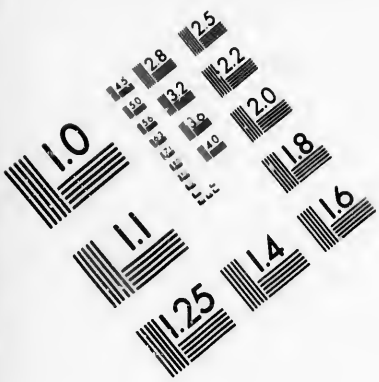

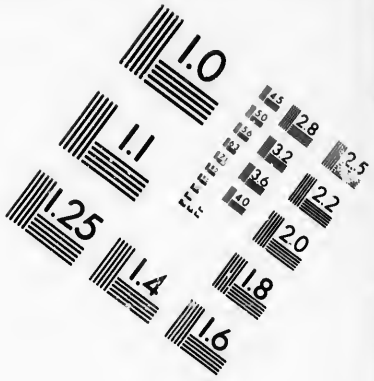

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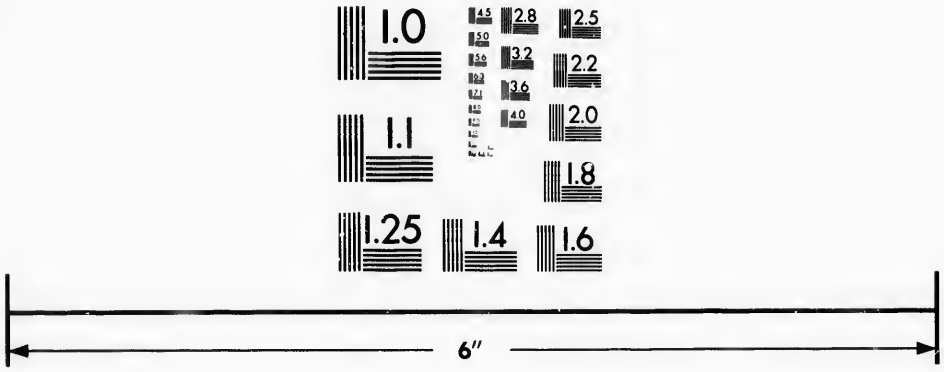

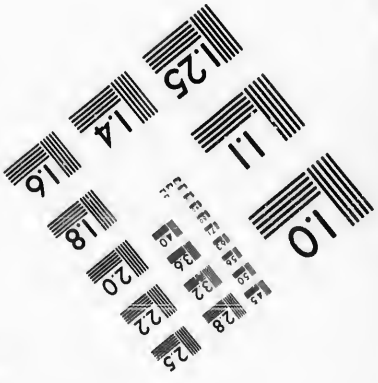

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(*From the Canadian Naturalist, Vol. 7. No. 3.*)

DESCRIPTIONS OF NEW FOSSILS FROM THE DEVONIAN ROCKS OF WESTERN ONTARIO.

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Professor of Natural History in University College, Toronto.

Having been engaged for some time in studying the fossils of the Corniferous Limestone of Western Ontario, I purpose in the present communication to give brief descriptions of some of the new forms which have come under my notice. I shall, however, simply give the descriptions, without illustrations, as I am preparing a detailed report upon the fossils of some of the Palæozoic formations of Ontario, in which the species in question will be fully illustrated.

I. Zaphrentis fenestrata, n. sp.

Corallum simple, cylindro-conical, curved. Tabulæ well developed, remote, bending downwards as they approach the outer wall. Septa strong, equally developed, not alternately large and small, apparently forty-eight in number. Epitheca thin, with a few shallow undulations of growth, but destitute of vertical striæ or costæ.

This species is closely allied to *Z. gigantea*, Lesueur, but appears to be clearly distinct; though the above description is founded upon but a single specimen, which is all that I have as yet obtained. It differs from *Z. gigantea* in the greater proportionate thickness, and much smaller number of the septa,

and in the greater remoteness of the tabulæ. Thus in *Z. gigantea* the septa are from seventy to one hundred and forty in number, and they are alternately small and large; whilst their thickness is not particularly great, and the distance between the tabulæ is not excessive. *Z. fenestrata* is also a smaller form than *Z. gigantea*. From *Z. prolifica*, Billings, the present species is distinguished by its greater size and more cylindrical form, and the much smaller number of the septa, as well as by the fact that the septa are not alternately of different sizes. *Zaphrentis patula* of Edwards and Haime, possesses forty equal septa, but is of a much smaller size, and its shape is much more turbinate. *Z. centralis*, of the same authors, is also very much more diminutive in its dimensions.

The tabulæ of the circumference of the coral in *Z. fenestrata*, where they bend downwards to meet the epitheca, appear to be clearly of the nature of highly developed dissepiments; since they are not placed at exactly the same level in contiguous interseptal loculi. The specific name is in allusion to the peculiar fenestrated appearance exhibited by portions of the coral from which the epitheca has been removed, when the interseptal loculi are seen to be crossed at intervals of from two to three lines by the obliquely descending tabulæ, producing the appearance of a series of oblong fenestrules.

Length of the only specimen observed five inches (real length probably nearly twice as much); diameter of summit one inch and a half. Calice and fosette unknown.

Locality and formation.—Caniferous limestone, Port Colborne.

Genus Blothrophyllum (Billings).

"Corallum simple, turbinate or cylindrical. Internal structure consisting of a central area occupied by flat transverse diaphragms, an intermediate area with strong radiating septa, and an outer area in which there is a set of imperfect diaphragms projecting upwards, and bearing on their upper surfaces rudimentary radiating septa. A thin complete epitheca, and a septal fosette." (Billings, Canadian Journ., New Series, Vol. IV., p. 129.)

The central space of the theca is occupied in corals of this genus, as in *Amplexus*, by flat or slightly flexuous tabulæ, upon which the septa encroach slightly or not at all. Outside this

central area is a narrow zone in which the tabulæ are bent downwards towards the base of the corallum, and are at the same time occasionally split or bifurcated; whilst the continuity of the spaces between them is interfered with by a series of strong septa. Outside this, again, is an outer zone formed by a series of tabulæ which are directed upwards and outwards in an arching manner, and which carry on their upper surfaces a series of imperfect septa, their lower surfaces being simply costate or ridged. Lastly, the tabulæ of this external zone are walled in by a thin but strong epitheca, with which the outer surface of the coral is invested.

The genus differs from *Zaphrentis* in not having the septa prolonged inwards to, or near to, the centre, and in having the central tabulate area surrounded by an intermediate imperfectly vesicular zone, surrounded in turn by an exterior zone of arched tabulæ and incomplete septa. From *Amplexus* it is distinguished by the possession of the exterior zone last mentioned, and by the septa being more largely developed; whilst it is distinguished from *Clisiophyllum* by the first of the above-mentioned peculiarities, and also by the fact that the tabulæ of the central area are nearly or quite flat, and are not elevated into a conical protuberance.

The genus *Blothrophyllum* was originally defined by Mr. Billings (*op. cit.*), and the single species *B. decorticatum* was described. In addition to this previously recorded and very characteristic species, I have now to describe an allied form, *B. approximatum*, also from the Corniferous limestone of Western Ontario.

II. Blothrophyllum approximatum, n. sp.

Corallum of unknown length, cylindrical or cylindro-conical. The outer area consisting of strong arched diaphragms, curving upwards and outwards, distant from one another from half a line to two lines, bearing upon their upper surface imperfect septa which extend from one tabula to another when the tabulæ are remote by the former distance only, but which otherwise do not do so. Septa alternately large and small, distant from one another about a third of a line. Tabulæ of the central area closely approximated, from three to four in the space of two lines, flat or slightly flexuous, the septa only slightly encroaching on them. Epitheca with numerous constrictions of growth and

encircling annulations, as well as obscure longitudinal striæ. Dimensions unknown, but certainly attaining a diameter of three inches.

In most of its essential characters this species agrees with *B. decorticatum*, Billings, of which perhaps it may turn out to be only a variety. It is, however, distinguished by the apparently constant peculiarity that the tabulæ of the outer area are very closely set, much more closely than in *B. decorticatum*. Thus, typical specimens of the latter exhibit only from three to five of the curved tabulæ of the outer area in the space of an inch; whereas examples of *B. approximatum* present no less than from ten to fourteen tabulæ in the same space. Whether this character is one of specific value or not, may be questioned, but I think it advisable to refer the specimens which exhibit it, provisionally at any rate, to a new species.

Locality and formation.—Corniferous Limestone of Port Colborne.

Genus Heliophyllum (Hall).

The genus *Heliophyllum* is very closely allied to *Cyathophyllum*, and the following are the definitions of it, given respectively by Milne Edwards and Haime, and by Mr. Billings:

1. "Corallum simple. Septal apparatus well developed, and producing lateral lamellar prolongations, which extend from the wall towards the centre of the visceral chamber, so as to represent ascending arches and to constitute irregular central *tabulæ*, and which are united towards the circumference by means of vertical dissepiments." (Milne Edwards and Haime.)

2. "Corallum simple or aggregate; radiating septa well developed, obliquely striated on their sides by thin elevated ridges, which extend from the outer wall in an upward curved course towards the centre. These ridges are connected by numerous thin laminæ, which divide the spaces between the septa into small sub-lenticular cells. The transverse diaphragms are thin, flexuous, and confined to the central portion of the coral." (Billings.)

The internal structure which distinguishes corals of the genus *Heliophyllum* is thus of a somewhat complicated nature. The septa are well developed and extend nearly or quite to the centre of the theca, where they are often somewhat twisted; but there is no columella. A central tabulate area exists, but is of comparatively circumscribed dimensions. Externally to this tabulate

area, the interseptal loculi are divided into cells or small compartments by the intersection of two sets of dissepiments having different directions. The dissepiments of the first and most conspicuous set are directed from the internal surface of the wall obliquely inwards and upwards towards the centre, in a succession of arches, the convexities of which are turned upwards. These dissepiments doubtless correspond with that circumferential portion of the tabulæ, which is bent downwards towards the base of the coral in species of *Zaphrentis*, *Clisiophyllum*, *Diphyphyllum*, &c. When these dissepiments are more or less imperfect or have suffered destruction, they leave upon the flat surfaces of the septa a corresponding number of arched striæ or ridges. Similarly, in the calice of the coral these dissepiments appear on the free edges of the septa as so many short spines. The dissepiments of the second series are more delicate, more discontinuous, and much more variable in direction than those of the preceding series. Sometimes they are nearly vertical, or, in other words, are pretty nearly concentric with the theca. Sometimes they are not far from the horizontal, and intersect the dissepiments of the former series at a very acute angle. Most commonly they are directed inwards and downwards from the theca towards the centre, so as to cut the dissepiments of the preceding series nearly at right angles. Decorticated examples of *Heliophyllum* exhibit a most characteristic appearance, due to the intersection of the septa and filled-up interseptal loculi with the dissepiments of the first mentioned series. In this way is produced a succession of vertical ridges and intervening sulci crossed by numerous curved or sharply zig-zagged encircling ridges.

The species of *Heliophyllum* which have been described by Mr. Billings as occurring in the Devonian rocks of Canada, are *H. Eriense*, *H. Cayugaense*, *H. Canadense*, *H. exiguum*, *H. colligatum*, *H. Halli*, and *H. tenuiseptatum*, the first five from the Corniferous formation, and the last two from the Hamilton shales. All these, except *H. tenuiseptatum*, have come under my notice as occurring in the Corniferous Limestone of Western Ontario, and I have also a single new form to record.

III. Heliophyllum Colbornense, n. sp.

Corallum simple, cylindrical, not expanding towards the cup. Septa sixty at a diameter of one inch, carrying on their flat surfaces arched striæ at distances of from one-third to half a

line. Epitheca with numerous rounded or sharp-edged annulations and constrictions of growth. A flat space at the bottom of the cup, to the centre of which the septa extend. Cup deep; fossette unknown.

This species is nearly related to *H. Cayugaense* and *H. Canadense*, Billings; but it is, I think, decidedly distinct. It is distinguished from *H. Canadense* by its cylindrical and not broadly-expanding shape, the cup being equal to or even less than the diameter of the coral at a point apparently a little above the base; by the flattening of the bottom of the calice; by the greater closeness of the arched septal striæ; and by the smaller number of septa. From *H. Cayugaense* the present species is separated by its much smaller thickness, its cylindrical, not expanding form, the smaller number of the septa, and the closeness of the septal striæ.

The length of *H. Colborneuse* must have been over three or four inches; but none of my specimens are perfect. The dimensions of a broken individual are: length two inches and a-half; diameter of broken base one inch; diameter of cup ten lines; depth of cup four lines. In another also broken specimen, the length is two inches and a quarter; the diameter at the broken base thirteen lines; the diameter of the cup one inch; and the depth of the cup five lines. Other examples referable to this species exhibit a diameter of from an inch and a quarter to an inch and a half.

Locality and Formation.—Corniferous limestone of Port Colborne.

IV. Petraia (?) Logani, n. sp.

Corallum small, turbinate, more or less curved, almost trigonal in transverse section, owing to its being flattened on the side of the convex curvature, and also on the lateral surfaces. Septa twenty-six or twenty-eight at a point a little above the base, but sixty or more at the margin of the calice, the increase of number being due to the bifurcation of each primary septum at a distance of about a line and a-half above the base, and also to the intercalation of new septa along both sides of a line which runs along the dorsal or convex side of the coral from top to bottom. This line is marked on the exterior by two primary septa, which form a prominent ridge externally and pass inwards to the centre of the coral. At the margin of the cup the septa are somewhat unequally developed, being alternately larger and smaller, the

larger primary septa being prolonged inwards to the centre of the theca, where they become somewhat bent and twisted together. No columella appears to be present, nor are there any *tabulæ*. The flat sides of the septa are furrowed with a succession of deep grooves, about four or five in the space of one line, which are directed in an obliquely ascending and arching manner from the wall towards the centre, the interspaces between them being tumid and rounded, and thus imparting a crenulated appearance to the outer edges of the septa when exposed to view. These arching grooves are not connected with lamellar dissepiments having a similar direction; but the septa for some little distance below the cup are united by delicate transverse dissepiments. The epitheca is marked with a few annulations of growth, which are mostly very obscure, and with well marked costæ or striæ corresponding with the septa.

In none of the specimens in my possession does the epitheca extend more than half an inch (often less) above the base of the corallum. Beyond this point to the margin of the calice, the edges of the septa are seen with their characteristic crenulated appearance, and united here and there by minute dissepimer
As already noted, the flattened convex side of the coral alw
exhibits two pre-eminently large septa, produced by the bifu
tion of one, which run from the top to the bottom of the coral
a straight line. The remaining septa are directed obliquely from
both sides towards this central pair; so that new septa are intercalated along this line in proceeding from the base to the calice. It is possible that these two septa may mark the position of a fosette in the cup; but none of my specimens exhibit the interior of the calice, and I am, therefore, unable to speak positively on this point. For the same reason I can say nothing as to the condition of the free edges of the septa internally.

The total length of the corallum is from three-quarters of an inch to one inch, the diameter of the calice varying from half an inch to nearly three-quarters. The calice is oblique, so that the greatest length of the coral is along its convex curvature.

Petraia Logani is closely allied to *Petraia* (*Turbinolopsis*) *pluriradialis*, Phillips, with which I was at first sight disposed to identify it. It is, however, readily distinguished by the flattening of the convex curvature and lateral aspects of the coral, and by the smaller number of radiating septa. As regards other more minute characters, the published descriptions of *P. pluri-*

radialis are not sufficient to enable any closer comparison to be instituted with advantage between the two species.

There exists also a singular, and in some respects inexplicable, resemblance between the form here described under the name of *P. Logani*, and that described by Mr. Billings under the name of *Heliophyllum exiguum* (Can. Journ. New Series, Vol. V. p. 261); at the same time that differences of such gravity exist that the two forms cannot be united under the same specific title, or even placed in the same genus. Without pretending at present to explain the discrepancies of observation here alluded to, it may be as well to present in a summary form the points of agreement and difference which appear to exist between the two species.

1. Both corals are of the same general form and size, and occur not only in the same formation, but also at the same locality.

2. Both corals are alleged to possess externally a couple of straight septal ridges, extending from the top to the bottom of the coral, and having the other septa directed obliquely towards this line on both sides. I have, however, never been able to detect this structure in the comparatively few specimens which have come under my notice, which I should feel disposed to refer to *H. exiguum*.

3. The number of septa in the cup appears to be about the same in both, though said to be sometimes as many as eighty in *H. exiguum*, whilst they never appear to exceed sixty-five in *P. Logani*.

Whilst the above are the chief points of agreement, there are the following points of difference to be noted:

1. *H. exiguum*, though this is not specially alluded to, must possess more or less well developed *tubulæ*; but no traces of such structures can be detected in *P. Logani*, in broken specimens or in longitudinal sections.

2. The septa in *H. exiguum* exhibit on their flat sides "about six obscure arched *striæ* to one line." Those of *P. Logani* exhibit a succession of arched *grooves* of considerable depth, separated by somewhat tumid interspaces; and these grooves are only about four or five in the space of one line. Nor can it be supposed that this discrepancy is due to any confusion on my part between *casts* of *P. Logani* and the actual coral itself, such a mistake being impossible in dealing with the well-preserved specimens of the Coniferous formation.

3. The septa in *P. Logani* bifurcate regularly in proceeding from the base to the cup, thus being always arranged in pairs in the upper part of the coral; whilst no such arrangement is stated as regards *H. exiguum*.

4. When looked at as seen in transverse sections of the cup, the septa of *H. exiguum* are seen to possess plain sides, as is the case in *Zaphrentis*; whilst those of *P. Logani* are denticulated with tooth-like dissepiments or spines, which rarely extend to the contiguous septum. It need hardly be said that the structures here alluded to are not to be confounded with the spines which occur on the *free edges* of the septa of *H. exiguum*, as in the genus *Heliophyllum* in general.

5. The epitheca of *H. exiguum* is thick, deeply annulated, hardly showing the lines of the septa, and co-extensive with the outer surface of the coral. In *P. Logani*, on the other hand, the epitheca is very slightly marked with ridges of growth, usually exhibits distinct costæ, and never appears to extend to the margin of the calice; though it is certainly difficult to say positively whether this last appearance is natural or is due to a partial decortication of the coral.

Upon the whole, I think that the fossil here described as *Petraia Logani* is distinct from previously known forms. Its reference to *Petraia* is provisional, but it apparently cannot be referred under any circumstances to the genus *Heliophyllum*. I have named it in honour of the eminent geologist, Sir William Logan, F.R.S.

Locality and formation.—Not uncommon in the Corniferous Limestone of Rama's Farm, Port Colborne.

V. Alecto (?) Canadensis, n. sp.

Polyzoary adnate, attached parasitically to the exterior of corals, branching in an irregularly dichotomous manner. Cells in reality uniserial, but so disposed by the turning of each cell-mouth to alternate sides as to look as if bi-serial. The terminal portion of each cell bent outwards; the aperture circular. The cells tubular, elongated, slightly or not at all expanded and not at all elevated towards their apertures. Five cells in the space of two lines; width of cell about one-fiftieth of an inch near the mouth.

I have considerable doubts as to the affinities of this extraordinary little fossil; but I think it is certainly one of the Cyclostomatous Polyzoa, and I see at present no better course

than to refer it to *Alecto*, Lamoroux. When not examined closely, the fossil presents a striking resemblance to a Sertularian Zoophyte, exhibiting exactly the appearance of a number of tubular calyeles or cells springing alternately from the two sides of a common canal or stem. When minutely looked into, however, it is seen that this is deceptive, and that the fossil consists really of an alternate or sub-alternate series of long, tubular, slightly flexuous cellules, each cell being nearly cylindrical, and having the terminal portion geniculated or bent outwards, in such a manner that the mouths of successive cells point in opposite directions.

The difficulty in determining the systematic place of this fossil is much increased by the fact that it occurs solely in the form of casts, ramifying in the walls of moulds from which corals have been removed. It is, therefore, impossible to determine what was the texture of the cœnœcium, whether calcareous or corneous; whilst the lines of division between the cells, where they come in contact with one another, are only very faintly and obscurely indicated. The form of the aperture of the cell appears to have been circular, and its position terminal; but some uncertainty attaches to both of these statements.

Locality and Formation.—Common, growing parasitically upon the corallites of *Diphyphyllum arundinaceum*, or upon the epitheca of *Fistulipora Canadensis*, in the former position generally accompanied by a species of *Spirorbis*. Corniferous Limestone, Port Colborne, and Lot 6, Con. 3, Wainfleet.