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North Italian Bryozoa.—Part II. Cyclostomata

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14. NORTH ITALIAN BRYOZOA.—Part II. CYCLOSTOMATA. By ARTHUR Wm. WATERS, Esq., F.L.S., F.G.S. (Read January 27th, 1892.)

[PLATE III.]

THE Chilostomata from the same localities were dealt with in vol. xlvii. (1891) p. 1 of this Journal. It is always unsatisfactory to describe Cyclostomata, as there are so few characters that can be employed in classification, nor are we yet sure as to the relative importance of those used. The difficulties are much increased by the vast number of named species based upon some slight difference in the mode of growth, and in some cases the individual state of preservation has been the ground of a new species.

I have before me a list of 424 names of Tertiary Cyclostomata,¹ which no doubt could be increased to nearly 600, but we are certainly within the mark when we say that of these more than 200 could not be recognized again, while many are known to be only synonyms.

In the Tertiaries *Hornera*, *Idmonea*, *Filisparsa*, and *Entalophora* are by no means sharply-defined genera, and seem to run into one another.

The most interesting species dealt with is a new one, which I have called *Diastopora brendolensis*. It has a tubule to most zoecia, but differs from the living species *D. obelia*, which also has tubules; for in the fossil they run up more by the side of the zoecium, whereas in *D. obelia* they are on the front of the zoecium, about the middle. The zoarium is usually erect, formed by very compressed branches with zoecia on both sides; but there are, besides, some incrusting specimens having similar small zoecia provided with tubules. This would seem to show that those who united under *Diastopora* erect and incrusting forms were right. The genera *Mesenteripora* and *Bidiastopora* are, however, retained by some.

The ovicell by the side of the zoarium of *Hornera serrata* is in a position new for the Cyclostomata.

¹ A similar list of Tertiary Chilostomata comprises about 1400, and I have little doubt that I could bring the list up to 2000. The number of names of Cretaceous species must be as large, and the list of Palæozoic bryozoa also very considerable; from these figures we may see, therefore, that there is an overwhelmingly large field not yet reduced to order.

List of Species.

	Living.	Val di Lonte.	Montecchio Maggiore.	Brendola.	Ferrara di Monte Baldo.	Ronzo.	Crosaro.	Hungary (Pergens).	Malo.	Other Localities.
1. <i>Crisia subæqualis</i> , Reuss*	..*	..*	..*	..*	..*	..*	..*	..*	
2. <i>Diastopora tenuis</i> , Reuss*	* R	..*	..*	..*	..*	..*	..*	..*	
3. — suborbicularis, Hincks	* ..*	..*	..*	..*	..*	..*	..*	..*	..*	
4. — brendolensis, sp. nov.*	..*	..*	..*	..*	..*	..*	..*	..*	
5. <i>Idmonea concava</i> , Reuss*	..*	..*	..*	..*	..*	..*	..*	..*	
6. — reticulata, Reuss*	..*	..*	..*	..*	..*	..*	..*	..*	
7. <i>Filisparsa varians</i> , Reuss	* ..*	..*	..*	..*	..*	..*	..*	..*	..*	
8. — astalis, ? Manzoni*	..*	..*	..*	..*	..*	..*	..*	..*	
9. <i>Entalophora rapipora</i> , d'Orb.	* ..*	..*	..*	..*	..*	..*	..*	..*	..*	Cretaceous.
10. — pulchella, Reuss*	..*	..*	..*	..*	..*	..*	..*	..*	Priabona.
11. — tenuissima, Reuss*	..*	..*	..*	..*	..*	..*	..*	..*	
12. <i>Hornera concatenata</i> , Reuss*	..*	..*	..*	..*	..*	..*	..*	..*	Cretaceous.
13. — serrata, Reuss*	..*	..*	..*	..*	..*	..*	..*	..*	
14. — asperula, Reuss*	* R	..*	..*	..*	..*	..*	..*	..*	Lonigo.
15. — frondiculata, Lamouroux	* ..*	..*	..*	..*	..*	..*	..*	..*	..*	
16. <i>Crassohornera arbuscula</i> , Reuss*	..*	..*	..*	..*	..*	..*	..*	..*	Lonigo.
17. <i>Stomatopora major</i> , Johnston*	..*	..*	..*	..*	..*	..*	..*	..*	
18. <i>Pavotubigera flabellata</i> , d'Orb.*	..*	..*	..*	..*	..*	..*	..*	..*	
19. <i>Defrancia brendolensis</i> , sp. nov.*	..*	..*	..*	..*	..*	..*	..*	..*	
20. <i>Lichenopora hispida</i> , Fleming	* ..*	..*	..*	..*	..*	..*	..*	..*	..*	
21. — incurstans, sp. nov.*	..*	..*	..*	..*	..*	..*	..*	..*	
22. <i>Heteropora subreticulata</i> , Reuss*	* R	..*	..*	..*	..*	..*	..*	..*	Cretaceous.

1. CRISIA SUBÆQUALIS (Reuss).

Crisia subæqualis, Reuss, Bry. von Crosaro, p. 279, pl. xxxiv. fig. 8.

This species occurs from Brendola, and also probably another, but it does not seem possible to determine small fragments nor to compare them with living forms. The fresh joint usually grows out above the third zoecium.

2. DIASTOPORA TENUIS (Reuss).

Discosparsa tenuis, Reuss, Bry. von Crosaro, p. 280, pl. xxxiv. figs. 9, 10:

Discosparsa regularis, Reuss, *op. cit.* p. 280, pl. xxxiv. fig. 11.

Lichenopora tenuis, Pergens, Bry. de Kolosvár, p. 6.

There are small zoaria from Brendola, which are flat and thin, with the zoecia more or less distinctly radial, very little raised, and without interstitial pores, on which account the species is placed under *Diastopora*. This, if not identical with, is closely allied to *Defrancia subdisciformis*, d'Orb. in Reuss, Mitt. u. Ob. Quader, pt. ii. p. 132, pl. xxv. fig. 7.

Loc. Val di Lonte (*Reuss*); Montecchio Maggiore (*P.*); Brendola; Malo (*W.*); Pap-Patak, Pap-Falvi-Patak, Kolos Monostor (*P.*).

3. DIASTOPORA SUBORBICULARIS (Hincks).

Diastopora suborbicularis, Hincks Brit. Mar. Poly. p. 464, pl. lxxi.

fig. 11; Waters, Quart. Journ. Geol. Soc. vol. xl. (1884) p. 689; *ibid.* vol. xliii. (1887) p. 342.

A specimen from Brendola has the zoecial tubes about the same size as the recent and fossil specimens already described, and the ovicell is nearly equal in width and length.

Loc. Living: European Seas. Fossil: Crag; various localities in Australia and New Zealand.

4. *DIASTOPORA BRENDOLENSIS*, sp. nov. (Pl. III. fig. 1.)

Zoaria very much compressed, with the zoecia in more or less regular rows. On many of the zoecia there is a tubule, which usually terminates near the zoecial orifice, and runs parallel with the zoecium, but occasionally it is on the front of the zoecium and terminates near the middle of it.

These tubules are in a somewhat different position from those of the recent *Diastopora obelia*, and, as far as I am aware, tubules are known only in these two cases.

Until this was cleaned with sulphate of soda, I had not seen the tubules and supposed that it was *Idmonea compressa*, Reuss (Wien. Tert. p. 46, pl. vi. fig. 32; Manzoni, Bri. foss. del Mioc. Austr. ed Ung. p. 6), but in that species no mention is made of tubules.

There are zoecia on the dorsal surface irregularly placed; on the front the angular sections of the cells resemble Manzoni's figure 17. Zoecial aperture about 0.06 millim., which is considerably smaller than that of *Diastopora obelia*.

We do not yet understand the function of the tubules, nor do they seem to have received much study, for the only description and figure of their contents is given by Dr. Pergens (Bryozoaires du Crétacé, Bull. Soc. Belg. de Géol. vol. iii. p. 311, fig. 4). Some sections that I have cut correspond fairly with Dr. Pergens's description, and upon examination of my sections I was at once struck with the similarity of the 'fibres allongées' to the various muscles in the zoecia; but in my specimens they form a club-shaped expansion near the extremity of the tubule, and are not arranged in the definite parallel manner figured by Dr. Pergens, being more or less contorted, and a point of considerable interest, not mentioned by that observer, is that the parenchym cord passes through the centre of this bundle of muscles. There are also sometimes muscles lower down attached to the lower part of the parenchym cord, so that this can no doubt be slightly moved by the muscles.

The internal structure seems to support an idea which I expressed long ago, that these tubules are homologous with the avicularia of the Chilostomata; by this I mean that the function has originally been the same. In the avicularia there is a parenchym body in a sheath, which can be pushed slightly forward when the beak is open; and to me this body has always seemed the important part of the avicularium, while, to my thinking, the prehensile theory never rested upon a sufficient basis.¹

¹ See my Supplementary Report on the 'Challenger' Polyzoa, p. 27.

The tubules are not to be looked upon as belonging to the zoecia, but as being of equal individual importance with the zoecia. My sections of the living *Diastopora obelia* are not sufficient to enable me to give a full description of these tubules, and during a recent short visit to the Zoological Station at Trieste this species was not met with, although the writer was specially on the look-out for it.

There are also from the same localities adnate specimens of fossil *Diastopora*, with similar zoecia and similar tubules, and seeing that these very exceptional characters are the same in both there seems sufficient reason for considering them as stages of the same thing. Again, from Malo there are a number of specimens without tubules, but in shape and growth exactly resembling the erect *Diastopora brendolensis*. These Malo forms are no doubt the *D. compressa* of Reuss, though the two may have to be united. It may be asked whether the tubules depend on the condition of growth.

Loc. Brendola; Val di Lonte; Novezzina (Ferrara di Monte Baldo); Malo.

5. *IDMONEA CONCAVA* (Reuss).

Idmonea concava, Reuss, Bry. von Crosaro, p. 282, pl. xxxv. figs. 3, 4; Olig. von Gaas, p. 478; Waters, Ann. Mag. Nat. Hist. ser. 5, vol. iii. p. 271; Seg. Form. Terz. Reggio, pp. 209, 297, 330, 371; Meunier & Pergens, Bry. du Syst. Mont. p. 13; Pergens, Bry. von Wola Lu'zanska, p. 62.

Idmonea gracillima, Reuss (*non* Busk), Bry. von Crosaro, p. 282; Pergens, Bry. Foss. de Kolosvár, p. 6; Bry. von Wola Lu'zanska, p. 63.

There is sometimes considerable difference in the dorsal surface of a specimen, part being very distinctly concave while the rest is almost flat or even convex, and as *I. concava* and *gracillima* were separated only on account of the characters of the dorsal surface I am convinced that they should be united. I would point out that in almost every locality where one of these forms has been found the other occurs also. Dr. Pergens gives a list of ten Hungarian localities where both occur, and this constant appearance together in beds of various ages, and widely separated, should alone make us suspect their identity.

Loc. Val di Lonte; Montecchio Maggiore; Brendola; Ferrara di Monte Baldo; Crosaro; Malo; Mons (Belgium); Wola Lu'zanska; Hungary (*Perg.*); South Bavarian Eocene, Gaas; Pliocene, Italy. Living: Mediterranean.

6. *IDMONEA RETICULATA* (Reuss). (Pl. III. fig. 10.)

Idmonea (Crisina) reticulata, Reuss, Bry. von Crosaro, p. 281, pl. xxxiv. fig. 13.

This is a very interesting species, as showing the *Idmonea* arrangement of the zoecia on the front, whereas the pitted structure on the dorsal surface is a character frequently occurring in *Hornera*, but not in *Idmonea*. *I. reticulata* is very closely allied to, if not identical with *Crisina triangularis*, d'Orb., Pal. Franc. p. 915.

This would be *Crisidmonea* of Marsson.

Loc. Val di Lonte (*Reuss*); Brendola; Crosaro; Montecchio Maggiore; Ferrara di Monte Baldo; Malo.

7. *FILISPARSA VARIANS* (Reuss).

Filisparsa varians, Reuss, Bry. von Crosaro, p. 286, pl. xxxv. figs. 14, 15; Manzoni, Bri. foss. del Mioc. d'Austr. ed Ung. p. 9, pl. vii. fig. 27; Reuss, Olig. von Gaas, p. 479.

Filisparsa tubulosa, Waters, Ann. Mag. Nat. Hist. ser. 5, vol. iii. p. 275.

Hornera biloba, Reuss, Foss. Pol. Wien. Tert. p. 43, pl. vi. fig. 21; Manzoni, Bri. foss. del Mioc. d'Austr. ed Ung. p. 9, pl. vii. fig. 25.

Filisparsa Delvauxi, Pergens, Plioc. Bry. von Rhodos, p. 6.

In specimens from Montecchio Maggiore there are ovicells at the bifurcation on the anterior surface. The ovicell is of a Tubuliporidan character with the opening wide, either directed straight forwards or slightly downwards. This is but a trifle stouter than *F. tubulosa* of the Mediterranean. The openings of the zoecial tubes are 0·2 millim. wide.

Loc. Val di Lonte; Montecchio Maggiore; Brendola; Crosaro; Ronzo; Malo; Gaas; Kostel; Baden; Hungary (*Perg. & Hantken*). Pliocene of Rhodes. Living: Mediterranean.

8. *FILISPARSA ASTALIS* (?) (Manzoni).

Filisparsa astalis, Manzoni, Bri. foss. del Mioc. d'Austr. ed Ung. p. 10, pl. viii. fig. 28.

There are some specimens from Montecchio Maggiore which are usually straight, but one colony dichotomizes at a wide angle. The zoarium is about 0·8 mm. wide, and the zoecia are more or less in series from one side of the zoarium across to the other, with three or four zoecia in a series. Orifice about 0·11 mm. wide. Anterior and dorsal surfaces dotted, and also faint longitudinal lines on the dorsal surface.

This is much like the description of the living *F. tubigera*, d'Orb., and in size it is about the same as *F. ramosa*, d'Orb., as measured by Pergens (Rev. des Bryoz. du Crét. p. 351).

Manzoni makes some species based upon the presence or nature of the dots; but surely this depends upon the state of preservation, as all *Filisparsa* and *Entalophora* have small tubes through the shell, showing as dots.

Seeing that Manzoni did not give measurements or the magnification, it is impossible to be quite sure about the identification of his species.

Loc. Montecchio Maggiore; Malo.

9. *ENTALOPHORA RARIPORA* (d'Orbigny).

(?) *Entalophora attenuata*, Reuss, Bry. von Crosaro, p. 286, pl. xxxvi. figs. 1, 2.

For other synonyms, see my 'Foss. Cyclost. Bry. from Australia,' Quart. Journ. Geol. Soc. vol. xl. (1884) p. 686; Pergens, 'Rev.

des Bry. du Crét. fig. par d'Orb.' p. 359; and Miss Jelly's 'Synonymic Catalogue.'

There is also, though less common, a more slender *Entalophora* from Brendola and Montecchio Maggiore with much smaller zoecial tubes (0.09 mm.), and this I am unable to identify with any named species, but am inclined to think that Reuss and Manzoni have caused some confusion between *E. anomale* and *E. attenuata*, and that *E. anomale* should have been the stout *E. raripora*, while *E. attenuata* is the more slender form.

Loc. Cretaceous of Europe (generally distributed); Eocene, Miocene, and Pliocene of Europe. Tertiaries of Australia and New Zealand. Val di Lonte; Montecchio Maggiore; Brendola; Crosaro; Ronzo; Malo. Living: Europe; Australia; Florida; Heard Island.

10. *ENTALOPHORA PULCHELLA* (Reuss). (Pl. III. fig. 12.)

Cricopora pulchella, Reuss, Foss. Polyp. Wien. Tert. p. 40, pl. vi. fig. 10.

Cricopora verticellata, Reuss, *op. cit.* p. 40, pl. vi. fig. 9.

Spiropora pulchella, Reuss, Bry. von Crosaro, p. 287, pl. xxxvi. figs. 4, 5.

Spiropora conferta, Reuss, Bry. von Crosaro, p. 287, pl. xxxvi. fig. 3; Manzoni, Bri. foss. del Mioc. d'Austr. ed Ung. p. 12, pl. x. fig. 39.

Pustulophora pulchella, Stoliczka, Olig. Bry. von Latdorf, p. 77; Manzoni, Bri. foss. del Mioc. d'Austr. ed Ung. p. 11, pl. ix. fig. 35.

Entalophora pulchella, Pergens, Bry. de Kolosvár, p. 6; Bry. von Wola Lu'zanska, p. 65; Revision des Bry. du Crét. p. 358, which see for synonyms of Cretaceous forms; Reuss, Foram. Anth. und Bryoz. des deutsch. Septarienthones, p. 194, pl. ix. fig. 5; Bry. und Foram. des unt. Pläners, p. 116, pl. xxix. fig. 3; Fauna d. Steinsalz von Wieliczka, p. 124.

Entalophora clavula, Reuss, Foram., &c., des deutsch. Septarienth. p. 194, pl. ix. figs. 3, 4 (*non* Reuss, Foss. Polyp. Wien. Tert. p. 41).

The lower part of the zoarium has the zoecia irregularly placed, that is to say is *E. pulchella* of Reuss, while the upper part has them verticillate and is the *Spiropora conferta* of Reuss. I have never found the irregular growth following the regular. Dr. Pergens agrees with me that in this species part grows as *Spiropora* and part as *Entalophora*; but he thinks, as it is not found in other cases, that we should not on this account unite the two genera. Although we cannot, however, expect hard and fast generic lines, yet it does seem that when the characters of the two genera are found in one stem this is, as I have proposed, sufficient reason for dropping the genus *Spiropora*.

The specimen figured in Pl. III. has three inflations which must be looked upon as ovicellular, and the zoecia are here more irregular in consequence of the inflations.

Loc. Val di Lonte; Montecchio Maggiore; Brendola; Ferrara di

Monte Baldo; Malo; Priabona; various localities in Hungary (*Pergens* & *Hantken*); Latdorf; Castelarquato; Eisenstadt, &c. Söllingen; Cenomanian of Saxony (?).

11. *ENTALOPHORA TENUISSIMA* (Reuss).

Spiropora tenuissima, Reuss, Bry. von Crosaro, p. 288, pl. xxxvi. fig. 6.

Specimens from Brendola, with delicate zoarium and narrow zoëcia arranged in verticillate manner, are no doubt what Reuss described, but I am by no means sure that this is a good species.

12. *HORNERA CONCATENATA* (Reuss).

Hornera concatenata, Reuss, Bry. von Crosaro, p. 283, pl. xxxv. figs. 5, 6.

Hornera concatenata, Waters, 'Closure of the Cyclost. Bry.,' Journ. Linn. Soc. vol. xvii. pl. xvii. fig. 2; *Pergens*, Bry. von Wola Lu'zanska, p. 63; Bry. Garumnicns de Faxe, p. 217.

Hornera subannulata, Phil., Tert. Verstein. N.W. Deutsch. p. 36, pl. i. fig. 9; Stoliczka, Olig. Bry. von Latdorf, p. 79, pl. i. fig. 4; Reuss, Fauna des deutsch. Oberolig. p. 58; Reuss, Foram. Anth. und Bryoz. des deutsch. Septarienth. p. 195, pl. x. figs. 2, 3.

The zoëcia occur in pretty regular series extending nearly across the zoarium. The closure is low down in the zoëcial tube.

Loc. Val di Lonte; Montecchio Maggiore; Brendola; Ferrara di Monte Baldo; Crosaro; Ronzo; Malo; ten localities in Hungary (*Perg.*); Ofenér Mergel (*Hantken*); Bavaria; and Upper Cretaceous (*Perg.*):

13. *HORNERA SERRATA* (Reuss; *non* d'Orb. & *non* Menegh.). (Pl. III. fig. 11.)

Hornera serrata, Reuss, Foss. Bry. von Crosaro, p. 285, pl. xxxv. figs. 10-11.

This very small species, on the anterior surface closely resembling *H. concatenata*, Reuss, is distinguished by the posterior surface on which the zoëcial lines spread out alternately. I have not in my specimens seen any indication of this being the terminal branch of *H. concatenata*; the possibility might, however, be kept in view. The bordering lines on the dorsal surface unite before the median line of the zoarium, but a ridge is continued to each of the two next zoëcia, and it will be seen that in this as well as some of the other *Idmonea* the zoëcia extend far back on the dorsal surface.

In a specimen from Montecchio Maggiore there is an ovicell entirely at the side of the zoarium, and as far as I know this is the first time that an ovicell has been found in this position. It is only indicated by the dotted lines in the figure, as that is drawn from a Brendola specimen.

Loc. Val di Lonte (*Reuss* & *W.*); Montecchio Maggiore (*G.* & *W.*); Brendola; Ferrara di Monte Baldo.

14. *HORNERA ASPERULA* (Reuss). (Pl. III. fig. 7.)

Hornera asperula, Reuss, Bry. von Crosaro, p. 284, pl. xxxv. figs. 8, 9.

Hornera d'Achiardi, Reuss, *op. cit.* p. 285, pl. xxxv. fig. 12.

This is a very small species, and in specimens from Brendola numerous short branches grow at right angles to the main branch. There is no serial arrangement of the zoecia as in *H. concatenata*, and in the younger ends there is a longitudinal ribbing as figured in *H. d'Achiardi*, whereas the older part is plain.

Loc. Val di Lonte (*Reuss*); Brendola; Montecchio Maggiore (*Gott.*); Ferrara di Monte Baldo; Lonigo.

15. *HORNERA FRONDICULATA* (Lamouroux).

For synonyms, see Jelly, Catal. of Marine Bryozoa, p. 115, and add:

Hornera trabecularis, Reuss, Bry. von Crosaro, p. 284, pl. xxxv. fig. 7.

H. trabecularis of Reuss represents the growing end of *H. frondiculata*, and Pergens has already indicated that they are synonymous. There are also stouter basal portions from Brendola.

Loc. Widely distributed in the Eocene, Miocene, and Pliocene of Europe, and in the Australian Tertiaries; Wanganui, New Zealand; Val di Lonte (*Reuss*); Montecchio Maggiore; Brendola; Malo; Crosaro; Ronzo. Living: Mediterranean; Cape Verd.

16. *CRASSOHORNERA ARBUSCULA* (Reuss). (Pl. III. figs. 5, 6.)

Ceriopora arbusculum, Reuss, Foss. Polyp. Wien. Tert. p. 34, pl. v. figs. 12, 13.

I had not seen this species when I described *Crassohornera waipukerensis* (Quart. Journ. Geol. Soc. vol. xliii. p. 349), but, as I then said, they are very closely allied. In the Montecchio Maggiore specimens the entire surface is covered with shallow pits, with a pore in the centre, those on the dorsal surface being the smaller. The ovicell, which is dorsal, extends over nearly the whole width of the zoarium, and the pits on its surface are more angular than those on the zoecia.

The zoarium starts with a flat base, and, after growing vertically for a very short distance, grows horizontally, with numerous short branches on each side. The position of the ovicell indicates that we have to do with more than a basal growth, and shows relationship with *Hornera*, nor is it by any means certain that a second genus is required.

Manzoni (Bri. foss. del Mioc. d'Austr. ed Ung. p. 18, pl. xi. fig. 43) says this is probably the same as *Ceriopora globulus*, *C. cylindrica*, &c., but with this opinion I am unable to agree. There is also *Ceriopora arbusculus*, Roemer, from Söllingen, which, though named independently, is very similar.

Loc. Val di Lonte (*Reuss*); Montecchio Maggiore; Brendola; Lonigo.

17. STOMATOPORA MAJOR (Johnston).

For synonyms, see Waters, Quart. Journ. Geol. Soc. vol. xliii. (1887) p. 342.

A specimen from Val di Lonte would seem to be this species, and I believe that the *Diastopora echinata*, Reuss, Foss. Polyp. Wien. Tert. p. 52, pl. vii. figs. 14, 15, and *Alecto echinata*, Manzoni, Bri. foss. del Mioc. d'Austr. ed Ung. p. 16, pl. xiv. fig. 57, are also this species.

The zoecia have an internal diameter of about 0.15 mm.

18. PAVOTUBIGERA FLABELLATA (d'Orbigny).

Pavotubigera flabellata, d'Orb., Pal. Franç. p. 767, pl. 752. figs. 4-8; Waters, Quart. Journ. Geol. Soc. vol. xl. (1884) p. 691.

There are some specimens with the point of origin excentric, just as figured by d'Orbigny, while in some the colonies are almost discoid, and others again are semicircular; this last is probably a younger form and has been described by Reuss as *Defrancia dimidiata*. It would seem that in these various forms we have only stages of growth before us.

Loc. Cretaceous, Meudon; Tertiary of Australia, Aldinga; Brendola; Montecchio Maggiore.

19. DEFRANCEA BRENDOLENSIS, sp. nov. (Pl. III. figs. 2-4.)

Zoarium stalked, then spreading out and forming a lamina, which has radiate lines underneath. Upper part of the zoarium more or less cup-shaped, with usually 10 to 12 very stout and much raised rays, with the zoecia opening to the outside of the zoarium. Centre of the cup pitted. In one specimen there is no lamina, and in this case there is a regular increase in size from the base, making the zoarium funnel-shaped, and the under surface has large pits, so that it then does not differ from the Cretaceous *Bicavea urnula*, d'Orb., Pal. Fr. pl. 776, fig. 2.

D. brendolensis is allied to the *Discotubigera insignis*, Manzoni (Bri. foss. del Mioc. d'Austr. ed Ung. p. 17, pl. xvi. fig. 64); to *Defrancia (Pelagia) Beyrichii*, Reuss (Septar. p. 193); to *Bicavea*, d'Orb., and possibly *Discocytis*, d'Orb.

Loc. Brendola; Montecchio Maggiore.

20. LICHENOPORA HISPIDA (Fleming).

Tubulipora stelliformis, Reuss, Foss. Polyp. Wien. Tert. p. 49, pl. vii. fig. 4.

Defrancia interrupta, Reuss, Bry. von Crosaro, p. 258, pl. xxxiv. fig. 12, pl. xxxvi. fig. 9.

Loc. Living: European Seas; Australia; Tristan d'Acunha. Fossil: Miocene, Eisenstadt and Mörbisch; Pliocene, Crag, Calabria. Australia; New Zealand. Brendola; Val di Lonte; Crosaro; Montecchio Maggiore.

21. LICHENOPORA (?) INCRUSTANS, sp. nov. (Pl. III. figs. 8, 9.)

Zoarium incrusting as a single layer. Zoecia opening vertically with strong bars radiating out to the neighbouring zoecia.

Until this was properly cleaned it looked like *Diastopora*. There are no signs of a radial or discoid growth and the structure reminds us of that of *Heteropora*, so that it is difficult to know where it should be generically placed.

I have not had suitable material for making sections in order to study whether the cross-bars are hollow.

Loc. Brendola and Montecchio Maggiore.

22. *HETEROPORA SUBRETICULATA* (Reuss).

Heteropora subreticulata, Reuss, Bry. von Crosaro, p. 288, pl. xxxvi. fig. 7; Pergens, Bry. von Wola Lu'zanska, p. 65.

Heteropora reticulata, Marsson (*non* Busk), Bry. Rügen. Kreide, p. 26, pl. ii. fig. 4.

A specimen from Brendola twice dichotomizes. Zoarium about 1 millim. wide. This, I believe, is the same as a specimen I have seen from the Chalk of Gravesend and which was then considered to be *Clausa micropora*. As already remarked by Reuss, the zoecia are more abundant upon the one side than upon the opposite. The cancelli are situated in deep pits, and in well-preserved specimens are much smaller than the oral apertures. Oral aperture about 0.07 mm. wide.

Loc. Val di Lonte (*Reuss*); Brendola; Malo; Wola Lu'zanska. Cretaceous, Rügen.

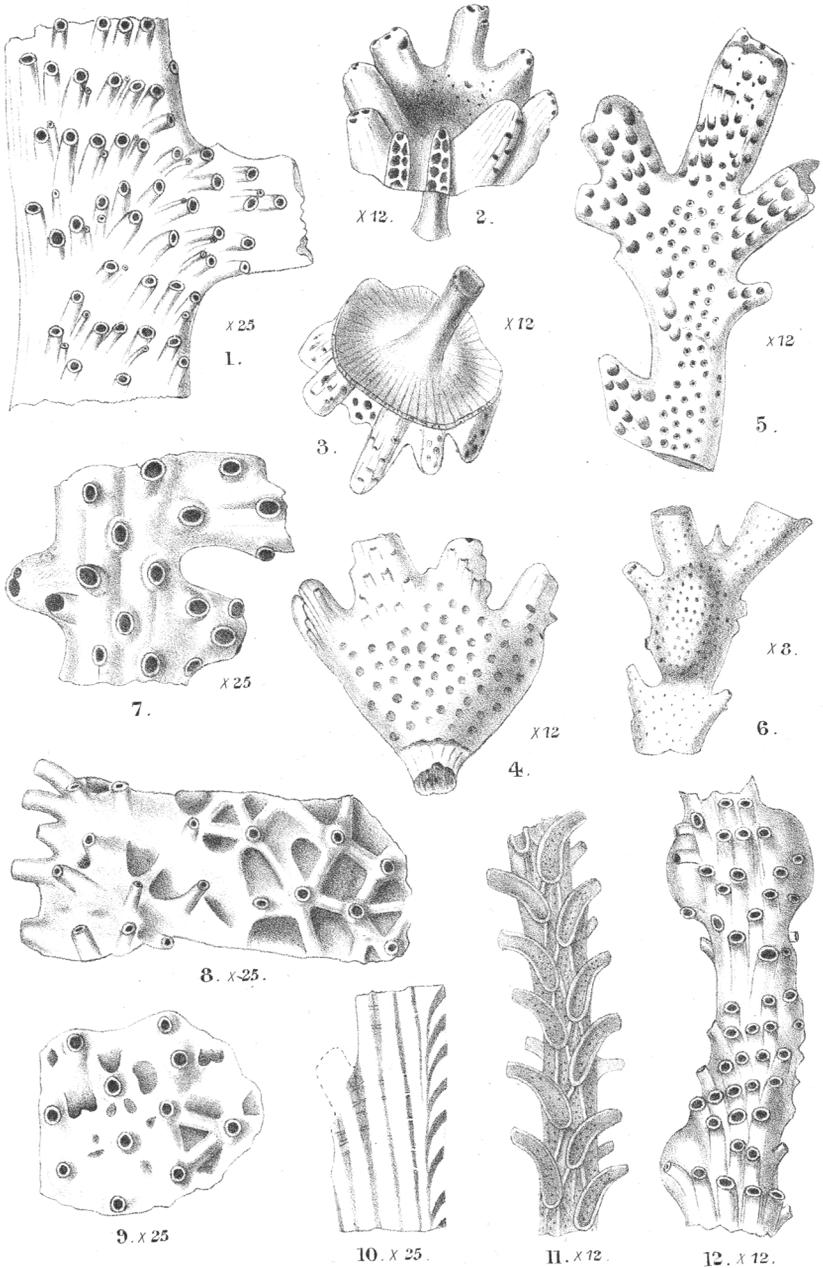
Note.—To the Chilostomatous species mentioned in my previous paper I would add *Microporella distoma*, Busk, from Malo, Novezzina, and Crosaro.

EXPLANATION OF PLATE III.

- Fig. 1. *Diastopora brendolensis*, sp. nov., × 25.
 Figs. 2-4. *Defrancea brendolensis*, sp. nov., × 12.
 Figs. 5, 6. *Crassohornera arbuscula*, Reuss, × 12 & 8.
 Fig. 7. *Hornera asperula*, Reuss, × 25.
 Figs. 8, 9. *Lichenopora incrustans*, sp. nov., × 25.
 Fig. 10. *Idmonea reticulata*, Reuss. Section, × 25.
 Fig. 11. *Hornera serrata*, Reuss. Dorsal surface, × 12.
 Fig. 12. *Entalophora pulchella*, Reuss, showing ovicellular inflations, × 12.

DISCUSSION.

Dr. G. J. HINDE said that the revision of the characters and classification of the Bryozoa, so carefully carried out by Mr. Waters, was of considerable importance to all students of these forms.



A.W. Waters del.

A. Hollick lith.

NORTH ITALIAN BRYOZOA-CYCLOSTOMATA.