

reversed his engine, put on brakes, and whistled loud and very alarmingly, 'but he took no notice, his attention seemed to be on the coal train.' Death must have been instantaneous. There could be no pain, not even a momentary feeling of alarm or fear. The double noise gave no warning of the engine behind, and he was struck, unconscious of danger, and not even turning from his watching of the other receding train." These are the simple facts as recorded by Sir Wm. Jardine in the work already referred to. His remains were deposited in the graveyard of Deerhurst Church, between Tewkesbury and Gloucester, in the family vault. His entire ornithological collection was presented to the new museum of the University of Oxford, under the condition of being always open for scientific consultation, and a large number of specimens and skeletons, illustrating the comparative anatomy of birds, were presented to the museum at Worcester.

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NOTES ON BRITISH EOCENE POLYZOA. BY GEORGE ROBERT VINE.

PLATE V.

In the early part of 1887 Mr. G. W. Shrubsole, F.G.S., of Chester, made over to me, for description or otherwise, a slide of London Clay Polyzoa. This slide contained five specimens, comprising four species at least, and I believe that it represented the whole of the Polyzoa discovered by his brother when investigating the prolific London Clay fauna of Sheerness.

In addition to this series I have my own private collection which has been accumulating for years, but unavoidably slowly, and I have also had the advantage of studying collections from the Isle of Wight beds, which form parts of the private collections of others. I am also indebted to Prof. T. Rupert Jones, F.R.S., Charles D. Sherbon, and Alfred Bell, Esq., either for the gift, or loan, of Polyzoa derived from various Eocene horizons.

In 1850 William Lonsdale published, in Dixon's "Geology of Sussex," descriptions of four species of Eocene Polyzoa.

1. *Eschara Brongniarti?* M. Edw., Tab. i., fig. 9.

2. *Cellepora* ? *petiolus*, Lonsd., Tab. i. fig. 10, p. 151.
3. *Lunulites urceolata* ? Lamk., Tab. i., fig. 8, and
4. *Idmonea coronopus* DeFrance, Tab. ix., fig. 24, p. 153.

As these will be referred to again further on it will be useless to make remarks on the species.

In Morris' catalogue of British Fossils (1854), and also in the Palæontological part of Jukes's "Student's Manual of Geology" (1857), the following species and their horizon are indicated :—

1. *Flustra crassa*, Desm. London Clay: Primrose Hill.
2. *Eschara Brongniarti*, Lonsd. „ „ ; Bracklesham Bay.
3. *Cellepora petiolus*, Lonsd. Mid-Eocene, Bracklesham.
4. *Lunulites urceolatus*, Lamk. *Coscinoporis pileolus*, Phill. and Wood, Mid-Eocene, Bracklesham.
5. *Idmonea coronopus*, DeFr. Mid-Eocene, Bracklesham Bay.

In 1866 Mr. George Busk, F.R.S., published in the Geological Magazine (Vol. iii., p.p. 298-302), a description of "Three species of Polyzoa from the London Clay at Highgate, in the collection of W. T. Wetherell, Esq., F.G.S." The plate containing the figures were drawn, but never published, by J. De Carle-Sowerby, and this, with the figures of Lonsdale in Dixon's Geology of Sussex, are the only illustrations of British Eocene Polyzoa that I am acquainted with. As regards the literature three other references will complete the list also.

In Phillip's work on the Geology of Oxford and Valley of the Thames (ed. 1871), I find the following reference. After giving a rather full list of Polyzoa, ranging throughout the whole of the Cretaceous epoch (pp. 434-436), the author refers briefly to the Eocene strata within the drainage of the Thames, and Polyzoa are mentioned, but genera only, no species are given.

*Horizon* : London Clay ; *Cellepora*, *Crisia* ? and *Eschara*.

„ Thanet Sands and Woolwich beds. *Flustra*? *Lunulites*.

In the "Catalogue of Tertiary Fossils" in the School of Mines (1878), I find references to the following species only :—

*Flustra crassa*, Desm. Thanet Sands, p. 7.

„ sp. Woolwich and Reading beds, p. 10.

*Flustra crassa*, Desm. London Clay, Highgate, p. 14.

Polyzoon „ „ Sydenham, p. 14.

In my “British Association Report on Fossil Polyzoa (1884-5), and also in the supplementary part of the Report on Recent Polyzoa” (1885-6), I referred to, and gave all that was known of the Fossil species, and a full reference, as far as I was able to at the time, of foreign horizons of Eocene and Miocene Polyzoa.

When compiling material for the Tertiary division of my British Association Report on Fossil Polyzoa (5th of the series), relying upon a general experience of the subject, I naturally suggested that the poverty of a British Eocene Polyzoa fauna may be ascribed to want of research rather than to a positive absence of forms. My suggestion was futile, and I have learned since that Eocene Polyzoa is indeed scarce, both in this country and on the continent. My friend, Mr. Bell, writing me on the subject, goes into the question rather fully, and as there is a scientific value in his remarks I cannot forbear quoting and endorsing his views.

“Considering the richness of other sections of organic life in the Eocene, the great poverty of the Molluscoida; Brachiopoda and Polyzoa, is very remarkable, and this poverty does not arise from an oversight on the part of collectors, or for want of looking for. Some thousands of specimens having passed through the hands of one or other of us, it is possible to speak with some amount of certainty upon this head. Of the few species listed, *M. Lacroixii*, *Flustra crassa*, and *Lunulites urceolatus*, are the commonest, but are by no means abundant; and the first two have a wide range in Eocene time. Neither do they occur in any quantity in the Continental Eocene fauna, as an examination of some thousands of shells from the Paris basin will expose an equal sparseness.

The cause of this absence is difficult to explain, as far as the free-growing Cyclostomata are concerned, unless that the soil, or food, or other conditions of life, was not favourable for their development. For the adnate Cheilostomata, the want of such shells or adherent surfaces proper for their habitat may be sufficient cause.

Reasoning from the rich Crag fauna, it would appear that Polyzoa

require certain genera of Mollusca, and only certain species of these are selected, dead shells and shell banks among the bivalves especially being in demand, *Pecten opercularis* and *P. Gerrardii*: *Pectunculus*, *Cytherea rudis*, *Pholas*, *Solen*, *Tellina crassa* and *obliqua*, *Fusus antiquas*, *Nassa* and *Collumbella*. Other genera are less so, and of these *Fissarella*, *Capulus*, *Buccinum*, *Purpura tetragona*, *Ostrea*, and *Cardium*, are the chief. Terebratulæ are good hunting grounds in the Coralline, but not in the Red Crag. With the exception of *Solen*, *Pectunculus*, and others, these genera are rare, or at least numerically so, individually in the Eocenes, and of these it may be said that very few examples are known in a worn or "dead" condition. Drifted shell banks are not common. Most of the species are in their native haunts, or where they have been removed, the genera, such as *Cyprina*, are not those selected for attachment.

The conditions of life again are not favourable: the Eocene of England consisting of either sharp sand or muddy clay, estuarine or fresh water beds.

Sharp sand is also unfavourable for preservation, as in the case of the Oldhaven sand at Bromley, where the *Pectunculi* are in millions, with the surface nearly all decorticated, and in the London Clay, casts of the shells are alone preserved (save a few portions of the test) in a pyritised condition.

There is only one other reason I can suggest for their absence, *i.e.*, that the Molluscoida had reached their apogee in the Cretaceous period, and only few genera and individuals represented this class of organisms, till other times and conditions more favourable to their existence came in, in other words, they were non-existent.\*

In the following monograph, for the sake of future students, I have collected together all that is known respecting the few Eocene species, but whenever I could I have corrected the older work by references to my own and the loaned collections; the new species and varieties are additions to all previous lists, and described from examples in my own cabinet.

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\* Brit. Assoc. Report on Recent Polyzoa, 1885-6, p. 192 of Report.

	Thanet.	London Clay.	Bagshot and Bracklesham.	Barton.	Oligocene.	Recent.	My own Cabinet.
Genera and Species.							
Cheilostomata, Busk.							
1		×					
2		×	×		×	×	✓
3	×	×					✓
4			×				
5			×			×	
						×	
6		×					✓
						×	
7		×	×				✓
		×					✓
8		?	×				✓
9			×				✓
10			×	×			✓
11		×				×	
12			×	×			✓
Cyclostomata, Busk							
13		×				×	
14		×	×			?	✓
15		×					✓
16			×				✓
17			×				

\* I. Atlantica?

† Allied to if not identical with Reuss's species.

DESCRIPTION OF SPECIES.\*

Generally I have followed the classification of Mr. Hincks in British Marine Polyzoa. Some of the species, however, especially those adopted from Mr. Busk and Mr. Lonsdale, I have allowed to remain under the generic terms adopted by these respected authors.

Sub-Order CHEILOSTOMATA Busk.

Family GEMILLARIDÆ Busk.

Genus, DITTOSARIA, Busk.

1866. Polyzoa of the London Clay, Geol. Mag., vol. III., p. 3.

*Zoarium* rigid, calcareous, dichotomous. *Zoecia* adnate by the back, and throwing out a double cell at each dichotomy.

\* NOTE.—Nearly the whole of the species of Eocene Polyzoa referred to in this paper have been figured, and the reader will find at the end ample descriptions of the plate v.

1. DITTOSARIA WETHERELLI, Busk. Geol. Mag., vol. iii., p. 4, pl. xii., fig. 3.

Allied to *Gemellaria loricata*, but the orifice of the Zoecia is much smaller and nearly round. Mr. Busk says that "the wall of the cell is sparsely punctured so as at first sight to suggest a suspicion that the species may belong to the cyclostomatous sub-order, but close examination of the orifice will show, I think, signs of the articulation of an operculum, were not the ventricose form of the cell itself a sufficient indication of the true place of the species."

*Habitat*: On Stone?

*Horizon*: London Clay, Highgate. Collection of N. T. Wetherell.

Family MEMBRANIPORIDÆ.

2. MEMBRANIPORA Lacroixii, Busk. Geol. Mag. vol. iii., 1866.  
 ,, Lacroixii, Savigny, Egypt. pl. 10, fig. 10.  
 ,, Lacroixii, Busk, B. M. Cat. p. 60, pl. 69.  
 ,, Lacroixii, Hincks, B. M. Pol. p. 129; pl. xvii.  
 Flustra distans, Hassall, Johnston.  
 ,, Peachii, Couch.  
 Conopeum reticulum, Gray.

There are in the Eocene rocks fragments of a species of *Membranipora* allied to, if not identical with, this widely distributed form. Mr. Busk, in describing three species of Polyzoa from the London Clay at Highgate,\* says, "I am unable to perceive any essential difference between the form here represented and the existing species (*M. Lacroixii*). . . . In general aspect and mode of growth, . . . the two agree very closely. The only distinction I am able to draw between the Eocene and recent form, as exemplified in a specimen now before me, collected by the late Mr. W. Thompson, of Belfast, at Portmarnoch, consists in the somewhat greater thickness of the septa in the former. The two agree also in the circumstance that in the septa of the more worn cells there is an appearance of minute distant pores, which is quite in accordance with the existence in very perfect specimens, of extremely delicate marginal spines.

*Habitat*: On Shells and Stones, &c.

\* Geol. Mag. 1866, vol. iii., p. 2.

*Horizon*: Oyster beds, Colwell Bay (Prof. Judd); Bracklesham beds, Isle of Wight; London Clay: Walton-on-Thames (C. D. Sherborn); Highgate.

In examples of the above species from Colwell Bay, especially whenever the sides of the cells are exposed, the delicate communication pores, three in number (Rosettenplate), are seen to perfection, much better preserved and less calcified than in some of the more recent specimens in my possession.

3. MEMBRANIPORA? CRASSA, Desmar.

*Flustra crassa*, Desm., of authors.

I only know the species by a poorly preserved example which I should not care to attempt a description of. As the species is quoted in School of Mines Catalogues it may be well to retain it in the list of Eocene Polyzoa.

*Horizon and Locality*: Thanet Sands; London Clay, Highgate; (School of Mines collection.)

4. BIFLUSTRA (MEMBRANIPORA) EOCENA, Busk.

= *Biflustra eocena*, Busk, Geol. Mag. vol. iii., p. 3, pl. xii., fig. 2.

*Zoarium* irregular, infundibuliform. *Zoecia* oblong, arched above; septa granular, double: aperture sub-oval or rounded, the lower border thickened, granular.

*Horizon and Locality*: London Clay, Highgate.

In a memoir "Les Bryozoaires du Systeme Montien, (Eocene inferior),"\* the authors describe a very beautiful species under the name *Biflustra symmetrica*, in the *Zoarium* of which the cells are much better preserved than in our own. The areas are rather more elongated than in *B. eocena* and the septa well granulate. Not much detail can be got from the London Clay example, as, being embedded in a mass of *Septaria* the *Zoarium* and *Zoecia*, have suffered in consequence.

5. DIACHORIS INTERMEDIA, Hincks.

1881. = *D. intermedia*, Hks., Ann. Mag. Nat. Hist., Aug., p. 133.

1885. *D. intermedia*, Waters; A. Bell, Brit. Assoc. Rep. p. 195.

Quoted by Mr. Bell in the Eocene list supplied to me while the Report on Recent Polyzoa was passing through the press.

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\* A. Meunier and Ed. Pergens Louvain, 1886.

*Horizon* : Bagshot Beds, Isle of Wight.

I have no knowledge of the Eocene example of this species. Those examples described by Mr. Hincks in 1881, of which *D. intermedia* was one, were Australian forms generally ; *D. intermedia* is from Tasmania.

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Family CRIBRILINIDÆ, Hincks.

Genus MEMBRANIPORELLA (part) Smitt.

1880. Hincks, Brit. Mar. Polyzoa, p. 199.

For remarks on this beautiful genus, which in the Brit. Marine Polyzoa follows the *Cribrilina* group, see the above. "*Membraniporella* is strictly a transitional form ; but as its spines, in the adult condition, are so modified as to form a front wall which rises above the margin and roofs in the area, its place would seem to be amongst the Cribrilinidæ." Species of the genus have a very wide geographical distribution, but I have no fossil range to refer to.

MEMBRANIPORELLA NITIDA, Johnston. See Hincks, Brit. Mar. Polyzoa, p. 200.

The range of variation in this species is so great in recent examples that I hardly care to create a new specific name for this Eocene form.

6. MEMBRANIPORELLA NITIDA, Johnst. Var. *eocena*, var. n.

As in recent species the front of the *Zoœcia* is disposed in lines, varying from twenty to twenty-six (10 or 13 on each side of the mid-rib) in number. Unlike *M. nitida*, the lines at the base of the Zoœcia, eight in number, are formed after the manner of *M. melonantha*, Busk, but the cells are contiguous, not produced. Hincks says nothing about punctures in these flattened ribs, but in the eocene variety there are from three to four in some of the horizontal ribs. Otherwise the description of the recent species in Brit. Mar. Polyzoa will serve for this variety as well as regards the *Oœcia*, *avicularia* and general outline of the Zoœcium.

*Horizon*: London Clay, Isle of Sheppey (discovered by Mr. Shrubsole).

In my own cabinet I have several recent examples of *M. nitida* from Guernsey and the Red Sea, and so variable is the ornamentation



of the species that one naturally hesitates increasing the nomenclature of the species. The arrangement of the ribs at the base of the cell is sufficiently distinctive of the variety.

7. MICROPORELLA VIOLACEA, Johnst. Var. (*a*), FISSA, Waters.

1880. Microporella fissa, Hincks. Contrib. Gen. Hist. Mar. Poly.

Ann. Mag. Nat. Hist. Ser. 5, vol. vi., p. 381, pl. xvii., f. 4.

1881. Microporella violacea var. fissa, Waters. Quar. Jour. Geol.

Soc., vol. xxxvii., p. 329, pl. xv., fig. 26, pl. xvii., f. 73.

Mr. Waters describes in his "Fossil Chilostomatous" Boyozoa from S. W. Victoria, Australia, a peculiar variety of the widely distributed *M. violacea*. The Zoarium is *Eschara-form*, flat and depressed. Zoecia pyriform or oval, much raised, surrounded by a row of pores, or in old and worn cells covered with pores. The peculiar character of the Zoecia of *M. violacea* will be seen if the student will refer to Brit. Mar. Polyzoa, vol. ii., pl. xxx., figs. 1 and 2, and in *M. plagio-pora*, var. *b*, the Crag form of *M. violacea* in the same plate. Intercalary cells, much smaller than the regular Zoecia, are shown in fig. 4.

The London Clay variety of *M. violacea* seem to combine all the variations pointed out by Mr. Hincks and Mr. Waters in their description of *Leprealia plagio-pora*, Busk, and *M. violacea*, var. *fissa*, Waters.

Var. *b*. There is still another variety of this species in my collection, but I have not sufficient material at my disposal to venture on a wider separation. This is *Eschara-form* like the *fissa* variety, but the Zoecia are smaller and the slit beneath the small pore, either entirely absent or less pronounced, the front of the cell being almost or entirely punctate.

*Horizon and Locality*: Bracklesham beds, Isle of Wight.

8. ESCHARA ? BRONGNIARTII, M. Ed.

1836. Eschara Brongniarti, M. Ed. Ann. des Sc. Nat. 2nd series,  
lvi., pl. xi., figs. 9-9*b*.

1838. ,, ,, M. Ed. Rech. sur les Polypes, and sur  
Eschares fossiles; Paris basin.

1850. ,, ,, ? Lonsdale. Geol. Sus., Tab. 1, figs. 9-9*c*

Zoarium foliaceous. Zoecia symmetrically placed in the opposite layers, not overlaid at either extremity, pear shaped, bounded by a

row of foramina; surface area small, nearly solid; mouth in same plane with surface large, semioval, curved margin, slightly raised, straight or proximal margin flat, slightly inclined inwards; "one or two foraminated vesicles at proximal angles of mouth;" interior of cells nearly similar in shape to exterior; lateral connecting foramina numerous near base of wall, terminal two; dorsal surface of opposite layers not separable, extremely thin; walls of adjacent cells separable, glossy but uneven.

*Horizon*: Bracklesham beds, Isle of Wight (Mr. Bell's collection).

I have no doubt but that the fragments in my cabinet belong to this species, as they answer the very full description of Lonsdale, but it is to be hoped, after the publication of the present monograph, that more attention will be given to the collection of Eocene Polyzoa.

9. *ESCHARA* sp.

There is a fragment of a species of *Eschara* (?) in my Eocene collection, which for the present I leave as above, as I am unable to identify it. The form is quite distinct from all others that I have described.

*Horizon*: Bracklesham beds, Isle of Wight.

10. *CELLEPORA PETIOLUS*, Lonsdale.

1850. *Cellepora* ? *petiolus*, Lonsd. Dixon's Geol. of Sussex, p. 151, pl. i., f. 10.

1854. *C. petiolus*, Lonsd. Morris' Catalogue.

1867. *Orbitulipora petiolus*, Reuss. Über, Bryoz. aus dem deutsch Unteroligocän, p. 217.

? ,, Haidingeri, Stol oligoc. Bryoz. v. Latdorf.

1878. *Cellepora petiolus*, Lonsd. Catalogue School of Mines.

*Zoarium*, disc-shaped, attached by a short cylindrical hollow pedicle, situated on the edge of the disc. *Zoecia*, in opposite layers, but without intermediate laminae; rows in each layer radiating from the centre, irregularly alternate; cells globular, peristome prominent, bounded by a deep groove; orifice round or slightly oval. *Oecia*, large, semi-globular, covering the proximal portion of the cell; "affecting more or less the size of the cellular mouth opening into vesicle within the cell." Surface sometimes provided with a minute tubercle near distal edge.

*Horizon*: Barton beds; Whitecliffe Bay; Bracklesham; Stubbington.

This seems to be the most abundant form of all the Eocene Polyzoa, as I have examples from all the above localities. In some of the masses of Bracklesham Clay, in the soaking of the mass, at least a dozen specimens may be obtained in very perfect condition. The Whitecliffe Bay forms are much better preserved.

11. CELLEPORA sp. (*punicosa*?) (Geol. Mag. vol. iii., p. 4.

Among Mr. Wetherell's collection Mr. Busk found "a very minute *Cellepora*, resembling some of the minute globular specimens of *C. punicosa*."

*Horizon*: London Clay, Highgate.

Family SELANARIDÆ, Busk, 1853.

= Fam. Asterodiscina, Lonsd. Dixon's Geol. Sus.

11. LUNULITES URCEOLATA, Lamk.

1816. *L. urceolata*, Lamk. Animx. Sans Vert. t. ii., p. 195.

1836. ,, ,, M. Ed., t. ii., p. 300.

1850. *L. urceolata*, ? Lonsd. Dix. Geol. Sus., p. 159, pl. i. f. 8.

Not GOLDFUSS, nor LAMOUREUX.

*Zoarium* obtusely conical. *Zoecia* in parallel rows, easily separated; form irregularly hexagonal or imperfectly oval; surface open, margin sharp, interior rounded, puctured by a few minute foramina; distal extremity slightly overlying, walls between the rows smooth. Thickness of *Zoarium* slightly exceeding the depth of the *Zoecia*. *Vibracula* (= Intermediate chambers, Lonsd.) in linear series, lozenge shaped, and variable in size. Concave surface ribbed, foraminated.

*Horizon*: Barton, and Bracklesham beds, Isle of Wight.

My Barton beds examples are mere fragments, but the vibracular cells are distinct and characteristic.

Sub-Order CYCLOSTOMATA, Busk.

Fragments of species belonging to this Sub-Order are very rare, and sometimes ill preserved, but they form, nevertheless, a very pretty group of Eocene Polyzoa.

12. CRISIA EBURNEA ?

1871. *Crisia*? Phillips' Geol. of Oxford and Valley of the Thames.

1886. = *Crisia* sp. Alfred Bell.

A small fragment of *Crisia*, probably belonging to *C. eburnea*, is all that I have a note of, as indicating the existence of species of this group in Eocene rocks.

*Horizon*: London Clay. (Phillips)

*Crisia eburnea*, in fragments of course, have been found in Post Pliocene rocks, Montreal: British Palaeolithic: Scotch Glacial deposits: Austro-Hungarian Miocene. I have also found fragments in Australian Yarra-Yarra material.

13. *IDMONEA CORONOPUS*, Defrance?

1850. *Idmonea coronopus*, Lonsd. Dixon's Geol. Sus. p. 153, pl. ix., f. 24.

(*Idmonea Atlantica*? Forbes), Busk, Hincks.

*Zoarium* dichotomously branched; branches diverged excentrically, more or less rounded on the back; transverse rows of tubular Zoecia, blended along the medial line, forming a crest; erect, less in height than the depth of reverse portion of branch.

*Horizon*: Bracklesham beds, Isle of Wight.

The species described by Defrance is placed both by Busk\* and Hincks† as synonyms, though doubtfully, of *Idmonea Atlantica*, Forbes.

The *I. Atlantic* of the Post Pliocene beds of Garvel Park especially, is a most variable species, but whether it reaches back to the Eocene beds is rather doubtful; still beyond this I must admit that the fragments in my possession help to favour the references of Busk and Hincks. I think it wise, however, for the present to leave it where Lonsdale placed it.

15. *IDMONEA GRACILLIMA*, ? Reuss.

1869. Palæont. Stud. Tertiær. d. Alpen., pl. xxxv., figs. 1-2.

There are fragments of *I. gracillima*, Reuss, amongst the "Bryozoenschichte von Montecchio Maggoire," which closely resemble the species which I place here rather doubtfully. I cannot give many details of the British example, but while comparing specimens of the North Italian form I could not help noticing a resemblance, though

\* 1875. Pt. iii. Brit. Mus. Cata. Busk, p. 11.

† 1880. Brit. Mar. Poly. Hincks, p. 451.

faint, between these and the British example. Mr. Busk had a small fragment of *Idmonea* in the Wetherell collection, but he did not attempt identification on account of its imperfection.

*Horizon*: London Clay, Sheppey.

16. HORNERA sp. (*minuta* sp. n.?)

One single fragment of a species of *Hornera*, resembling some of the minute dichotomous forms found in the Crag, but I cannot identify it as belonging to any of these, it is well however to preserve the record. Zoarium flattened at the base where it has been attached to some foreign body, arising from which are two minute branches having cells, about six in number.

*Horizon*: Bracklesham beds, Isle of Wight.

17. HORNERA sp. (FLABELLIFORMIS? Blainville).

Amongst Mr. Alfred Bell's collection is a specimen of a flat, branching, flabelliform *Hornera*, probably referable to *H. flabelliformis*, Blainv. = ? *H. Ferussacii*, Michelin (Eocene and Miocene), but unfortunately none of the cells are exposed. The face is buried in a matrix of clay, but it is the largest example of all the Bracklesham Polyzoa, and if I were to attempt the washing of it the whole symmetry of the form would be destroyed. It is possible that free examples of this species may be found if carefully looked after.

*Horizon*: Bracklesham beds, Isle of Wight.

These are the whole of the true Eocene species that I am acquainted with. In higher beds, however, Mr. Bell assures me there is to be found at times fragments of rock derived from the earlier. In a note he says, "Looking over a parcel of stuff from the Post-Tertiary deposit of Selsey, in Bracklesham Bay, I came across the enclosed. It appears to me to be of Eocene origin." The material itself, a piece of fine sandy conglomerate in all probability was derived, but it was encrusted by Polyzoa, a very fine specimen of *Lepralia Pallasiana*, Moll.

In space this species has a wide geographical range; in time it reaches back to the Coralline Crag.

FOREIGN EOCENE POLYZOA, Calcaire grossier.

= Bracklesham beds, Lyell.

The following species from the "Calcaire grossier de Mons,"

have been described and partly figured by A. Meunier and Ed. Pergens.\* The probable horizon of the Calcaire grossier rocks are on a line with our Bracklesham beds according to Lyell, but are characterised as "Eocène inferieur" by the authors. The number of fragments on which observations and identifications were based amounted to between 500 and 600, out of which about 31 species were identified, but only 24 are described. The others are reserved for further identification.

The list will be valuable to students of the Polyzoa fauna of our Eocene Rocks. Besides the Polyzoa there were a fine series of Ostracoda and Foraminifera, and although Polyzoa are rare, comparatively, in the Bracklesham beds, Ostracoda and Foraminifera abound in the finer *debris* of the clay, but I cannot say to what extent. Foraminifera (about 60 species) are abundant as individuals in the London Clay of Sheppey.

POLYZOA (= BRYOZOA, of Authors)

Sub-order, CHEILOSTOMATA, Busk.

Family CELLULARIDÆ.

1. *Cellularia diplodidymioides*, Meu. and Perg.

Family CELLARIDÆ.

2. *Cellaria mucronata*, M. et Perg.
3. „ *vandenbroeckii*, M. et Perg.
4. „ *hians*, Reuss = *Vincularia hians*, Rss.

5. *Planicellaria eocena*, M. et Perg.

Family MEMBRANIPORIDÆ.

6. *Membranipora subtilimargo*, Rss.
7. „ *symmetrica*, M. et Perg. = *Biflustra*.
8. „ *angulosa*, Rss.
9. „ *gothicâ*, M. et Perg.
10. „ *oblonga*, D'Orb.
11. „ *squamosa*, M. et Perg.

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\* Louvain, 1886.

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Family MICROPORIDÆ.

12. *Micropora gracilis*, Munst. sp.

Family MICROPORELLIDÆ.

13. *Bactridium Hagenowi*, Rss.

Family MYRIOZOIDÆ.

14. *Schizoporella phymatopora*, Rss.

Family ESCHARIDÆ.

15. One species of *Eschara* only, found in the material.

Family SELENARIDÆ.

16. *Cupularia Houzeaui*, M. et Perg.

Sub-order, CYCLOSTOMATA, Busk.

Family TUBULIPORIDÆ.

17. *Tubulipora plumula*, Rss.

18. „ *dimidiata*, Rss.

Family ENTALOPHORIDÆ.

19. *Pustulopora Corneti*, M. et Perg.

20. *Entalophora montensis*, M. et Perg.

Family IDMONEIDÆ.

21. *Idmonea concava*, Rss.

22. „ *gracillima*, Rss.

Two other species of *Idmonea* are in the Author's possession, but names are reserved for more complete identification.

Family LICHENOPORIDÆ.

23. *Discoporella Grignonensis*, M. Ed.

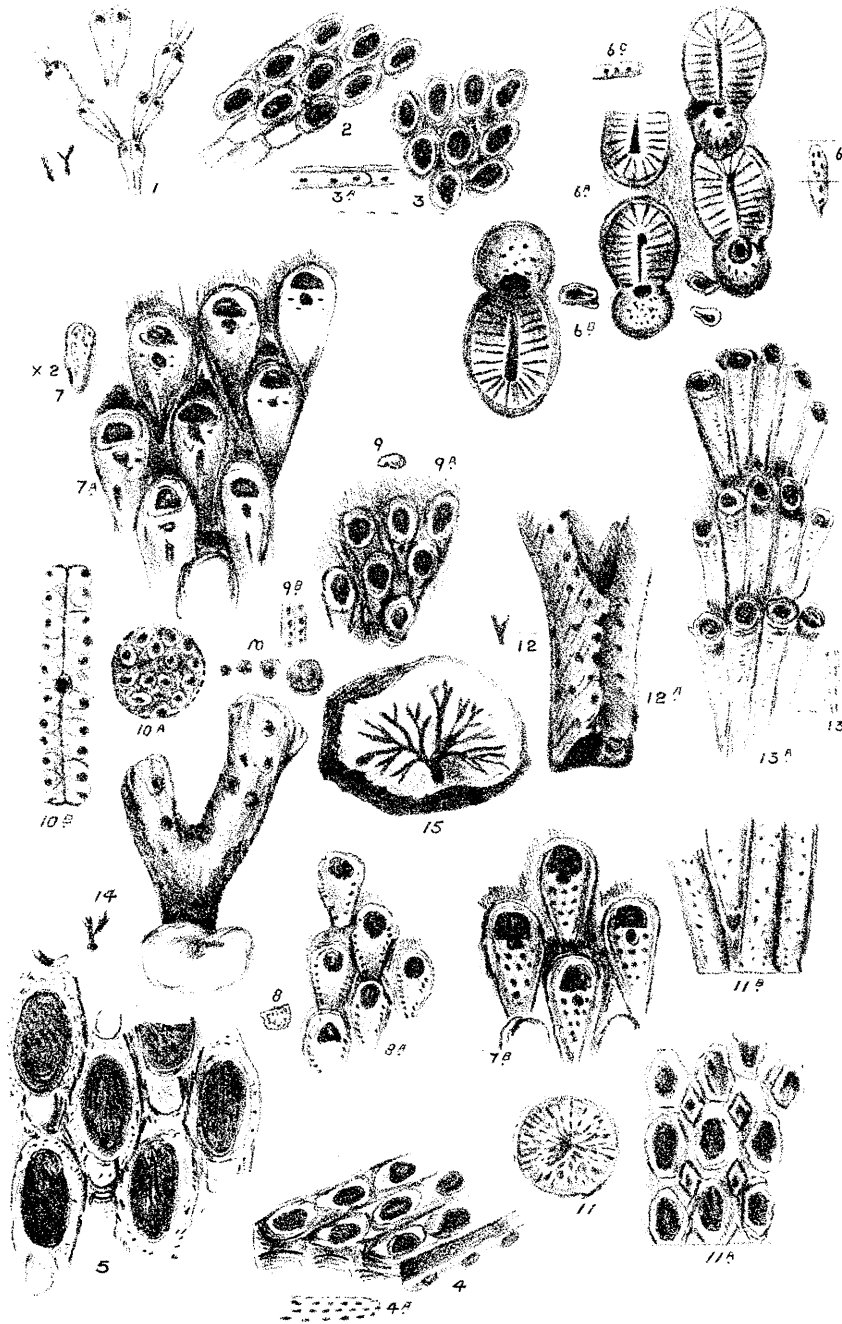
24. *Lichenopora Defranceiana*, Mich.

DESCRIPTION OF FIGURES. PLATE V.

(See Text for Localities, &c.)

1. *Dittosaria*, *Wetherellii*, Busk. Natural size and enlarged.

2. *Membranipora Lacroixii*, Busk. London Clay, Highgate.



VINE: EOCENE POLYZOA.



3. *Membranipora Lacroixii*, Busk. *3a*, Communication pores in side walls. Up. Eocene, Colwell Bay.
4. *Biflustra eocena*, Busk. *4a*, Natural size of fragment.
5. „ *symmetrica*, Men. et Pergens. Foreign example.
6. *Membraniporella nitida*, var. *eocena*, n. var. Natural size.
- 6*a*. „ „ Four cells from about the middle of colony, showing Oœcia and avicularia, one cell reversed as in the colony.
- 6*b*. „ „ Zoœcia, rather more perfect, with Oœcia and avicularia. *6c*, dotted bar.
7. *Microporella violacea*, var. *fissa*, Waters. Colony magnified about twice.
- 7*a*. „ „ var. *a*. A few cells magnified to show character.
- 7*b*. „ „ var. *b*.
8. *Eschara?* *Brongniartii*, M. Ed. Natural size and enlarged, *8a*.
9. *Eschara?* (*Membranipora?*) sp. *9-9a*. Natural size and magnified; *9b*, to show the *Eschara*form character of example.
10. *Cellepora petiolus*, Lonsd. Four examples, showing the variety of size in this peculiar species, which in the Bracklesham beds are most abundant. Examples vary much from size of figures to nearly  $\frac{1}{2}$  inch in diameter.
- 10*a*. „ „ A small colony enlarged.
- 10*b*. „ „ Side view, showing point of attachment.
11. *Lunulites urceolata*, Lamk. Fig. *11a*. A few cells with lozenge-shape avicularia, *11b* reverse.
12. *Idmonea coronopus* (Defr.) Lonsdale. Natural size and magnified.
13. „ *gracillima*, Reuss. Natural size, and side view enlarged.
14. *Hornera* sp. (*minuta* sp. n. ?) Unique.
15. „ (*flabelliformis?* Blainv.) The whole of the colony depicted; enlarged about  $1\frac{1}{2}$  times; embedded in matrix, reverse only; branches flat, striated, and slightly rounded or angular.