*, B., and *M. bisinuata*, as previously pointed out, we ought not to speak of a mucro.

In *Smittia* the oral avicularium may, just as in *Porella*, be enclosed in the secondary aperture, as seen in some forms of *S. Landsborovii*; and, as at present defined, I find myself unable to decide what is *Porella*, though perhaps we shall find other characters uniting together a part of what is now called *Porella*.

The mandibles of the oral avicularia of a number of this group show a similarity in having a diagonal strengthening chitinous bar from each side of the lucida. We may call this the *Smittia Landsborovii* type, represented also by *Porella cervicornis*, Ell. & Sol., *P. marsupium*, *P. laevis*, *P. rostrata*, *Umbonula verrucosa*, *Smittia rigida*, Lorenz; but before we can know the value of this character further comparisons of similarly placed avicularia are required. The variation in position, size, and direction of the oral avicularia of some *Schizoporellæ*, as for instance *S. auriculata*, must put us on our guard against hasty conclusions.

The *Eschara cervicornis* of Pallas and M.-Edwards has the oral avicularia within the orifice, and I have therefore called it *Porella*; but Mr. Hincks would call it *Smittia*, and from this I think we may see the artificialness of the genus *Porella*, as at present understood.

As to the peristomial characters, there is great variety in the genus *Smittia*, and again in *Schizoporella* there is in many species a raised peristome, as, for instance, in *Schizoporella discoidea*, B.; and in several *Celleporæ*, as represented by *C. granum*, the peristome is tubular above the oral aperture. Though no doubt often useful specifically, peristomial characters do not seem applicable for generic divisions.

I give a figure of the *Smittia* which Dr. Jullien would call *Exochella longirostris* from Cape Horn, as it shows the lyrula and cardellæ meeting and enclosing a space, and probably this is similar to the structure of *Smittia tricuspidis*, H., but in the latter the prolongation of the peristome forms a tube on each side.

Dr. Jullien has recently also suggested that *Mucronella* should be dropped; but I am unable to follow him in the way in which he would divide up the group.

Smittia unispinosa, sp. nov. (Pl. III. figs. 1-3.)

Zoarium incrusting. Zoæcia large, quadrate, distinct, with

pores round the border. The peristome raised at each side of the aperture, but not at all on the distal end, where there is one large jointed spine, occasionally replaced by two, nor is the proximal edge raised.

At one side, rather below the aperture, a large raised avicularium with a round mandible, but sometimes replaced by a gigantic avicularium almost the size of the zoecium. In one specimen there is also one vicarious avicularium larger than a zoecium, with a spatulate mandible. The operculum is thin, scarcely chitinous, nearly orbicular, slightly curved inwards on the lower edge, and quite plain.

The ovicells are large, globular, much raised, and in mature specimens there are two or three mucronate processes and perforations on the front of the ovicell.

In young ovicells the markings remind us of the trifoliate stigma on the ovicells of a group of *Retepora*.

Smittia trispinosa, J., var. *munita*, Hincks.
(Pl. III. figs. 12, 13, 23.)

Smittia trispinosa, Johnst. var., Ann. & Mag. Nat. Hist. ser. 5, vol. xiv. p. 283, pl. ix. fig. 5.

Specimens from Green Point have the zoecia heaped up and short, with a peristomial sinus, caused by the peristome being raised on both sides. The surface is coarsely granulated, and to some zoecia there are three supraoral spines. The ovicells are distinct, partly buried in the zoecia above, with large pores over the surface, and there is usually an elongate avicularium on each side of the aperture. The lyrula and cardellæ are nearly equal and near together, and all three are directed inwards; but the operculum, on the other hand, is turned upwards towards a kind of hood on the distal end of the zoecium (see diagram, fig. 13).

Loc. Port Phillip Heads (Victoria); Green Point.

Smittia malleolus, Hincks. (Pl. III. figs. 14, 15.)

Porella malleolus, Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. xiii. p. 361, pl. xiii. fig. 5.

In the specimen from Green Point the interoral avicularium is very marked, with the mandible projecting far into the aperture. The ovicells are wide and not very much raised.

In the avicularium there is a calcareous process arising from the calcareous bar. This I propose to call a ligula, and have pointed out ("On the Use of the Avicularian Mandibles" &c., Journ. Micro. Soc. ser. 2, vol. v. p. 776) that a ligula

occurs in *Cellepora sardonica*, W., *Schizoporella biaperta*, Mich., *S. auriculata*, Hass., *Lepralia edax*, B., *Retepora marsupiata*, Sm., var., *R. Couchii*, H., *Porella cervicornis*, M.-Edw. In my European specimens of *Smittia Landsborovii* it is extremely minute, but is somewhat larger in a New Zealand specimen.

I should feel inclined to consider *S. malleolus* a variety of *S. Landsborovii* and some varieties with the avicularia far down the peristomial aperture have previously been described.

Hab. Burmah (H.); New Zealand (W.); Green Point, Port Jackson.

Smittia Napierii, Waters. (Pl. III. figs. 34, 35.)

Smittia Napierii, Waters, Quart. Journ. Geol. Soc. vol. xxxix. p. 438, pl. xii. fig. 14, vol. xliii. p. 59.

The lyrula is directed inwards, but does not seem to be usually bifid, and at each side of the denticle the peristome is a little raised and forms an apparent sinus; the ovicells are usually somewhat immersed, but there is considerable variation in this particular.

This has small zoecia, and no doubt is closely allied to *Smittia (Mucronella) tricuspis*, H., but I still think they are distinct.

Smittia præstans, Hincks. (Pl. III. figs. 9-11.)

Mucronella præstans, Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. x. p. 168, pl. vii. fig. 1; Waters, Quart. Journ. Geol. Soc. vol. xliii. p. 56.

Mucronella duplicata, Waters, *op. cit.* vol. xxxvii. p. 328, pl. xvi. fig. 54, and vol. xxxviii. p. 266.

The Green Point specimen is without ovicells. It differs from the typical form in having punctures in pits generally over the surface, and should perhaps be separated as a variety on this account.

Smittia signata, sp. nov. (Pl. III. figs. 4-6.)

Zoarium incrusting. Zoecia separated by a thick raised line, usually rectangular, punctured round the edge. Peristomial orifice suborbicular, narrower below, with the peristome thick and raised; on one side of the zoecia almost attached to the peristome there is a lanceolate avicularium. The oral aperture has a distinct sinus, probably formed by two lateral teeth; the operculum is thin and is strengthened by a thicker raised line, taking the shape of the mandibles of *Ann. & Mag. N. Hist. Ser. 6. Vol. iv.*

many spatulate avicularia. Ovicell distinct, raised, but partly buried in the cell above; its surface is perforated.

It is very difficult to know where this should be placed; but the appearance and the general characters are decidedly those of *Smittia*, as is also the thin operculum; but there is no lyrula, and the sinus would make it *Schizoporella*. *Smittia obstructa* has a semicircular chitinous bar, and a bar also occurs across the operculum of *Lepralia mucronata*, B.; but this is not a common character.

Smittia obstructa, sp. nov. (Pl. III. figs. 7, 8.)

The surface of the zoœcium is granular, the sides of the peristome are very prominent, and sometimes there is a short triangular avicularium leaning against each prominence, the lower edge of the peristome is continuous, but not much raised.

Ovicells distinct, slightly elevated, proximal and distal portion thickened by a subsequent calcification, forming a perforated area between. Two or three suboral spines. Sometimes a fairly large avicularium on the front of the zoœcium, and there are a few spatulate vicarious avicularia.

The operculum is characteristic, being marked by a thickened crescentic ridge starting from each lower corner; the rest of the operculum is thin. Lyrula distinct, not large.

This may be the *Smittia trispinosa* var. *bimucronata* of Hincks.

Retepora fissa, MacG.

Retepora fissa, MacG. Trans. Roy. Soc. Vict. vol. ix. p. 140; ib. vol. xix. p. 291, fig. 8; Zool. Vict. dec. x. p. 17, pl. xcvi. figs. 12-16.

There is a young colony from Green Point without ovicells, and many of the zoœcia are unarmed, but some have avicularia. Two radical calcareous processes are thrown off, and there is often a triangular avicularium at the base of the fenestra. A young colony like this is with difficulty distinguished from *R. avicularis*. As mentioned in my Suppl. 'Challenger' Report, it would seem that *R. fissa* may be made the centre of a group.

Retepora porcellanea, MacG.

For synonyms see Waters, Suppl. Rep. on the 'Challenger' Polyzoa, p. 19.

Rhynchopora profunda, MacG. (Pl. II. fig. 15.)

Rhynchopora profunda, MacG. Trans. Roy. Soc. Vict. vol. xix. p. 193, pl. ii. fig. 8; Waters, Ann. & Mag. Nat. Hist. ser. 5, vol. xx. p. 196, pl. vi. figs. 11, 16.

A figure of a young colony from Green Point is given in order to show a zoecium in the first stage, and those a little older in which calcareous nodulated structure has been formed on the surface and in which the avicularian chambers are being formed.

Loc. Victoria; New Caledonia; Port Jackson, New South Wales.

Rhynchopora longirostris, Hincks.

Rhynchopora longirostris, Hincks, Ann. & Mag. Nat. Hist. ser. 5, vol. viii. p. 125, pl. iv. figs. 7, 8; Waters, Quart. Journ. Geol. Soc. vol. xlvi. p. 70, pl. vii. fig. 22.

Mucronella tuberosa, Hincks, *op. cit.* vol. vi. p. 383, pl. xvii. fig. 7.

In my specimens from Victoria and Green Point the processes are irregularly nodulated.

There is one curious abnormal mandible formed by the coalescence of two at their distal ends, so that there are two bases.

Loc. Living: Curtis Island (*H.*); Victoria; Green Point, Port Jackson, New South Wales. Fossil: Napier, New Zealand.

Cellepora columnaris, Busk. (Pl. II. figs. 1-6.)

Cellepora columnaris, Busk, Zool. 'Challenger' Exp. pt. xxx. p. 194, pl. xxix. fig. 11, and pl. xxxv. fig. 16.

Cellepora cidaris, MacG. Zool. of Vict. dec. xvii. p. 243, pl. clxv. fig. 4.

I did not appreciate that the specimens from Green Point were the *columnaris* of Busk until I saw the 'Challenger' specimens.

The columns are often very thick, occupying more space than a zoecium, and extend through several layers of the zoarium; they are solid throughout, but the central portion is more transparent than the outer, and the radiating lines only occur in the outer layer. I would call the attention of palaeontologists studying sections of problematic organisms to section fig. 4. The surface of the zoecia and columns are granulated, and the structure is no doubt the same as that of *C. cidaris*, though in no parts so strongly tuberculated as in MacGillivray's figure; the ovicells are not abundant, and where they occur are so much buried that the characters cannot be made out, but the surface appears to be plain; one large spatulate avicularium has been seen on one of the colonies.

Loc. Bass's Straits, 38 fath.; Port Phillip Heads (*MacG.*); Green Point, Port Jackson.

Cellepora granum, Hincks.

For synonyms see Waters, Ann. & Mag. Nat. Hist. ser. 5, vol. xx. p. 198.

There are some specimens from Green Point larger than the one previously mentioned, and they are more strongly calcified. In the most typical *C. granum* the peristome is not continuous, but carried up in "front;" and in one specimen from Green Point the peristome is in some zoœcia continuous, in others merely projects in front as if one half had been cut away, giving a very different appearance to the zoœcia. The same thing occurs in the Naples form (see Ann. & Mag. Nat. Hist. ser. 5, vol. iii. p. 195).

In the Green Point specimens there are large vicarious avicularia with the mandibles very wide at the distal end, just as in *C. Costazii*, Aud.

There seems to be a group of *Celleporæ* with subglobular ovicells part way up a somewhat tubular zoœcium ; the ovicells have a distinct area surrounded by elongate or radiating pores. They are known as *C. granum*, H., *C. Boryii*, Aud., *C. Costazii*, Aud., *C. Hassallii*, Johnst., *C. costata*, MacG., *C. retusa* var. *caminata*, Waters, *C. platalea*, MacG., *Lagenipora nitens*, MacG., *L. spinulosa*, H., *Phylactella lucida*, H., *C. rota*, MacG., *C. rufus*, B., *C. bilabiata*, B., *C. signata*, B.; but these should be reduced to two or three species.

In *Cellepora* perhaps we may see the signification of the perforated area on the ovicell which occurs in so many species. As growth of the colony progresses the ovicell becomes more and more immersed, often nothing being seen of it except the perforated calcareous wall of the area, and no doubt a readier communication with the surrounding water is thus maintained to the last. There are, however, many species in which the ovicell has only a lunar mark of thinner structure ; this may be a degenerated form of the perforated area, where a less erect growth of the zoœcia has made the perforation of less importance.

A somewhat similar structure occurs in other genera, and then all except the area may become immersed, as, for instance, in *Smilia marmorea*.

Stomatopora incrassata, Smitt.

Stomatopora incrassata, Hincks, Brit. Mar. Polyzoa, p. 436, pl. lix. figs. 2, 3.

The Green Point specimens are no doubt identical with the form described by Mr. Hincks ; but as I am not sure about other descriptions reference is only made to his.

The branches anastomose, and from various parts erect "cylindrical processes" rise up. These erect fasciculi remind us of *Fasciculipora bellis*, MacG. (see Ann. & Mag. Nat. Hist. ser. 5, vol. xx. p. 259) ; but in the latter they are about

double as wide and arise from a calcareous crust; this, however, is at first formed by a growth similar to the creeping branches of *S. incrassata*, and subsequently spreads out.

This would be *Filifascigera* of d'Orbigny (Pal. Fr. p. 684), and I have a recent specimen from New Zealand which I cannot distinguish from *F. dichotoma*, d'Orb. In it the bundles consist usually of four zoecia and the basal portion is punctate without zoecia. In such cases we must look upon the names given as registering the occurrence rather than expressing any opinion on the classification; and the same would apply to other Cyclostomata.

Loc. Britain; Green Point, Port Jackson.

Diastopora latomarginata, d'Orb.

Diastopora latomarginata, d'Orb. Pal. Franç. p. 827, pl. 753. figs. 10–12; Waters, Ann. & Mag. Nat. Hist. ser. 5, vol. iii. p. 272, pl. xxiv. fig. 12, which see for synonyms.

Tubulipora concinna, MacG. Trans. Roy. Soc. Vict. vol. xxi. p. 94, pl. i. fig. 10.

The zoecial tube of the Green Point specimens is a trifle smaller than that of my Naples specimens, measuring only about 0·06–0·07 millim., whereas those from Naples are about 0·08 millim. In both cases the ovicells are inflations transverse to the rows of the zoecia, with the ovicellar duct directed towards the centre of the colony.

Diastopora is not at all uncommon in the southern hemisphere, and it is therefore surprising to find that the author of the article on distribution in the 'Encyclopædia Britannica' speaks of *Diastopora* as mostly northern.

Loc. Living: Arctic Seas; Mediterranean; Victoria; Green Point, Port Jackson. Fossil: Pliocene of Sicily and Italy.

Idmonea serpens, Linn.

Loc. Living: European Seas; New Zealand; Green Point, Port Jackson. Fossil: Pliocene of Europe; various localities in New Zealand.

Lichenopora californica, Busk.

Unicavaea californica, d'Orb. Pal. Franç. p. 972.

Discoporella californica, Busk, Cat. Mar. Polyzoa, pt. iii. p. 32, pl. xxx. fig. 5.

Lichenopora californica, Waters, Journ. Linn. Soc., Zool. vol. xx. p. 282. pl. xv. fig. 1.

There are several small specimens from Green Point without ovicells; but from the other characters they seem to be *L. californica*.

Loc. California; Victoria; Green Point, Port Jackson.

Lichenopora hispida, Flem.

Loc. Living: European Seas; Tristan d'Acunha, 100–1100 fath.; Green Point, Port Jackson. Fossil: Miocene and Pliocene of Europe; Australia and New Zealand, various localities.

Lichenopora victoriensis, Waters.

Lichenopora victoriensis, Waters, Journ. Linn. Soc. vol. xx. p. 284, pl. xv. fig. 4.

Lichenopora reticulata, MacG. Trans. Roy. Soc. Vict. vol. xx. p. 126, fig. 1.

I have changed the name given by MacGillivray, as *reticulata* had already been used for another species.

Loc. Victoria; Port Stephens, 5–6 fath.; New South Wales.

Diachoris spinigera, MacG., and *Cellepora bispinata*, B., described from other New South Wales localities, also occur from Green Point.

EXPLANATION OF THE PLATES.

PLATE I.

- Fig. 1.* *Microporella coscinopora*, Rss., var. *armata*, W., $\times 25$.
Fig. 2. The same. Mandible, $\times 85$.
Figs. 3, 4. The same. Opercula of ovicellular and ordinary zoœcia, $\times 85$.
Fig. 5. The same. Section, $\times 25$.
Fig. 6. *Cribriolina clithriadiata*, Waters, $\times 25$.
Fig. 7. The same, decalcified, $\times 25$.
Fig. 8. The same. Mandible, $\times 85$.
Fig. 9. The same. Operculum of ovicelligerous zoœcium, $\times 85$.
Fig. 10. *Cribriolina figuralis*, Johnst., Guernsey, decalcified, $\times 25$.
Fig. 11. *Microporella inversa*, Waters. Three stages of growth, $\times 50$.
Fig. 12. The same, decalcified, $\times 50$. *a*, pore, $\times 250$.
Fig. 13. *Lepralia depressa*, Busk, $\times 25$.
Fig. 14. The same. Operculum, $\times 85$.
Fig. 15. The same. Operculum of ovicelligerous zoœcium, $\times 85$.
Fig. 16. The same. Pores, $\times 85$.
Fig. 17. *Schizoporella filocincta*, Rss., $\times 25$.
Fig. 18. The same. Operculum, $\times 85$.
Fig. 19. *Lepralia vestita*, var. *australis*, W., $\times 25$.
Fig. 20. *Lepralia vestita*, H., Tahiti. Operculum, $\times 85$.
Figs. 21, 22. *Micropora elongata*, H., $\times 25$.

PLATE II.

- Fig. 1.* *Cellepora columnaris*, B., $\times 12$.
Fig. 2. The same. Operculum, $\times 85$.
Fig. 3. The same. Section showing columns, $\times 12$.
Fig. 4. The same. Section cutting the columns transversely, $\times 12$.
Fig. 5. The same. Zoœcium, $\times 25$.
Fig. 6. The same. Avicularian mandible, $\times 250$.

- Fig. 7. Schizoporella ambita*, sp. nov., $\times 25$. *a*, operculum, $\times 85$.
- Fig. 8. Schizoporella levigata*, sp. nov., $\times 25$. *a*, mandible, $\times 250$; *b*, ditto, $\times 85$; *c*, operculum, $\times 85$.
- Fig. 9. Schizoporella mucronata*, Sm., $\times 25$. *a*, operculum, $\times 85$.
- Fig. 10. Schizoporella subinversa*, MacG., var. nov., $\times 25$. *a*, decalcified cell, showing lateral tubular connexions of the avicularian chamber, $\times 85$; *b*, operculum; *c*, operculum of ovicelligerous zoecium, $\times 85$.
- Fig. 11. Schizoporella biserialis*, H., var., $\times 25$. *a*, operculum, $\times 85$.
- Fig. 12. Beania hirtissima*, Hell., var. *conferta*, MacG., $\times 25$. *a*, operculum, $\times 85$.
- Fig. 13. The same.* Dorsal surface, $\times 25$.
- Fig. 14. The same.* Subdiagrammatic figure, showing the zoecia free in the upper part and with one ovicell to the middle zoecium.
- Fig. 15. Rhynchopora profunda*, MacG., $\times 25$, showing young zoecium and stages of growth, $\times 50$.
- Fig. 16. Membranipora lineata*, L., var., $\times 25$.
- Fig. 17. Lepralia Poissonii*, Aud., var. with immersed ovicells, $\times 25$.

PLATE III.

- Fig. 1. Smittia unispinosa*, sp. nov., $\times 25$.
- Fig. 2. The same.* Mandible, $\times 85$.
- Fig. 3. The same.* Operculum, $\times 85$.
- Fig. 4. Smittia (?) signata*, sp. nov., $\times 25$.
- Fig. 5. The same*, $\times 85$.
- Fig. 6. The same.* Operculum, $\times 85$.
- Fig. 7. Smittia obstructa*, sp. nov., $\times 25$.
- Fig. 8. The same.* Operculum, $\times 85$.
- Fig. 9. Smittia prestans*, H., var., $\times 25$.
- Fig. 10. The same.* Operculum, $\times 85$.
- Fig. 11. The same.* Mandible, $\times 85$.
- Fig. 12. Smittia trispinosa*, var. *munita*, H., $\times 25$.
- Fig. 13. The same.* Section showing denticles, cap, operculum, and spines.
- Fig. 14. Smittia malleolus*, H., $\times 25$.
- Fig. 15. The same.* Aperture showing avicularium with ligula, $\times 50$.
- Fig. 16. Smittia Landsborovi*, Johnst. Aperture, $\times 50$.
- Fig. 17. Porella cervicornis*, Pall. Aperture, $\times 50$.
- Fig. 18. Smittia —?*, from Port Phillip. Aperture, showing denticles, $\times 50$.
- Fig. 19. Smittia ophidiana*, Waters. Aperture, showing denticles, $\times 50$.
- Fig. 20. Smittia oculata*, MacG. Aperture, showing denticles, $\times 50$.
- Fig. 21. Smittia cheilostoma*, Mauzoni. Aperture, showing denticles, $\times 50$.
- Fig. 22. Smittia reticulata*, MacG. Aperture, showing denticles, $\times 50$.
- Fig. 23. Smittia trispinosa*, var. *munita*. Aperture, showing denticles, $\times 50$.
- Fig. 24. Smittia delicatula*, B. Aperture, showing denticles, $\times 50$.
- Fig. 25. Mucronella porosa*, Hincks. Aperture, showing denticles, $\times 50$.
- Fig. 26. Mucronella ventricosa*, Hassall. Aperture, showing denticles, $\times 50$.
- Fig. 27. Mucronella Eileri*, H., var. *biavicularata*, W. Aperture, showing denticles, $\times 50$.
- Fig. 28. Mucronella biarcisa*, H. Aperture, showing denticles, $\times 50$.
- Fig. 29. Mucronella rostrata*, H. Aperture, showing denticles, $\times 50$.
- Fig. 30. Mucronella larvis*, MacG. Aperture, showing denticles, $\times 50$.

- Fig. 31.* *Mucronella spinosissima*, MacG. Aperture, showing denticles, $\times 50$.
Fig. 32. *Mucronella diaphana*, MacG. Aperture, showing denticles, $\times 50$.
Fig. 33. *Mucronella Peachii*, Johnst. Aperture, showing denticles, $\times 50$.
Fig. 34. *Smittia Napierii*, Waters, $\times 25$.
Fig. 35. The same, $\times 85$.
Figs. 36, 37. *Erochella longirostris*, Jullien, $\times 85$.
Fig. 38. *Mucronella variolosa*, Johnst., $\times 50$.
Fig. 39. *Smittia Smittiana*, Busk. Aperture, $\times 50$.
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II.—On the Cretaceous Species of *Podoseris*, Dunc.

By Prof. P. MARTIN DUNCAN, M.B. (Lond.), F.R.S., &c.

[Plate V.]

CONTENTS.

List of old and new Species.

Reconsideration of the old and Description of the new Species.

Young Forms of *Podoseridae*.

Remarks upon some Morphological Details.

A VERY interesting collection of Corals, numbering nearly 140 specimens, has been entrusted to me by Thomas Jesson, Esq., F.G.S., who obtained them from the Red Chalk of Norfolk. The species do not assist the stratigraphical geologist in fixing a definite horizon for that interesting Cretaceous deposit. They are all members of the genus of Lophoserine Fungida which I established in 1869, under the name *Podoseris* (Pal. Soc. 1869, Monogr. Brit. Foss. Corals, 2nd ser. pt. ii. no. 1, p. 25) *. The species have not been found away from the Red Chalk. The great variability of the species of this genus was noticed in the essay which contained the generic diagnosis, and it is very evident after examining the collection lately received. The species *P. elongata* and *P. mamilliformis* have some very remarkable varieties, which are now described, and it is satisfactory to find amongst Mr. Jesson's treasures a perfect and unworn specimen of the last-named species. The diagnosis of both of the original species requires slight modification, and it is advisable to add some new species to the genus.

* The genus was considered during the publication of the "Revision of the Madreporaria" (Journ. Linn. Soc., Zool. 1884, vol. xviii. p. 153), and it was placed in the *Podoseridae*, an alliance of Lophoserines. It has of course no affinity with *Rhizangia*, Ed. & II, as has been suggested.





