



XIII.—On some new genera and species of Palæozoic corals and Foraminifera

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EXPLANATION OF PLATE VII.

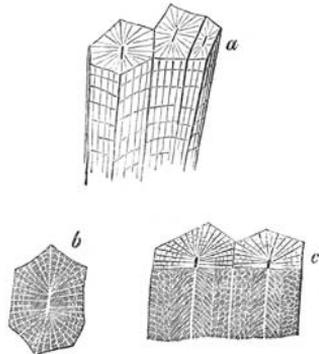
- Fig. 1. a b c d*, four figures of fibrillæ after Muys.
- 2. "A fibre covered with cellular membrane at the upper part," cross-striated and splitting up into fibrillæ at one end : after Fontana.
 - 3. Diagram of fibrillæ after Bowman.
 - 4. Diagram to illustrate the views of Sharpey, Lealand and Carpenter : *a*, two fibrils united ; *b*, single fibril, with each sarcal particle having a dark central and clear outer part.
 - 5. Diagram of two fibrillæ to illustrate the views of Mr. Erasmus Wilson : *a*, usual appearance of fibrillæ ; *b*, a very much stretched fibril to show the dark and clear spaces, each divided into four.
 - 6. Diagram to show the fibrillæ in the distinct and superficial focus : *a*, fibrils in distinct focus ; *b*, fibrils in superficial focus from the frog.
 - 7. Diagram of two fibrils from the lobster : *a*, fresh fibril much stretched, showing scalloped edges of clear space ; *b*, similar fibril unstretched, showing clear space apparently dark from its narrowness.
 - 8. Diagram to illustrate a membrane observed among the fibrillæ : *a*, membrane as seen in frog and salmon ; *b*, similar membrane observed among fibrillæ of the muscle of skate, perfectly fresh.
 - 9. General appearance of a dissection of muscular fibre from the frog, magnified about 500 diameters.

XIII.—*On some new genera and species of Palæozoic Corals and Foraminifera.* By FREDERICK M'COY, M.G.S. & N.H.S.D. &c.

[Continued from p. 20.]

Stylaxis (M'Coy), n. g.

Gen. Char. Corallum composed of adjacent polygonal, prismatic, easily separable tubes, internally divided into three areas : *vertical section*, 1st, a thin, flat, straight axis ; 2nd, a broad inner area composed of numerous curved vesicular plates in irregular rows converging upwards to the axis ; 3rd, an outer area on each side composed of smaller and more curved vesicular plates, in rows inclining obliquely upwards and outwards : *horizontal section* displaying the central flat axis surrounded by radiating lamellæ extending from the walls, and connected in the outer area by numerous transverse vesicular plates : *additional columns*



a. Mode of growth and division of stem ; *b.* horizontal section ; *c.* vertical section.

produced by a bipartite division of the parent stem parallel to one of its faces: polyps distinctly separated above.

The corals of this genus bear precisely the same relation to *Nemaphyllum* that *Stylastræa* (Lonsd.) does to the *Lithostrotion* of the same writer (*Strombodes*) with regard to their mode of development, that is to say, in *Nemaphyllum*, as in *Strombodes*, the increase is by circular buds developed within the walls of the parent stem, the polygonal walls being gradually perfected by the joint labour of adjacent polyps; which it is inferred from their mode of growth, had a community of existence and organic union at the surface, and from the same cause the columns have no outer surface to exhibit in a rough fracture, but break through the middle rather than separate one from another. In the *Stylaxis* however, as in the *Stylastræa*, the new columns are produced by a sudden splitting of one of the columns into two, the divisional lines commencing along the middle of one face and going directly across to the opposite face, distinctly separating the young four-sided column at once by a double-plated, rectilinear boundary-wall parallel with one of the faces; the external striæ of the old column being traceable upwards into the young one. The columns are easily separable one from another in the rough fracture, and the polyps are inferred to have been distinct from each other, and each to have constructed independently its own boundary-wall.

Stylaxis major (M'Coy).

Sp. Char. Tubes averaging 6 lines in diameter, mostly hexagonal, external surface coarsely striated longitudinally and transversely marked with strong curved irregularities of growth, the convexity of the curves upwards: *horizontal section*, sixty-three slender radiating lamellæ converging from the walls towards the flat central style or axis, which is about 1 line in width; one half of the lamellæ reach the centre, the intervening ones reach half way; outer area exhibiting numerous transverse vesicular plates between the radiating lamellæ: *vertical section*, axis straight, ribbon-like; inner area broad, of slightly curved vesicular plates forming rows of lengthened irregular cells, extending obliquely downwards and outwards from the axis, about three in a row; outer area of rows of small hemispherically-curved plates, including small rounded cells extending very obliquely upwards and outwards, about six in each row.

This species is remarkable for the large size of its tubes and great number of the radiating lamellæ.

From the carboniferous limestone of Derbyshire.
(*Col.* University of Cambridge.)

Stylaxis Flemingii (M'Coy).

Sp. Char. Corallum of very long, prismatic, generally hexagonal, easily separable tubes, averaging 3 lines in diameter; outer surface strongly striated longitudinally, and marked with direct transverse rugosities of growth; bipartite division of the columns frequent: *vertical section* exhibiting the thin flat axis surrounded by an inner zone of small vesicular plates inclining downwards and outwards from the axis, and an outer zone of small vesicular plates inclined in an opposite direction or upwards and outwards: *horizontal section*, axis thin, half a line wide, surrounded by about forty-three thin, radiating lamellæ from the walls, half of which only reach half way; numerous small, thin, transverse connecting plates between the lamellæ in the outer zone.

The bipartite mode of division of the column is frequently and easily observed in this species, which commonly forms large masses. It greatly resembles externally the *Stylastræa basaltiformis*, but is easily distinguished by the small, but distinct, central axis visible in the transverse fracture, and further by the different disposition of the lamellæ of the inner zone. The small size of the tubes and less number of lamellæ distinguish it from the *Stylaxis major*.

This is probably the *Lithostrotion striatum* of Fleming, (Brit. Anim.) as he particularly says, "the rays of the star unite with a *small solid central axis*." I think however with Mr. Lonsdale, that he is wrong in his references. I have great pleasure in dedicating it to so admirable a naturalist, the extraordinary merit of whose writings on the British marine animals is well known to all who engage in the same laborious and difficult study.

Common in the carboniferous limestone of Derbyshire.

(*Col.* University of Cambridge.)

Columnaria (Gold. as here redefined).

Gen. Char. Corallum of aggregate, subparallel branches, either round and concentrically wrinkled, or more usually by mutual pressure becoming polygonal and longitudinally sulcated, but always easily separable; internal structure as in *Amplexus*, having many transverse simple diaphragms, and the walls longitudinally sulcated by marginal rudimentary lamellæ, which crenulate the edges of the transverse plates. Increase by fissure of the parent tube or cell, as in *Stylastræa* (Lonsd.). Type of the genus *Columnaria sulcata* (Gold.).

This genus has been erroneously described by Goldfuss in the first instance, and has been misunderstood by nearly every subsequent author—all describing radiating lamellæ from the walls

to the centre, and stating that there are no transverse plates; I was rather surprised therefore to find the characters I have given above, in authentic specimens from the Eifel of the *C. sulcata* (Gold.); they also exist in the *C. irregularis* (Münst.), *C. senilis* (Koninek), and the following. I deny the existence in those species of radiating lamellæ near the centre, and find the transverse diaphragms conspicuous. The real affinities of the genus seem to be between *Michelinea* and *Amplexus*, differing from the former in the tubes being individually distinct (as in *Stylastræa*) and easily separable by fracture, and being without communicating pores; from the latter it only differs in its compound mode of growth. As thus restricted the genus is no doubt a good one: the other dissimilar species placed in this genus by Dr. Goldfuss and others will easily fall into *Cyathophyllum* and other existing genera.

Columnaria laxa (M'Coy).

Sp. Char. Corallum forming large masses of contiguous, slightly flexuous tubes, rarely in contact; generally round and finely wrinkled transversely, occasionally the tubes in some part of their length touch the adjoining ones, and then become polygonal and longitudinally sulcated; transverse diaphragms undulated, and obliquely inclined in various directions; diameter of tubes from 3 to 4 lines.

The tubes being rarely in contact, and often cylindrical and flexuous, distinguishes this species from its congeners. The transverse diaphragms and absence of radiating lamellæ will serve to separate prismatic portions from the other basaltiform corals found with it.

Not uncommon in the carboniferous limestone of Derbyshire. (Col. University of Cambridge.)

Michelinea glomerata (M'Coy).

Sp. Char. Cells polygonal, irregularly aggregated, so as to open on every side of the large amorphous masses formed by its irregular mode of growth; cells averaging 2 lines in diameter; internal vesicular plates very irregular, much curved and highly inclined.

This is perhaps most allied to the Russian *M. concinna* (Lonsd.), but as that species is remarkable for the breadth, flatness and horizontality of its internal plates, so this is equally remarkable for their irregularity, convexity, small size, and nearly vertical position, forming in the sections a multitude of small rounded vesicles, without any approach to horizontality. The small size of the cells and mode of growth seem somewhat analogous in

both, and separate them at a glance from the three other published species.

Common in the carboniferous limestone of Derbyshire, forming subcylindrical masses 3 or 4 inches long.

(Col. University of Cambridge.)

Michelinea grandis (M'Coy).

Sp. Char. Corallum widely conic, the width considerably exceeding the height, externally marked with thick, rounded, radiating ridges, finely wrinkled across; polygonal cells, on the upper convex surface, averaging 5 to 8 lines in diameter (most near the former at a height of half an inch, most near the latter size at a height of 2 inches), very deep with thin walls not coated by vesicular plates, but having numerous distinct foramina and many longitudinal striæ within; internal vesicular plates small, very thin, much curved, forming nearly horizontal rows of vesicles at the bottom of the cells.

This fine species is most allied to the *M. tenuisepta* (Phil. sp.), but is distinguished by the much wider conical form of the mass and by the cells having, on an average, a diameter three times greater at the same height than in that species, of which I have examined many specimens both British and foreign, and find the figures of Michelin and Koninck, as well as of Prof. Phillips, exact in this respect. Young specimens (1 to 2 inches in diameter) slightly resemble the *M. favosa* (Gold. sp.) in form, having the base much flatter than in the adult, but on comparison with authentic Belgian specimens they are found to be distinguished by the large rounded radiating ridges on the exterior, of which no traces exist in that species, as may be also seen from the figures of Goldfuss and Michelin; the cells also of the present species are, even at that stage, larger, and increased growth destroys all resemblance. The *M. megastoma* (Phil. sp.), which has large cells (although much less than the present species), is distinguished by its mode of growth, it forming large flattened expansions; internally its vesicular plates are much larger, fewer, and highly inclined at the circumference, coating the walls of the cells to their very edge, giving them a peculiar thick tumid appearance, which may be imperfectly recognized in the worn specimen figured by Prof. Phillips, but which distinguishes even fragments from the other four species. Average height of the conical masses $2\frac{1}{2}$ inches, width $3\frac{1}{2}$ inches.

Very common in the carboniferous limestone of Arnside, Kendal.

(Col. University of Cambridge.)

Sarcinula (Lamk.).? = *Arachnophyllum* (Dana).

The corals of this genus are essentially composed of vertical, cylindrical, transversely septate tubes, with radiating lamellæ within, forming distant circular cells without polygonal boundaries; the tubes are imbedded in a uniform cellulose tissue, from which the buds or young tubes seem to arise whenever the distance becomes great between any two cells, but the young tubes do not seem traceable into the old. The coral referred to by Dana (*Acervularia Baltica* of Lonsdale in the 'Silurian System') as the type of his genus *Arachnophyllum*, I find to have the cell-tubes transversely septate, though not well shown in Lonsdale's figure—the latter genus has therefore no peculiar characters—the cellular structure of the rays being common to several corals.

Sarcinula tuberosa (M'Coy).

Sp. Char. Corallum forming large shapeless masses, the upper surface covered with irregular tubercose projections, separated by flat or concave spaces, and each having a depressed tubular centre 1 line in diameter, average distance between the centres 5 lines; from the margin of each centre about thirty slightly sigmoidal, very delicate laminae radiate to the adjoining ones, generally without interruption, the radii connected by numerous small transverse vesicular plates: *vertical section*, centres forming nearly vertical and subparallel cylindrical tubes, with close transverse septa, connected by exceedingly fine uniform cellulose structure, which seems formed of small depressed cells arranged nearly in horizontal layers with a double curve conforming to the projections of the surface: *horizontal section* shows the tubular centres connected by a minute uniform cellular structure with a scarcely appreciable radiation.

This strongly resembles the so-called *Acervularia Baltica* of the 'Silurian System.'

Rare in the carboniferous limestone of Derbyshire.

(*Col.* University of Cambridge.)

Sarcinula placenta (M'Coy).

Sp. Char. Corallum forming tabular masses about 1 inch thick; under side with small, concentric, imbricating undulations of growth and radiating scratch-like striæ; the upper and lower surfaces parallel and flat, composed of vertical cylindrical tubes forming circular cells at the surface 1 line in diameter, and averaging about 2 lines apart; the intervening space being flat, cellular, and obscurely radiated on the weathered surface by

about thirty curved radii: *vertical section*, tubes irregularly transversely septate by vesicular plates; spaces between the tubes composed of slightly waved transverse rows of small, curved, vesicular plates, forming a nearly uniform, minutely cellular structure: *horizontal section*, tubes either plain or showing more or less of the transverse vesicular plates; intervening spaces irregularly cellular, but showing a slight disposition to form curved, star-like lines round the tubes.

This interesting coral bears a strong external resemblance to the *Nemaphyllum decipiens* (M'Coy), but is distinguished by having no divisional lines between the stars in either section.

Rare in the carboniferous limestone of Derbyshire.
(*Col.* University of Cambridge.)

Sarcinula Phillipsii (M'Coy).

Ref. ? *Phil. Pal. Foss.* fig. 15 D.

I have given the above name provisionally to a coral which I believe to be identical with the Flintshire one figured as above by Prof. Phillips, but not named or described. It is closely allied to the preceding species, but is of a thicker growth, the tubes are one-third larger and surrounded by thirty-two to forty strong radiating lamellæ extending to the adjoining tubes, and there is an obvious tendency in the middle of the transverse diaphragms to extend upwards to form an irregularly compressed solid axis, often visible in the weathered cups.

Common in the carboniferous limestone of Corwen.
(*Col.* University of Cambridge.)

Astræa carbonaria (M'Coy).

Sp. Char. Corallum forming very large masses, terminal stars from 9 lines to an inch and a half in diameter, obscurely pentagonal, bounded by narrow, rounded, cellular spaces (no simple divisional walls), having from 107 to 130 thin, jagged, radiating lamellæ, which descend to form an oval or circular cup, and one half of which rise again to form a large oval central boss, in the centre of which the lamellæ become indistinctly blended: *vertical section* shows the uninterrupted passage of the loose vesicular tissue, in gentle curves, from star to star; a very small space directly under the centre of each star having the vesicular structure almost transverse: *horizontal section* shows the alternately long and short radiating lamellæ connected throughout by fine transverse vesicular plates, and the former obscurely blended at the centre (no axis), and the irregular cellular structure intervening between the adjacent stars.

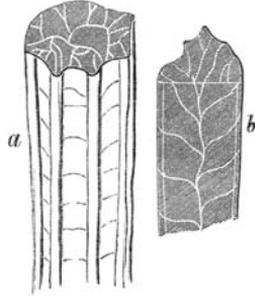
This magnificent species is the only true *Astræa* I have yet seen from the palæozoic rocks, the numerous corals of this age described under this generic title by British and foreign authors belonging for the most part to the family *Cyathophyllidæ*, often transversely septate in the middle and having solid polygonal divisional walls to the stars—characters completely at variance with those of the recent and mesozoic *Astræa*, and indicating important differences in the animals and mode of increase.

Abundant in some parts of the carboniferous limestone near Bakewell, Derbyshire; more rare in the same formation at Corwen.

(Col. University of Cambridge.)

Heterophyllia (M'Coy), n. g.

Gen. Char. Stem elongate, subcylindrical, irregularly fluted longitudinally: *horizontal section*, few, distant lamellæ destitute of any order of arrangement, but irregularly branching and coalescing in their passage from the thin solid external walls towards some indefinite point near the centre, where the few main lamellæ irregularly anastomose: *vertical section* showing about the middle an irregularly flexuous line (the edge of one or two of the radiating vertical lamellæ), from which on each side a row of thin, distant, sigmoidally curved plates extends obliquely upwards and outwards, forming a row of large rhomboidal cells on each side.



Heterophyllia: a. exterior of stem; b. horizontal and vertical section.

The paradoxical characters of the lamellæ—their perfect want of symmetry of disposition, and their irregular branch-like union among themselves, together with the remarkable openness of the cellular structure, render those corals totally unlike any other recent or fossil group. From *Cladocora* and *Caryophyllia*, to which they are most allied, they are distinguished by the want of the cellular axis, and by their few, unsymmetrical and anastomosing lamellæ. I suspect the *Cladocora? sulcata* of Lonsdale may belong to this group, but I have not seen examples of it myself.

Heterophyllia grandis (M'Coy).

Sp. Char. Stem slightly flexuous, about 5 lines in diameter, scarcely tapering in 3 inches, longitudinally marked with deep unequal grooves, and few, large, polygonal, unequal ridges,

giving a very irregularly angulose section to the stem ; surface smooth ; internal structure as given in the generic character.

Rare in the carboniferous limestone of Derbyshire.
(Col. University of Cambridge.)

Heterophyllia ornata (M'Coy).

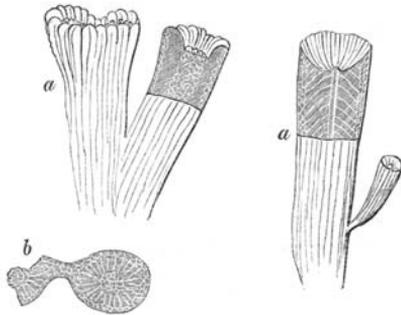
Sp. Char. Stems subcylindrical, long, flexuous, averaging $1\frac{1}{2}$ line in diameter, with about sixteen narrow, subequal, longitudinal ridges sharply defined, and separated by flat spaces rather wider than the ridges they separate, the ridges are set with small round tubercles more than their own diameter apart ; surface very minutely granulose : internal structure as in generic character ; *horizontal section*, lamellæ about fourteen at the margin.

Rather rare in the carboniferous limestone of Derbyshire.
(Col. University of Cambridge.)

Siphonodendron (M'Coy), n. g.

Gen. Char. Corallum of variously aggregated, branching, cylindrical or elongate-conic stems ; young branches produced by lateral buds ; outer wall thin,

lined by two or three rows of small vesicular plates forming a narrow outer vesicular area in both sections ; terminal cups deep, lined by numerous vertical lamellæ, alternately larger and smaller, and having in the bottom a small, prominent, tubular axis : *vertical section* shows a



small, central, persistent, siphon-like tube or axis, which pierces through a series of long, conical or dome-shaped

Recent *Lithodendron*.
a. Mode of growth and vertical section.
b. Horizontal section.

Siphonodendron.
a. Mode of growth and vertical section.
b. Horizontal section.

transverse diaphragms occupying the greater part of the width of the tube, the convexity upward, forming in this section lines diverging downwards and outwards from the axis, till they reach the narrow external cellulose layer on each side : *horizontal section* shows the small tube-like axis, surrounded usually by a few thin concentric lines which are the edges of the conoidal diaphragms cut through by the section ;

from these the vertical lamellæ radiate to the circumference, where they are connected by the small transverse vesicular plates forming the narrow external cellular zone.

I propose this genus for a number of corals exceedingly abundant in the mountain limestone, but hitherto classed by Prof. Phillips, Mr. Lonsdale, and others with *Lithodendron*. This latter genus was originally proposed by Schweigger (Beobachtungen, &c. tab. 6) to include, 1st, the *Oculina* of Lamarck, including the type of Blainville's *Dendrophyllia*; and 2ndly, a division, which allowing the previously constituted genus *Oculina* to stand for the first division, becomes the real type of his genus, and the four references he gives to Esper's 'Pflanzenthiere' as examples of this genus are typical examples of the group subsequently named *Lobophyllia* by Blainville; this latter name therefore becomes a mere synonym of *Lithodendron* and should be laid aside, unless, as many writers seem inclined, it be used for the short, wide species with lobed discs, and thus leave *Lithodendron* for the more slender cylindrical forms: although there is no clear line of separation between the groups, it may be convenient to retain both names for those extreme forms, but in no case can the *Siphonodendra* of the mountain limestone be brought in any close relation with those recent and mesozoic types. The differences are briefly these: 1st, *Siphonodendron* increases by lateral buds,—*Lithodendron* by a lateral elongation and gradual division of the old cup and dichotomous fissure of the stem; 2nd, *Siphonodendron* has a narrow tubular axis and wide conoidal diaphragms, while *Lithodendron* has a large cellular axis and no diaphragms. I have illustrated those points in the accompanying sketch. *Cladocora* of Ehrenberg agrees in external form and mode of branching with *Siphonodendron*, but has the internal structure here represented in *Lithodendron*.

Cladochonus brevicollis (M'Coy).

Sp. Char. Slender stem-like neck of each cell about 1 line long and half a line in diameter, the upper end suddenly swelling to a cup-shaped cell about 2 lines long and 1 line in diameter, curving downwards at an angle of about 135° , the point of junction of the cup and the stem giving origin, at an angle of 45° , to the stem of a second cell similar to the first, but inclining in the opposite direction, and in like manner giving origin from its upper convexity to a third and that to a fourth, &c. perfectly similar cell, forming together an erect, regularly zigzag corallum.

From its regularly angular mode of growth or connexion of the large drooping bell-shaped cups, inclining in opposite direc-

tions from thin short slender stems, this is one of the prettiest species of the genus. It most resembles the *C. tenuicollis* (M'Coy) figured in the 'Annals' for October 1847 (Pl. XI. fig. 8), from the carboniferous shales of New South Wales, but is distinguished by its smaller size and much shorter necks to the cells, while, as in that species, their small diameter compared with their cups distinguishes it from the *C. crassa* (M'Coy) of the carboniferous slate of Ireland.

Rare in the carboniferous limestone of Derbyshire.
(*Col.* University of Cambridge.)

(*Madreporacea.*)

Dendropora megastoma (M'Coy).

Sp. Char. Stem slightly flexuous, subquadrate, branches few, distant, resembling the main stem in size and shape, and coming off from it nearly at right angles; each face has a row of large oval cells with prominent edges, the sides of which have twelve vertical sulci ending in tubercles; the cells of each row are rather less than twice their diameter apart, the lateral rows opposite and alternating with the other two rows; the width of the cells slightly exceeds that of the face on which they rest, so as to indent the margin; interstices obscurely porospunctate; width of stem about half a line.

This beautiful coral is distinguished from the *D. explicita* (Mich.) from the Devonian beds of Boulogne-sur-Mer by its smaller size and larger cells. Michelin, in his 'Iconographie Zoophytologique,' finds this genus from the last-named coral, and approximates it to the genera *Criserpia* and *Aulopora*; the twelve sulci which I observe to the margin of the cells in this species however show that this cannot be the true affinity of the group, which must now rather be placed in the *Madreporacea* near *Seriatopora*.

I have examined several specimens on a piece of carboniferous limestone from Derbyshire.

(*Col.* University of Cambridge.)

Palaeopora (M'Coy), n. g.

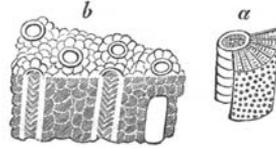
Gen. Char. Corallum polymorphous, generally subhemispherical and concentrically ridged beneath, rarely branched; formed of cylindrical, distinctly walled, tubular cells, having internally twelve vertical sulci or rudimentary lamellæ, and divided at irregular intervals by transverse diaphragms; the tubes surrounded and connected by a uniform minute network of small vesicular plates.

I propose this genus for all the so-called *Porites* of the palaeozoic rocks. First described by Goldfuss as *Astrææ*, they were re-
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moved by Ehrenberg (Ueber Corallenthiere des rothen Meeres, &c.) and Lonsdale (Silurian System) to the recent genus *Porites*, in which they were followed—probably without examination—by many writers; Profs. Bronn (Lethæa, &c.), Phillips (Palæozoic Fossils) and others have however much more happily pointed out their resemblance to *Heliopora*. The distinct walled tubular cells visible in both sections, connected by cellular tissue, with their twelve rudimentary lamellæ, distinguish the present ancient corals from the modern genera just named, for *Porites* has a minutely reticulated corallum impressed by shallow polygonal *undefined* cells on the upper surface, and presenting in the horizontal and vertical sections an uninterrupted uniformly vesicular structure. *Heliopora* agrees perfectly in external appearance, and in the two sections exhibits the same characters of vesicular structure connecting tubular cells with transverse diaphragms, but in it the tubes have eighteen or more rudimentary lamellæ, while they are constantly twelve in the present genus, which I only know as yet in the older and middle palæozoic rocks.

Fistulipora (M'Coy), n. g.

Gen. Char. Corallum incrusting, composed of long, simple, cylindrical, thick-walled tubes, the mouths of which open as simple equal circular cells on the surface, and having transverse funnel-shaped diaphragms at variable distances; interval between the tubes occupied by a cellular network of small vesicular plates.



Fistulipora: a. mode of growth, natural size, enveloping a crinoid stem.
b. magnified surface and section.

This genus is proposed to include the *Manon cribrosum* (Gold.) of the Eifel, &c., and the two following species from the mountain limestone. They have no affinity with the fossil sponges of the genus *Manon*, with which the only previously known species was classed by Goldfuss and others, but are more allied to the so-called *Porites* of the palæozoic rocks (*Palæopora*, M'Coy), from which they differ in the absence of the rudimentary radiating or vertical lamellæ to the cell-tubes. The sides of the tubes do not seem to be ever perforated by connecting pores.

Fistulipora minor (M'Coy).

Sp. Char. Cell-tubes with slightly prominent margins at the surface, about four in the space of one line, rather less than their own diameter apart, the intervening space composed of from one to three rows of the minute vesicular cells.

The tubes of this species are of so small a diameter that I have

not been able to see the diaphragms; they are from half a line to nearly an inch in length according to the age of the example, but not altering materially their diameter or relative distance. It most usually occurs incrusting crinoid stems or other foreign bodies, from which the tubes radiate to the surface, and I suspect the whole corallum, from the minuteness of its parts, may have been taken for a *Favosites* or *Alveolites*, from which the lens will easily distinguish it by showing the reticulated interstices between the tubes.

Not uncommon in the carboniferous limestone of Derbyshire. (Col. University of Cambridge.)

Fistulipora major (M'Coy).

Sp. Char. Cell-tubes two-thirds of a line in diameter and about their own diameter apart, their walls thick, of concentric layers, with closely placed funnel-shaped internal diaphragms: interstices minutely vesicular, four to six rows of vesicular cells between each pair of tubes.

The comparatively great size and distinctness of the parts of this coral enabled me first clearly to ascertain the generic peculiarities of the whole group.

Rare in the carboniferous limestone of Derbyshire. (Col. University of Cambridge.)

FORAMINIFERA.

I believe no examples of this group have been hitherto determined in the British carboniferous rocks, which is the more remarkable from their great abundance in the corresponding deposits in Russia, and according to M. de Verneuil* in America. I may mention, that since the publication of M. Ehrenberg's paper on the carboniferous *Foraminifera* in the 'Monats Bericht' of the Berlin Academy, I have diligently sought for the several carboniferous species he describes in the limestone of a great number of different British localities without success. The following is the only species I have met with, and I only know it at present from the one locality.

Nodosaria fusulinaformis (M'Coy).

Sp. Char. Shell of two or more inflated, pyriform, easily separable lodges, the first one having a small mucronate point at its posterior end, and contracted to a very slender, short neck at the anterior end, which joins the pyriform second cell, which

* "Note sur le parallélisme des dépôts paléozoïques de l'Amérique Septentrionale avec ceux de l'Europe," &c., Bulletin de la Soc. Géol. de France, 2^e série, vol. iv.

is also contracted to a similar minute neck in front; surface smooth. Length of individual cells averaging 1 line, width two-thirds of a line.

So like is this in size and shape to the inflated variety of Fischer de Waldheim's *Fusulina cylindrica* occurring in such quantities in some parts of the Russian carboniferous limestone, that it might easily be mistaken for it; it is destitute however of the longitudinal external fissure-like opening and complex internal structure of that genus, seeming more properly allied to certain moniliform, few-celled *Nodosariae*, such for instance as the *N. rudis* and *N. rugosa* of M. D'Orbigny's work on the Austrian Foraminifera, with both of which species it agrees almost perfectly. The lodges or cells are almost always found separated (from the minuteness of the connecting neck), which gives them the striking resemblance to *Fusulinae* above alluded to; I have heard however of several of them having been found united in a line by their little necks, and I have myself seen two thus united, and the posterior cell not being a terminal one.

Occurs in great numbers on the weathered surfaces of the carboniferous limestone in the parish of Shivey, Tyrone, in the north of Ireland.

(Col. University of Cambridge and Royal Dublin Society.)

Exclusive of the above species, the following is a list of such British corals of the carboniferous period as I have myself noted since the publication of Morris's Catalogue of British Fossils in addition to the species there given; it includes, 1st, some species described by foreign authors which I have recognized in Britain; 2nd, a few Devonian species for which I give undoubted carboniferous localities; and 3rd, those new forms which I have figured and described in the 'Synopsis of the Characters of the Carboniferous Limestone Fossils of Ireland' published some years ago, the result of an examination of the collections made in that country by Mr. Griffith of Dublin, with whose permission I now however, for the first time, publish the principal geological and geographical localities, the omission of which in the work mentioned has often been regretted. All the localities except those in *italics* are in Ireland. All the species in *italics* are in the Geological Museum of the University of Cambridge. The following abbreviations are used of the rocks: *Ar. L.* Arenaceous Limestone, a peculiar band in the middle of the yellow sandstone at the base of the carboniferous series; *Calp.* a provincial term for a band of dark argillaceous limestone occurring between the great lower and upper limestones, accompanied in the north of Ireland by thick

beds of shale and a little sandstone; *C. L.* Carboniferous Limestone generally; *C. Sh.* Carboniferous Shale generally; *C. Sl.* Carboniferous Slate, the shales between the base of the lower limestone and the top of the yellow sandstone, alternating more or less with each at the points of junction; *L. L.* Lower Limestone, the great limestone of Ireland, between the Calp and the carb. slate; *U. L.* Upper Limestone, a thinner deposit than the lower limestone, occurring between the Calp and the millstone grit. *Y. S.* Yellow Sandstone—a thick sandstone at the base of the carboniferous system in Ireland, occupying the space between the carboniferous slate and the old red sandstone, and by many geologists considered to belong to the latter; I have recognised however in the shales intercalated with it nearly the same suite of fossils which we find in the carboniferous slate and in the Calp, and in the beds of arenaceous limestone occasionally occurring in it I have identified the most characteristic fossils of the main or lower limestone, so that no doubt remains in my mind of the correctness of Mr. Griffith's original view, that this sandstone forms the true base of the carboniferous limestone formation.

ALVEOLITES.

Goldfussi (Michel. sp.), Icon. Zooph. L. L. Hook Head, Wexford.
 ? *palmata* (M'Coy). *Flustra* id., Syn. Carb. Foss. Irel.
 Calp. Manor Hamilton.

ASTREOPORA.

antiqua (M'Coy), Syn. Carb. Foss. Irel. C. Sl. Hook Point.

AULOPORA*.

campanulata (M'Coy), Syn. Carb. Foss. C. Sl. Hook Head.
gigas (M'Coy), Syn. Carb. Foss. of Irel. Calp. Ballintrillick.
serpens (Gold.), Petrefacten. Calp. Bundoran.

BERENICEA?

megastoma (M'Coy), Syn. Carb. Foss. C. Sl. Hook Head.

CANINIA.

cornu-bovis (Mich.), Icon. Zooph. C. L. *Corwen*.
cornu-copiae (Mich.), Icon. Zooph. C. Sh. Red Castle, Mt. Rath;
Glasgow; *I. of Man*.
flexuosa (Gold. sp.), Petrefacten. C. L. *Kendal*.
gigantea (Mich.), Icon. Zooph. { C. L. *Easky, Sligo*.
 { C. Sh. *Castletown Bay, I. of Man*.
patula (Mich.), Icon. Zooph. C. Sl. Hook, Wexford.

* If the small recent and newer fossil corals referred to the genus *Alecto* really belong (as seems the general opinion now) to the *Polyzoa*, there could be no hesitation in considering the comparatively gross palæozoic species not only as generically distinct, but as belonging to a different order—the sulcation visible within the tubes of several of the species clearly indicating rudimentary radiating lamellæ, which, as they exceed twelve in number, place those corals among the *Anthozoa*,—most probably, I think, near *Syringopora*, in which a similar sulcation has been detected. Instead therefore of considering the words *Alecto* and *Aulopora* as synonymous, we may, with advantage, retain each for the peculiar section of the group indicated.

CAUNOPORA.	
placenta (Phil.), Pal. Foss.	C. Sl. Poulscadden Bay, Howth.
CERIOPIORA.	
<i>affinis</i> (Gold.), Petrefacten.	C. Sh. <i>I. of Man.</i>
CLADOCHONUS.	
<i>antiquus</i> (M'Coy), Syn. Carb. Foss.	C. Sh. Rahan's Bay; St. John's Point, Donegal.
<i>bacularius</i> (M'Coy), Syn. Carb. Foss.	C. L. <i>Derbyshire.</i>
<i>crassus</i> (M'Coy), Syn. Carb. Foss.	{ C. L. <i>Derbyshire.</i> C. Sh. Lisnapaste; Lackagh.
CYATHAXONIA.	
<i>cornu</i> (Mich.), Icon. Zooph.	C. L. <i>Kendal.</i>
<i>spinosa</i> (Kon. sp.), Anim. Foss. Belg.	C. L. <i>I. of Man.</i>
DICTYOPHYLLIA.	
<i>antiqua*</i> (M'Coy), Syn. Carb. Foss.	C. Sl. Hook.
FAVOSITES.	
<i>Gothlandica</i> † (Gold.), Petrefacten.	C. L. <i>Derbyshire</i> ; <i>I. of Man.</i>
<i>inflata</i> (Kon.), Anim. Foss. Belg.	C. L. <i>Kendal.</i>
FENESTELLA.	
<i>antiqua</i> (Lonsd. Devonian var.), Geol. Trans. vol. v.	{ Y. S. Bruckless. C. Sl. Blackball Head, Cork; Currens; Clonea; Clonmel, &c.
<i>carinata</i> (M'Coy), Syn. Carb. Foss.	{ C. L. <i>Derbyshire</i> ; <i>I. of Man.</i> Tynan; Mountmellick. Calp. Malahide.
<i>crassa</i> (M'Coy), Syn. Carb. Foss.	L. L. Ballynacourty; Kildare.
<i>ejuncida</i> (M'Coy), Syn. Carb. Foss.	L. L. Cork.
<i>formosa</i> (M'Coy), Syn. Carb. Foss.	{ C. L. <i>Derbyshire.</i> Calp. Malahide, Dublin. U. L. Killymeal, Dungannon.
<i>frutex</i> (M'Coy), Syn. Carb. Foss.	U. L. Killymeal, Dungannon.
<i>hemisphærica</i> (M'Coy), Syn. Carb. Foss.	L. L. Cork.
<i>Morrisii</i> (M'Coy), Syn. Carb. Foss.	L. L. Cork.
<i>multiporata</i> (M'Coy), Syn. Carb. Foss.	{ C. L. Cork; Killymeal. Calp. Ballintrillick.
<i>oculata</i> (M'Coy), Syn. Carb. Foss.	C. Sl. Ballynacourty, Dungarvan.
<i>plebeia</i> (M'Coy), Syn. Carb. Foss.	{ C. Sl. Poulscadden. L. L. Cork; Howth; <i>Derbysh.</i> Calp. Bundoran; Ballintrillick.
<i>quadridecimalis</i> (M'Coy), Syn. Carb. Foss.	U. L. Black Lion, Enniskillen.
<i>varicosa</i> (M'Coy), Syn. Carb. Foss.	U. L. Black Lion, Enniskillen.

* More lately figured by Michelin (Icon. Zooph.) under the name of *Michelinca compressa*.

† It is several years since I first published this as a carboniferous coral from a single Irish specimen, concerning the locality of which some doubt was expressed. I have now examined a large suite from the Derbyshire limestone, and compared them minutely with authentic specimens of Goldfuss's coral from the Eifel, and am enabled fully to confirm my original observation.

GLAUCONOMI.

- bipinnata* (Phil. var.), Pal. Foss. { C. Sl. Ballynacourty; Poulscadden.
Calp. Bundoran.
U. L. Killymeal, Dungannon.
- gracilis* (M'Coy), Syn. Carb. Foss. { C. Sl. Ballynacourty, Red Castle, Mt. Rath.
Calp. Ballintrillick.
U. L. Killymeal, Dungannon.
- grandis* (M'Coy), Syn. Carb. Foss. L. L. Meelick Chapel, Co. Clare.
- pulcherrima* (M'Coy), Syn. Carb. Foss. C. Sl. Hook Head.

GORGONIA?

- Lonsdaliana* (M'Coy), Syn. Carb. Foss. C. L. Laracor, Trim.
- ziczac* (M'Coy), Syn. Carb. Foss. Ar. L. Granard.

HEMITRYPA.

- Hibernica* (Sc. sp.), M'Coy, Syn. Carb. Foss. { L. L. Cork.
Calp. Ballintrillick.
U. L. Knockninny; Black Lion.

ICHTHYORACHIS.

- Newenhami* (M'Coy), Syn. Carb. Foss. C. L. Meelick Chapel, co. Clare.

MILLEPORA?

- gracilis* (Phil.), Pal. Foss. C. Sl. Ballynacourty; Lisnapaste.
- similis* (Phil.), Pal. Foss. C. Sl. Toberyellathan, Gort; St. Doolaghs, Dublin.

NEMAPHYLLUM.

- aranea* (M'Coy). *Astræa* id., Syn. Carb. Foss. C. L. Magheramore, Tobercurry.

PETRAIA.

- bina* (Lonsd. Devon. var.), Phil. Pal. Foss. { Y. S. Bruckless.
C. Sl. Currens, Tralee.
- celtica* (Lamx. sp.), Phil. Pal. Foss. C. Sl. Clonea; Knocklofty.
- pauciradialis* (Phil. sp.), Pal. Foss. C. Sl. Currens; Ballynacourty.
- pluriradialis* (Phil. sp.), Pal. Foss. C. Sl. Currens, Castle Island.

POLYPORA.

- dendroides* (M'Coy). { Ar. L. Townparks, Killeshandra.
C. Sl. Red Castle, Mt. Rath.
- fastuosa* (Kon. sp.), Anim. Foss. Belg. { L. L. Hook Head.
U. L. Killymeal.
- marginata* (M'Coy), Syn. Carb. Foss. U. L. Killymeal, Dungannon.
- papillata* (M'Coy), Syn. Carb. Foss. { Ar. L. Townparks, Killeshandra.
L. L. Rathgillen, Nobber.
U. L. Black Lion, Enniskillen.
- verrucosa* (M'Coy), Syn. Carb. Foss. { C. L. Derbyshire.
C. Sh. Red Castle, Mt. Rath.

PTILOPORA.

- pluma* (Sc. MSS.), M'Coy, Syn. Carb. Foss. { C. Sl. Poulscadden, Howth; Hook.
L. L. Kildare.
Calp. Malahide.

RETEPORA.

- undata* (M'Coy), Syn. Carb. Foss. L. L. Kildare.

SIPHONODENDRON.

- pauciradiale* (M'Coy). *Lithodendron* id., Syn. Carb. Foss. C. L. Magheramore, Tobercurry.

STENOPORA.

scabra (Rafin. sp.). *Favosites* id., Kon. Anim. Foss. Belg.
C. Sl. Hook; Clonea; Currens.

STROMBODES (*Lithostrotion*, Lonsd.).

emarciatum (Lonsd. sp.), Geol. Russ. and Ural. C. L. *Derbyshire*.

VINCULARIA.

<i>dichotoma</i> (M'Coy), Syn. Carb. Foss.	{ L. L. Howth; Kildare. U. L. Black Lion, Enniskillen. U. L. Killymeal. U. L. Killymeal, Dungannon.
<i>megastoma</i> (M'Coy), Syn. Carb. Foss.	
<i>raricostata</i> (M'Coy), Syn. Carb. Foss.	

XIV.—*Supplementary Notices regarding the Dodo and its Kindred.*

Nos. 1, 2, 3. By H. E. STRICKLAND, M.A., F.G.S.

ONE of the main objects which Dr. Melville and myself had in view, in publishing our recent work on the *Dodo* and its Kindred, was to draw the attention of others to this interesting historico-physical investigation, and thus to elicit from all quarters such additional items of information as had escaped our own research. Many a curious scrap of *Dodo*-knowledge is doubtless still buried in the holes and corners of libraries, museums, and picture-galleries, and many a precious bone-fragment still moulders in the caverns and alluvions of the Mascarene Islands. Already, in the short interval since our publication saw the light, have several important links been added to the chain of evidence there displayed,—partly through the kind diligence of our friends, and partly by our own more recent researches. These supplementary facts I propose to communicate from time to time to the ‘*Annals of Natural History*.’

1. *Historical evidence of the Dodo*.—I grieve to be obliged to record that Oxford, the cradle of so much learning, now stands convicted of having been the grave, not of *one* *Dodo* (as was hitherto supposed), but of *two*. A small dingy MS. volume has lately been purchased by the fellows of Queen’s College, Oxford (I dare not say at what price), from Mr. Rodd the bookseller. This precious but unattractive little book is the original autograph diary of Thomas Crossfield, once fellow of Queen’s, and extends over fourteen years, from 1626 to 1640. Amidst a variety of matters, some of historical interest, and others “of no importance to any but the owner,” we find the following curious passage, which was first detected, and kindly communicated to me, by the Rev. Dr. Bliss.

Page 68. “1634. Spectacula Oxonii in hoc anno.

1. The Palsgraves Family.
2. His mat^{ies} Hokus Pokus.
3. Dancing vpon the rope.
4. Hierusalem in its glory, destruction.