- FIGS. 8, 9. *Pileopsis variabilis*, Galeotti (a Gasteropod). Eocene, Dieghem, near Brussels. 8. One of Galeotti's original figures. 9. Another specimen showing the horseshoe-shaped muscular impression.
- 10 to 13. *Mannia Nysti*, Dewalque. 10. Natural size; all the other figures greatly enlarged. Upper Miocene, Diest, three miles east of Antwerp. 11, 12. Incomplete interior of dorsal valve. 13. Section of both valves seen in profile.
- 14, 14a. *Terebratulina caput-serpentis*, Linné. Crag, Antwerp. 14a. Enlarged. Near Antwerp. Museum of Brussels.
- 15, 15a. *Terebratulina Putoni*, Baudon. Eocene, Dieghem, near Brussels. Coll. of M. Colbeau. 15a. Enlarged.
- 16, 16a. *Terebratulina ornata*, Giebel (*T. Nysti*, Bosquet). Enlarged. Oligocene formation, Hoesfelt, Belgian Limbourg. After Bosquet.
- 17, 17a, b. *Rhynchonella Nysti*, n. sp. 17a, b. Enlarged. Crag, near Antwerp. Museum of Brussels.
- 18, 18a. *Rhynchonella psittacea*, Linné (?). Crag, Antwerp. Museum of Brussels.

PLATE VIII.

- 1, 2. *Terebratula grandis*, Blum. Crag, Antwerp. 2. Referred erroneously to *Ter. cranium*. Museum of Brussels.
- 3, 4. *Terebratula bisinuata*, Lam. 3. Eocene, Dieghem, near Brussels. Coll. of Mr. Vincent. 4. var. *succinea*, Desh. Eocene, Gand. Coll. of M. Dewalque.
- 5 to 7. *Terebratula Kicksii*, Galeotti. Eocene. 5, 6. Eocene, Gand (given to me by Dr. L. de Koninck). 7. *T. trilobata*, Galeotti. Eocene, Brussels.
- 8, 8a, b. *Argiope Lefèvrei*, Nyst. 8a, b. Enlarged. Middle Eocene, Laeken. After Nyst and Lefèvre.
9. *Terebratula* (?). Stated to be from the Lowest Eocene (assise Landénienne). Chercq, near Tournay. Museum of Brussels.
10. *Terebratulina Woodi*, Nyst MS. Same locality and museum.
11. *Terebratula carneoides*, Guppy. Lowest Miocene (?), St. Bartholomew, Eastern West India Islands. Collected by Dr. Cleve.
12. *Argiope Clevei*, n. sp. Same formation and locality.

III.—DESCRIPTIONS OF NEW FOSSILS FROM THE DEVONIAN FORMATION OF CANADA.

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(Continued from page 126.)

Genus BOTRYLLOPORA, Nicholson. *Canadian Journal*, no. lxxx.

Polyzoary calcareous, sessile, and encrusting, forming systems of small circular discs, the upper surfaces of which are marked with radiating ridges, upon which the cells are carried. Each disc is attached by its entire lower surface, slightly convex above, with a central non-poriferous space, round which a number of radiating poriferous ridges occupy an exterior slightly elevated zone. Cells forming a double series on each ridge, immersed, with rounded mouths, which are not elevated in any part of their circumference above the general surface.

I have been unable to refer these singular *Polyzoa* to any existing group, and have, therefore, been compelled to found a new genus for their reception. In some respects the genus is allied to *Defrancia*; but the cells are not tubular, and no portion of them is free, whilst the latter genus does not appear to have been ever detected in rocks older than the Jurassic. The only Palæozoic genus of *Polyzoa*

which, so far as I am aware, presents even a superficial resemblance to *Botryllopora*, is *Evactinopora*, Meek and Worthen. In this latter genus, however, though the polyzoary is star-shaped, its internal structure is quite peculiar and altogether different from that of the former, whilst the entire organism appears to have been free.

The individual discs of *Botryllopora*, which, though social, are not organically united, present, on the other hand, a striking resemblance to the separate star-shaped elevations of *Stellipora* (*Constellaria*) *Antheloidea*, Hall, from the Lower Silurian; and it may, therefore, be proper to say a few words on the structure and affinities of this fossil, of which I have examined authentic specimens. *Stellipora antheloidea* occurs in the form of flattened expansions or of erect, flattened, sub-palmate fronds. The surface exhibits a vast number of little star-shaped elevations, each about a line in diameter, and consisting of a smooth, sometimes slightly depressed space, which is traversed by five or six obtusely-rounded radiating ridges, which do not quite meet in the centre. Each of the ridges of the star is covered with rounded calices irregularly disposed in three or four rows. The stars are arranged irregularly, generally at intervals of from half a line to a line; and the intervals between them are occupied by crowded circular pores, which are the mouths of so many tubuli. These pores do not encroach upon the spaces between the ridges of the stars, and the tubuli of which they are the mouths are seen on transverse section to be *tabulate*, being furnished with numerous distinct transverse partitions. It thus appears that *Stellipora antheloidea*, Hall, is not a Polyzoon, as believed by D'Orbigny, but, as pointed out by Milne Edwards and Haime, a *tabulate coral*, allied to *Monticulipora*, and presenting in particular a close resemblance to the coral which I have described under the name of *Callopora incrassata*.

BOTRYLLOPORA SOCIALIS, Nicholson. Pl. IX. Fig. 16.

Polyzoary social, consisting of systems of calcareous discs which are adherent by their lower surface to the exterior of foreign bodies, and which are not organically connected with one another. The upper surface of each disc approximately convex, but with a central depression or flattened space, surrounded by a series of strong obtuse elevated ridges arranged in a radiating manner. The diameter of the discs is about a line or a line and a half, and the radiating ridges are from eighteen to twenty-six, or more, in number. The ridges are unequally developed, some extending nearer to the centre than others, and each carries upon its upper surface a double row of minute round pores or apertures, the margins of which are not elevated above the general surface. The central space of the polyzoary is destitute of cells, and appears to be solid; and this seems also generally to be the case with the spaces between the radiating ridges. In some cases, however, the interradial spaces appear to be poriferous in the immediate vicinity of the circumference.

The groups of this singular *Polyzoon* are not of very rare occurrence in the Hamilton Formation, growing parasitically upon the

exterior of *Heliophyllum Halli*. It has, at first sight, a close resemblance to a group of little discoid corals, such as *Microcyclus*, attached by the whole of the lower surface; the radiating ridges looking like the septa, and the central space representing the calice. I do not know of any Palæozoic forms of *Polyzoa* with which the present species could be compared; and it is readily separated from such forms as *Defrancia* by the entirely different characters of the cells, which approach closely in form to those of *Retepora*, *Fenestella*, and *Polypora*. The largest group that has come under my notice comprises about twenty of the discoid coenecia, mostly in contact, but apparently in no way connected with one another directly.

Locality and Formation.—Hamilton Formation, Bartlett's Mills, near Arkona, Bosanquet.

CERIOPORA (?) HAMILTONENSIS, Nicholson. Pl. IX. Fig. 17.

Polyzoary ramose; branches cylindrical, about half a line in diameter, dividing dichotomously at intervals of from a line and a half to three lines, the angle included between each pair of branches being from 40° to 45° . Surface covered with oval, rounded, or subquadrate cell-mouths, arranged in longitudinal rows, which are separated by delicate thread-like lines or ridges. The cells of contiguous rows alternate, so that the apertures come to be also disposed in regular diagonal lines. About four rows (sometimes five) occupy the width of the stems, the cells having a width of about a tenth of a line. About five cells occupy the space of one line measured vertically. The interspaces between the mouths of the cells are occupied by exceedingly minute tubuli, which form only a single row, or are altogether absent on the lines which bound the cells laterally, whilst they usually form a double series on the spaces by which the cells of a given row are separated vertically.

This beautiful little fossil occurs in great abundance in some of the beds of the Hamilton formation. It is allied to the *Ceriopora punctata* of Goldfuss (Petref. Germ. plate lxiv. fig. 12), and to *Millepora interporosa*, Phillips (Geology of Yorkshire, vol. ii. pl. i. figs. 36–39), especially to the former; but it is distinguished from both by perfectly good and easily recognized characters. I am at present unable to decide as to its true generic affinities, and have simply referred it provisionally to *Ceriopora* on account of its close relationship to *C. punctata*, Goldf., which likewise occurs in the Devonian Rocks.

Locality and Formation.—Common in the Hamilton Formation, Widder, Township of Bosanquet.

POLYPORA PULCHELLA, Nicholson. Pl. IX. Fig. 18.

Polyzoary infundibuliform or flabellate, often of considerable size. Branches nearly straight, radiating from the base, and increasing in number by bifurcation at intervals of from two to four lines. About six branches in the space of three lines, the diameter of the branches being rather more than a quarter of a line, and the interspaces slightly less. Dissepiments on the same plane as the outer surface of the polyzoary, depressed below the inner surface, short, narrower

than the branches, and placed at intervals of about half a line apart. Fenestrules regularly oval, half a line in length, and about a quarter of a line in width, four or five in the space of three lines, alternate or sub-alternate in contiguous rows. The upper or inner surface of the branches carries the cells, three rows of which occur on every branch, and sometimes four opposite the origin of the dissepiments. The cells are flask-shaped, sometimes slightly unequal in size, their mouths round, those of the central row alternating with those of the lateral rows. From six to eight pores in the space of a line, or three to four in the length of each fenestrule. The reverse face of the polyzoary is smooth or obscurely striated.

The species to which this is most nearly allied is *P. Halliana*, Prout, which occurs in the St. Louis Group of Illinois, and which I have likewise detected in the Corniferous formation of Ontario. *P. pulchella* is, however, readily distinguished by the greater development of the dissepiments, the greater proportionate and absolute width of the fenestrules, and the possession of three (instead of four) rows of cells on each branch.

Locality and Formation.—Common in the Corniferous Limestone of Port Colborne, and Lot 6, Con. 1, Wainfleet.

POLYPORA TENELLA, Nicholson. Pl. IX. Fig. 19, b.

Polyzoary small, forming a flattened expansion; branches radiating from the base, and increasing by bifurcation at intervals of about two lines. Branches narrow, about eight in the space of three lines, their width being about a quarter of a line. Fenestrules oval, about eight or nine in a space of three lines measured longitudinally, and ten in the same space measured diagonally; the length of each about half a line, the width a third less. Dissepiments very short and narrow, without pores. Cells arranged in three alternating rows on the branches, opening by minute rounded apertures, two or three of which occupy the length of a fenestrule. Reverse unknown.

This pretty little species is nearly allied to *P. pulchella* and *P. Halliana*; but is distinguished by its much more delicate proportions, its narrower and more closely-set branches, and its smaller fenestrules.

Locality and Formation.—Rare in the Corniferous Limestone, Lot 6, Con. 1, Wainfleet.

POLYPORA TUBERCULATA, Nicholson. Pl. IX. Fig. 20.

Polyzoary small, forming a flattened expansion, which springs from a strong foot-stalk. Branches radiating from the base, and increasing by bifurcation at intervals of about a line and a half; from a third to half a line in breadth, rounded and destitute of carinæ. Dissepiments very short, widest at their junction with the branches. Fenestrules somewhat irregular in shape, usually a very long oval, always longer by from one-half to two-thirds than wide; having an average width of a third of a line to half a line, by a length of one line or a little less. Two fenestrules in the space of two lines measured longitudinally, four in the same space measured

transversely; those of contiguous rows being usually opposite or nearly so. Dissepiments non-poriferous. Four (sometimes three) alternating rows of cells on each branch, opening by minute rounded pores, which are prominently elevated above the general surface. Five pores to the length of a fenestrule. Reverse unknown.

Polyzora tuberculata differs from all the other recorded species of the genus, except *P. venucosa*, McCoy, in the possession of prominent-edged pores, which give to the celluliferous surface of the branches a peculiar tuberculated or pustulose appearance. The latter species, however, has exceedingly long and narrow fenestrules, with nearly twice as many pores to the length of a fenestrule. I have only seen fragmentary examples of this species.

Locality and Formation.—Rare in the Hamilton Group, Bartlett's Mills, near Arkona, Township of Bosanquet.

RETEPORA PHILLIPSI, Nicholson. Pl. IX. Fig. 21.

Polyzoary infundibuliform, or forming a flattened expansion. Branches slender, fifteen to eighteen in a quarter of an inch measured transversely, parallel, flexuous, not united by dissepiments, but coalescing at intervals of about a third of a line, and over spaces of the same length. Fenestrules oval, six or seven in the space of a quarter of an inch measured vertically, seven or eight in the same space measured diagonally (five in two lines on an average), regularly alternate in contiguous rows. Cells in two alternating rows upon each branch, the rows separated in decorticated specimens by a distinct impressed line. Three cells to the length of a fenestrule, sometimes only two; and one or two opposite the points where the branches coalesce. Reverse unknown.

This is a genuine *Retepora*, and in its general form and its biserial cells is closely allied to *R. prisca*, Goldfuss, which I have found abundantly in the Corniferous Limestone of Ontario. It is, however, readily distinguished by the more slender, rounded, and apparently non-angulated branches, the much smaller size of the fenestrules, and the greater number of these openings in a given space. I have named the species in honour of Professor Phillips, to whom we owe so many descriptions of Devonian and Carboniferous fossils.

Locality and Formation.—Corniferous Limestone, Port Colborne.

(To be concluded in our next Number.)

* * Plate IX. will accompany the concluding part of this paper in our next Number.
—EDIT. GEOL. MAG.

IV.—*HYBODUS*, A COAL MEASURE FISH.

By W. J. BARKAS, L.R.C.P. Lond.; M.R.C.S. Eng.

THERE appear to be two or three obstacles in the way of a proper classification of fossil fishes, and of obtaining sufficient data to establish the earliest period of the earth's formation, during the deposition of which any particular fish existed, the principal obstruction being caused by the disconnected manner in which the researches have been carried on; for palæontologists; as a rule, confine them-