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THE

PALEONTOLOGIST.

No. 1.] CINCINNATI,—U. P. JAMES. [JULY 2, 1878.

Plan of this Publication.—Numbers will be issued in the form of Bulletins, at such times as sufficient material is ready.

Object.—To furnish a medium for the early publication of original papers on Geology and Paleontology, in order to avoid the frequent delays when depending upon the regular serials—Journals and Proceedings of Societies.

DESCRIPTIONS OF NEWLY DISCOVERED SPECIES OF FOSSILS FROM THE LOWER SILURIAN FORMATION.—CINCINNATI GROUP, BY U. P. JAMES.

GENUS **ASTYLOSPONGIA,** (ROEMER.)

Astylospongia tumidus. (James.) Fossil subglobose, more or less depressed, with a shallow cavity on one side. Surface rough and generally covered with pit-like markings; sometimes quite distinctly lobed; examples examined not very satisfactory.

Locality—Cincinnati.

GENUS **STROMATOPORA,** (DE BLAINVILLE.)

Stromatopora papillata. (James.) Fossil forming a thin crust upon corals, shells and other foreign substances. Surface covered with very small, closely set, prominent papillæ, or tubercles, giving to the fossil a granulated appearance to the naked eye. Papillæ with circular apertures, in some cases, at the tops, others *seem* to be solid or closed. The examples on Strophomena and Orthis, have, in most cases, the papillæ arranged in radiating rows upon the striae of the shells, but in other cases, and in all specimens on corals, there is no such arrangement and no regularity. From 6 to 8 papillæ in the space of one line, interspaces non-poriferous.

Locality—Cincinnati and vicinity, extending to the upper beds of the Cincinnati Group.

GENUS **CHAETETES,** (FISCHER.)

Chaetetes crustulatus. (James.) Corallum consisting of a thin crust, from 1/8 to 1/4 of a line or more in thickness. Calices subpolygonal, varying greatly in form and size, about 7 or 8 in the space of one line, with groups of much larger ones about two lines apart, from center to center of the groups; sometimes one central calix of a group much larger than the others; other groups have 3 or 4 large calices at or near the center, decreasing in size outwardly; both number and size of the larger calices in the different groups quite inconstant; no surface prominences of any kind. Walls of corallites very thin; no interstitial pores.

All examples observed are spread over the surface of different species of Orthoceras.

Locality—Cincinnati and vicinity, extending to the upper beds.

Chaetetes. Sp. (?) In the upper beds of the *Cincinnati Group*, I find a form of coral—abundant—much like *C. gracilis* in *general features*, the chief difference being in the larger size of the branches, some of them nearly 1/2 an inch in diameter; the typical *gracilis averaging* not over one *line*. Should this prove distinct on further examination, I propose for it the name MEEKI, (Chaetetes Meeki) in honor of the late F. B. Meek.

Typical *C. gracilis* found in lower beds at Cincinnati.

Chaetetes. Sp. (?) A coral resembling *Chaetetes Jamesi*, Nicholson, is found in the upper beds of the *Cincinnati Group*. Its mode of growth seems to differ in some respects; being spread over shells, in thin lays, in some cases; in others branching out in a digitate manner from lobate, palmate and irregular shaped forms; the average calices are scarcely as thick walled as typical *Jamesi*, and the stellate spaces rather more conspicuous. Should it prove a distinct species, I propose for it the name *varians* (Chaetetes varians.)

The typical *C. Jamesi* is found in the lower beds of the Group at Cincinnati.

GENUS **HELIOLITES,** (GUETTARD.)

Heliolites Shepardi. (James.) Corallum sub-circular in outline at the base; discoid, or hemispherical, or dome shaped, or lozenge shaped; from ½ an inch to about an inch in diameter at the base. Cells on the upper surface from ½ a line to one line in diameter, in most cases two or more times their diameter apart, but sometimes not more than 1 line; margins of cells thin, very little or not at all elevated above the general surface; the cups show 12 well developed septa; coenenchyma thickly set with irregularly shaped pit-like markings, giving to it a roughened aspect. Vertical thickness, through the center, from less than ¼ of an inch to ½ an inch in different examples. Base (under side) markings are shown in sort of radiating lines from the center. A vertical section of one specimen shows the cells passing through the body of the fossil, but the internal structure cannot be clearly made out from the material at hand.

The base, (under side) of the 4 examples I have, vary widely—2 being flat with a saucer-shaped depression in the middle, about 2 lines in diameter, surrounded by an elevated rim, outside of which (in one case) are 4 concentric lines of growth, (?) slightly elevated—the other has but one raised line, rather more prominent, between the rim and margin. The third example has a raised center, slightly depressed in the middle, 2 lines in diameter, with a single broad circular groove between that and the margin. The fourth is more convex on the under than the upper side, with 6 concentric lines of growth, and a central prominence about 1½ lines in diameter, and a groove about ⅙ of a line deep and ½ a line broad, extending from the center to within a line of the margin on one side, where the fossil is thickened downwards and a slight depression opposite on the upper side; this is a lozenge-shaped specimen. The *base* difference may have been caused by the shape of the substances on which they appear to have grown—the upper surfaces are much alike.

Named in honor of Mr. Carlos Shepard, collector of the specimens.

Locality—Adams County, Ohio, upper part of Cincinnati Group.

GENUS **FISTULIPORA,** (McCOY.)

Fistulipora (?) multipora. (James.) Corallum incrusting foreign substances, generally other corals, entirely covering cylindrical and flattened branches, sometimes in superimposed layers; others spread over the surface of shells. The cells are of various irregular shapes—circular, oval, triangular and other forms—about ⅙ of a line in diameter. Between and sometimes surrounding the larger cells are numerous small pores, in some cases double rows, with no apparent regularity of arrangement. Occasionally, on some specimens, there are groups of the small pores occupying the places of the larger cells.

Locality—Cincinnati and vicinity, with a vertical range of 400 or 500 feet.

GENUS **AGELACRINUS,** (VANUXEM.)

Agelacrinus Holbrooki. (James.) Body circular, sub-globose. Disc composed of many thin plates, those in the interradial areas pentagonal or hexagonal, outside squamiform, imbricating; margin of the disc composed of numerous small cuniform and various shaped plates. Arms or rays not raised above the surface of the disc, four sinistral and one dextral, composed of two rows of interlocking pieces; ends of the rays curving quite sharply upward and inward, making nearly a semi-circle, to near the center of the interradial areas, and terminating in a blunt club-shaped form. Ovarian aperture situated subcentrally in the area between the dextral and one of the sinistral rays, depressed and composed of ten cuniform pieces and an outer row of small thin plates, placed, apparently, on their edges. The end of the dextral ray passes into or against the plates of the ovarian aperture.

Diameter at the base 1¼ inches, and measuring from side to side, *over* the crown, 1¾ inches; convexity ⅝ of an inch.

This species differs from *A. Cincinnatiensis*, Roemer, as defined and figured by Meek and by Hall, in the form of the interradial plates, the curve and shape of the rays towards and at the termination, and the convexity of the body. And from *A. pileus*, Hall, the same variations may be stated, except the convexity, in which it resembles the latter.

The fine type examples of this species are in the cabinet of Professor R. H. Holbrook, of Lebanon, Warren County, Ohio, in honor of whom the name is given.

Locality—near Lebanon, Warren County, Ohio.

GENUS **HELOPORA**, (HALL.)

Helopora dendrina. (James.) Polyzoary dendroidal, starting from a slightly expanding base, attached to other substances and spreading rapidly outward and upward; anastomosing frequently; branches cylindrical, stirated longitudinally, and from ⅓ to ½ a line in diameter. Cells variable in form and arrangement, from circular to long oval, in alternating rows in some parts, in others irregularly placed; cell apertures oblique, with slightly raised margins, from 6 to 8 in the space of a line measuring longitudinally. On and near the base the apertures are more elongated than above and arranged between elevated flexuous lines.

The best specimen examined of this species is about 2 inches in diameter across the top, sub-circular in outline, lying in a depression in a fragment of limestone. Found by Mr. Charles Schuchert, on Mt. Adams, Cincinnati.

Helopora tenuis. (James.) Polyzoary minute, consisting of straight, angular or cylindrical stems, with a single row of cells on the face exposed; cell apertures oblong, with raised margins, arranged between strong longitudinal lines, and separated about the distance of their longer diameter; about 6 cells in the space of a line, including the interspaces. Examples examined are unbranched, from ¼ to ½ an inch long, and ⅛ or $\frac{1}{10}$ of a line in diameter.

Some specimens have a depressed line on the highest part. and a row of much raised oblique cell mouths on each side—others show only striated faces, no cells; and some have swollen terminations. All examples observed lie upon the surfaces of other substances, no detached specimens found, consequently but one face of any *one* example can be seen.

Locality—Cincinnati.

Helopora Meeki. (James.) Polyzoary consisting of very small cylindrical or subcylindrical stems; sometimes branching dichotomously. About 6 cells in the space of a line measuring their longer axes, and arranged in rows between strong elevated longitudinal lines. The cells are generally opposite each other in the rows, but sometimes are alternating; cell apertures long oval, margins not raised; length of fragments observed from ¼ to ½ an inch; diameter ⅓ of a line.

All examples examined are attached to the surfaces of fragments of limestone.

Locality—Warren County, Ohio.

Helopora parvula. (James.) Polyzoary consisting of slender stems, branching dichotomously at irregular intervals, more or less angular, about ⅙ of a line in diameter. Parts observed from ¼ to ¾ of an inch in length; in most cases 2 or 3 rows of cells on the exposed surface of the lower part, but above the last bifurcation, sometimes *one* row only. Cells generally in alternating rows, but in some examples they are nearly opposite to each other, with quite strong, straight or zig-zag, more or less elevated lines between the rows. The number of cells vary from 6 to 9 in the space of a line longitudinally, of quite irregular shapes—circular, elliptical, angular and pointed—about their longer diameter apart. Cell apertures, of unworn examples, have raised margins, arched above and depressed below. Owing to the extreme frailness of the raised cell margins, they are mostly more or less worn off. In many cases the apertures have an oblique, outward, upward direction. The stems are often chain-like in appearance, *seemingly* angular, but it is difficult to determine the exact form, no *detached* specimens being found, all lying on the surface of or embedded in fragments of rock or shale.

Associated with this species are cylindrical examples with one or two more rows of cells, and *bulbous* upper terminations; the bulbs carry very small pores, which are not on other parts of the fossil; in other features they do not seem to differ from *H. parvula*. Should these prove, on further investigation, to be distinct, I propose the name *Helopora approximata*.

Locality—Obanon Creek, Clermont county, Ohio.

GENUS **PTILODICTYA**, (LONSDALE)

Ptilodictya Hilli. (James.) Polyzoary an unbranched, elongated, flattened, two-edged frond. Transverse section acutely elliptical, a little more than a line in thickness in the middle; faces of the frond gently curved to the thin sharp edges. Central axis clearly shown, both faces celluliferous. Prominent transverse, parallel ridges cross and extend over the whole length of the frond, about one line apart, giving it a corrugated appearance—a marked feature of the species. Cell apertures oval or lozenge-shaped, arranged between two series of elevated lines crossing the frond obliquely from the opposite edges. About eight cell apertures in the space of a line, measuring diagonally, not interrupted in their regularity in passing over the ridges. The cells seem to extend to the thin edges of the frond, but as the examples examined are somewhat weathered on the edges it is difficult to determine this point positively.

The two specimens examined are lying on opposite surfaces of a small block of limestone. One of them two and a half inches long, and six lines broad the whole length; the other is one and a half inch long and about four and a half lines broad to within six lines of the base, where it slopes off abruptly from one side, wedge-shaped to an acute point, the other side continues straight to the pointed end. It is not certain that this pointed base (?) is the normal form of the species, it may have been caused by weathering but it does not so appear.

The marked and decided difference between this species and *P. falciformis*, Nicholson, is the *prominent transverse ridges*.

Named in honor of Dr. H. H. Hill, of Cincinnati, who found the specimens on the bank of the Ohio River at Cincinnati.

Ptilodictya plumaria. (James.) Polyzoary plumose, pointed at the base, divided into three lobe-like parts by longitudinal depressions commencing near the base, which flatten out gradually as they approach the upper part, with a row of elongated, oblique pits in each depression directed outward and upward; the lower part of the central lobe gently curving from the base upward to about half the length of the specimen; the lateral lobes expand quite rapidly, and to thin edges—one side at a sharper angle than the other. On the surface are several rows of slightly radiating low nodes. Quite strong longitudinal wavy lines on the central lobe, from eight to ten in the space of a line, between which, measuring in the same direction, are about ten circular or oval cell apertures in the space of a line. The cells on the lateral lobes are quite indistinct on the only specimen yet examined, caused by weathering. A small portion of the upper part is covered with rock; the exposed part measures one and three-quarter inches in length, and seven-eigths of an inch in width at the broadest part.

I am indebted to G. T. O'Neall, Esq., of Waynesville, Warren Co., O., for this beautiful specimen, who found it near that place—upper part of the Cincinnati group.

Ptilodictya flexuosa. (James.) Polyzoary consisting of small, thin, flexuous fronds about two-thirds of a line in width, with sharp edges, giving off lateral branches about half the width of the main stem about two and a half lines apart; transverse section flat oval; the main stem curving slightly opposite and just above each branch. Six or eight rows of alternating, oval cell apertures on the main frond, and about half as many on the branches; about four cells in the space of a line measuring longitudinally. One row of cells on each side have an oblique direction; close on the edge of the frond, outside of the oblique row, is a row of imperfect cell mouths about half the width of the others. On some parts of the frond the cell walls are in contact, on other parts they are separate with minute tubuli between of very irregular forms.

This species bears some resemblance to *P. Shafferi*, Meek, but differs materially in being destitute of the sinuous longitudinal lines between the cells, the form of the apertures, the outer imperfect row of cells and the lateral branches.

Locality—Cincinnati.

Ptilodictya granulosa. (James). Polyzoary consisting of flattened two-edged fronds; branching dichotomously celluliferous on both faces; about one line in width; the main frond and branches nearly equal. Length not known. Transverse section compressed elliptical, one-quarter of a line or less in thickness through the center. Surface entirely covered with exceedingly minute *granules* not visible to the naked eye, but quite conspicuous under a good lens. From eight to eleven alternating rows of cells arranged between longitudinal lines in a quincuncial manner, the outer row on each edge has an oblique upward direction. Cell apertures elliptical, about five in the space of a line longitudinally.

Locality—Cincinnati.

Ptilodictya paralella. (James.) Polyzoary a flattened, linear, unbranched, two-edged frond, about one line wide, longest example observed one inch. Surface gently convex celluliferous on both faces; edges very thin and sharp. Eight or ten alternating rows of elliptical cells arranged between longitudinal lines; one row on each edge having an oblique direction. Cell apertures not raised, five or six in the space of a line measuring longitudinally.

Locality—Cincinnati.

GENUS **CERAMOPORA,** (HALL.)

Ceramopora, (?) Beani. (James.) Polyzoary forming thin, irregular expansions upon the surface of Orthoceras and other foreign substances. The cells have, sometimes, central points from which they radiate, and are arranged in a somewhat quincuncial order in alternating oblique rows; but in other cases they are not so arranged. Cell walls rather thick and not raised above the general surface; apertures slightly oblique in some cases. Cell apertures generally long oval or diamond-shaped. but sometimes quite irregular in form. About three cells in the space of a line measuring the longer diameter, and four or five measuring transversely. In some cases the cells and cell walls resemble the nonporiferous face of the fenestrules and branches of Retepora. Placed doubtfully in the Genus *Ceramopora, provisionally.*

Named in honor of Mr. Wm. H. Bean, of Lebanon Ohio, from whom I received a very fine specimen.

Locality—Cincinnati and other places in the Cincinnati group.

Ceramopora (?) irregularis. (James.) Polyzoary incrusting other substances. Cell apertures very irregular in size and shape, some twice as large as others and without any apparant regular arrangement—circular, oval, triangular, and other forms. Cell walls rather thick; apertures in best preserved specimens oblique, but generally they appear direct. An average of about six cells in the space of a line. The general surface resembles somewhat *Chaetetes Jamesi* Nicholson, on which it is frequently found grown, and it is sometimes taken for that species. In some cases it seems to have grown in superimposed layers.

Locality—Cincinnati and vicinity, having a vertical range of 500 or 600 feet.

Ceramopora alternata. (James.) Polyzoary consisting of hollow, branching, cylindrical or compressed stems from one to four lines in diameter, with irregular swellings; the hollows filled with foreign matter, (clay). Cell apertures of the most perfect specimens, elevated, oblique, arched. sub-circular or oval; five or six in the space of a line including the interspaces; generally arranged in alternating rows, sometimes in a diagonal manner around the branches. Spaces between the cells equal to their diameter or a little more or less on different examples. Slightly cut longitudinal sections of some specimens show the cells arranged in diagonal, alternating rows of a lozenge-shape, with minute interstitial pores. Distributed over the surface about two lines apart, are spots, sometimes slightly elevated, bearing fewer cell apertures and more or less of the small pores. The surface of worn or weathered examples—mostly so found—are nearly smooth; destitute in most cases of prominent cell mouths, but show more minute interstitial tubes and divisions, than perfect specimens.

Locality—Cincinnati and vicinity.

Ceramopora concentrica. (James.) The parts of the Polyzoary observed consist of cylindrical or flattened branching stems from one-eighth to one-half an inch in diameter, built up of concentric layers, each layer from one-quarter to one-half a line in thickness, and having for a nucleus a crinoidal column or some other foreign substance, in some cases evidently of a perishable nature, which, having decayed, left the stems in a condition to become flattened by pressure. The small cylindrical specimens have only a *single* layer, about one-half a line in thickness around the central object. On the surface of most specimens are maculae about two lines apart from center to center, occupied by from three to six cell tubes spreading in different directions at a very low angle. On the general surface the cell apertures are raised and arched in a hooded manner; walls rather thick, and, when most perfect, the raised margins are thin and sharp, when slightly weathered or worn, more or less small interstitial pores are shown. In some cases the cells are arranged in short alternating series. Cell apertures circular or oval, and about five in the space of a line. A slightly cut or ground specimen shows the interior of the cells arranged much like some specimens, so treated, of the preceding, and occasionally parts of the surface resemble that species, (*C. alternata.*)

I have one example varying from the above in being but a single layer, having grown upon a flat surface—about one-half an inch square—and become detached; there is no distinguishable difference in the upper or outer surface markings from the above, but the under or interior surface (which cannot be seen in the cylindrical forms), is *very* different from the outer, having the appearance of net work with alternating series of long oval or lozenge shaped meshes, radiating from central points.

I have a number of specimens of amorphous masses from about one to three inches in diameter which resemble this species in the mode of growth, and may be identical, but the surfaces being considerably weathered, and partly overgrown by other species, it is difficult to make them out clearly.

Locality—Cincinnati.

GENUS **HIPPOTHOA,** (LAMOUROUX.)

Hippothoa delicatula, (James.) Polyzoary creeping, adnate, branching dichotomously, and sometimes anastomosing. Branches linear, about one-tenth of a line in diameter. Cells uniserial, each growing by a pointed base from the cell below, and expanding gradually to the mouth; two or three cells in the space of a line. Apertures terminal, elevated, and nearly or quite the diameter of the cells, and placed on their front face.

This is an exceedingly delicate species and is found attached to corals and other substances.

Locality—Cincinnati.

GENUS **ORTHOCERAS,** (BREYNIUS.)

Orthoceras Hindei. (James.) Shell small, semi-cylindrical, tapering gradually, sometimes to a long slender point. Septa varying from less than three-quarters of a line to over a line in width, and generally forming about half a circle. Transverse sections of specimens embedded in rock as well as detached ones show this semi-cylindrical outline of the *shell*, and in some cases, a cylindrical siphuncle. In specimens showing the interior, the siphuncle appears like an elevated roughened ridge, with a central longitudinal groove of variable depths in different specimens; in one case the siphuncle approaches a cylindrical beaded form, divided into sections by the Septa; this specimen seems to have two series of Septa, the outer one much more oblique than the inner. In cases where the siphuncle is absent the interior of the Septa have a rounded corrugated appearance, and sort of overlapping arrangement. A longitudinal section through the thickest part of the shell shows an oblique arching of the Septa.

It seems as if the head and upper end and the whole length of the under side of this species was destitute of a shell or hard covering, consequently we find only the portions here described, the soft parts having disappeared entirely. I have collected and examined nearly one hundred specimens; the general forms and features are as stated. Specimens vary in size from one-half an inch to three inches in length, and from one-quarter to three-quarters of an inch transversely at the upper end.

I am indebted to Mr. S. T. Carley for good specimens of this fossil, and especially for a fine longitudinal section.

Named in honor of Geo. J. Hinde, Esq., Geologist and Paleontologist, of Toronto, Canada.

Locality—Cincinnati.

GENUS **CYCLONEMA,** (HALL.)

Cyclonema (?) minor. (James.) Shell very small; consisting of about 3 regularly rounded whorls, decreasing in size quite rapidly to the apex. Suture rather deep; body whorl ventricose; aperture circular or oval; outer lip thin; inner lip somewhat thickened and partly covering a shallow umbilicus. Whorls closely set with quite prominent transverse costa. No longitudinal lines on the whorls. The distinguishing characters of this species are the sharp transverse costae and absence of longitudinal lines on the whorls.

Shell about one line in diameter, measuring through the body whorl, and a little more in height. Placed in the *genus Cyclonema* provisionally.

Locality—Cincinnati.

GENUS **STROPHOMENA,** (RAFINESQUE.)

Strophomena (?) Ulrichi. (James.) Shell small, thin, fragile; length and breadth about equal—from ⅜ to ½ an inch. Cardinal line a little more or a little less than the widest part of the shell; lateral margins rounding regularly to the front; ventral

valve slightly convex; surface covered with fine radiating striae, those starting at the beak and cardinal line, and extending to the margin larger, generally, than the interstitial striae; one in the center from beak to front most prominent. The radiating striae crossed by very fine crowded concentive lines. Umbo prominent. Beak extending by a sort of cylindrical tube from ½ a line to a line beyond the cardinal line, which slopes gently to the lateral margins. Dorsal valve slightly concave, the striae appear of equal size, not alternating as on the other valve. Cardinal area and interior of the shell not seen.

All examples yet examined are on the surface of very friable shale or embedded in it; from the thinness of the shell it will, probably, be difficult to procure good detached specimens.

This species resembles *S. squamula,* James, except in the marked feature of the extended beak. Placed provisionally in this genus.

Named in honor of Mr. E. O. Ulrich, who found the specimens in a quary, near Covington, Kentucky.

GENUS **ORTHIS,** (DALMAN.)

Orthis (Platystrophia) **acuminata.** (James.) Shell small; width, measuring along the cardinal line, nearly twice the length from beak to front; cardinal line extending to acute points; lateral margins sloping in rapidly, and slightly rounding to the front. About 16 simple, angular plications on the lateral slopes of the dorsal valve and 3 in the sinus, but one of which extends to the beak, the other two being interstitial, commencing about half way between the beak and front. Beak projecting very little; surface of ventral valve the same number of plications as on the dorsal, with two on the mesial ridge at the beak and four at the front. Beak not projecting beyond that of the other valve. Cardinal area narrow.

Size of the typical specimen ½ an inch by the cardinal line and ¼ of an inch from beak to front. A smaller specimen shows less plications and but one fold in the sinus and two on the mesial ridge.

Locality—Cincinnati.

GENUS **ZYGOSPIRA,** (HALL.)

Zygospira modesta, var. **Kentuckyensis.** The fossil for which this name is proposed, by the finder, Henry Nettleroth, Esq., of Louisville, Ky., varies so little from *Z. modesta,* Say, as defined by Meek, except in *size,* that it can hardly be considered more than a very large variety of that abundant species. Its average size is fully 6 times that of the average modesta, but in all other characteristic features the resemblance is very close. In size it is about equal to *Z. Cincinnatiensis,* James, but the number of plications are nearly double and the lateral slopes of the ventral valve *much less depressed* than that sp.

Collected by Mr. Nettleroth, in the upper part of the *Cincinnati Group,* Jefferson County, Ky., about 18 miles east of Louisville. The difference in size can hardly be attributed to difference of horizon, as typical sizes of *modesta* are found in the Cincinnati Group from the lowest to the highest beds in Ohio and Indiana, and elsewhere.

GENUS **SPIRORBIS.** (LAMARCK.)

Spirorbis (?) **Lovelandensis.** (James.) Shell very small; whorls less than two, sub-cylindrical, not in contact, enlarging gradually, nearly on a plane; surface smooth, showing no striae or other markings. Slightly flaring at the mouth; shell a little over ½ a line wide across the whorls.

The typical example lies upon the surface of a fragment of limestone; no detached ones observed.

Locality—Loveland, Clermont county, Ohio.

THE TWO FOLLOWING SPECIES ARE FROM THE UPPER SILURIAN ROCKS.

—o—

Ptilodictya fimbriata. (sp. nov.) (James.) Polyzoary consisting of two edge fronds, branching dichotomously and trichotomously; branches and main stem of equal or nearly equal width, except at the branching points where the width is greater; branches generally curving or flexuous, edges thin and sharp. Central rows of cells oval, five or six in the space of a line measuring longitudinally, and ten in the same space transversely; interspaces about equal to the cells and occupied by more or less of very minute pores. Cells arranged between longitudinal lines, ten or twelve rows on each branch, in two or three of which, near each edge, the cells are larger than the others, more elongated and have an oblique direction.

The marked feature of this species is the *very finely striated poriferous edges* of the branches, giving them a beautifully fringed appearance. In this respect it differs from the *Generic* description of *Ptilodictya*, but in all other features it seems to agree.

The Polyzoary from which this description is made is three inches broad just above the middle and nearly two and a half inches from base to top. It is partly imbedded in a fragment of rock, the exposed surface somewhat worn, the base of the cells of the other side are shown in some places.

Position and Locality. Upper Silurian, Clinton or Niagara Group. My son (Davis) found the specimen at a locality in Clinton Co., Ohio, where there is a thin outcrop of the Clinton Group between the upper bed of the Cincinnati group and the lower bed of the Niagara group.

Ptilodictya. (sp. ?) This species branches out from the base somewhat like the preceding, but the branches are wider and closer together, in some places almost touching each other. Edges of the frond non-poriferous. Cells arranged longitudinally between sharp delicate lines. The specimen has been split longitudinally, nearly in the center, showing, in some parts, the central axis. It is imbedded in a fragment of rock.

This species resembles *P. excellens* Billings from the island of Anticosta, but it does not seem certain that it is *identical*. The "*small pits*" at the ends of the cells are more numerous than refered to that species, and they extend to other parts than at the ends, and in some cases spreading around the cells. The Polyzoary consists of twelve branches, having a somewhat triangular outline, the base at one of the corners, but a small portion of the top has been broken away.

Should this prove a distinct species, I propose the name of *Welshi* for it (*Ptilodictya Welshi*), in honor of Dr. L. B. Welsh, of Wilmington, Ohio.

Position and Locality. Upper Silurian Formation, Clinton Croup, Clinton Co., O.

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DESCRIPTIONS OF NEWLY DISCOVERED SPECIES OF FOSSILS AND REMARKS ON OTHERS, FROM THE LOWER AND UPPER SILURIAN ROCKS OF OHIO, BY U. P. JAMES.

GENUS **BUTHOTREPHIS,** (HALL.)

B. filoiformis. (sp. nov.) (James.) Fossil consisting of a narrow stem, slightly curved, with lateral branches less than a line in width, from 1 to 2 lines apart, and about 2 lines in length from the body of the stem. The branches stand at an angle, upward, with the stem of about 45 degrees. The specimen bears some resemblance to the pinna of a fern, with closely set lateral pinnules; it is 7 inches long and about ⅜ of an inch broad, measuring across from point to point of the branches. It is partly imbedded in a slab of shaly limestone.

Found by Mr. J. G. Shepard, near Lebanon, O., middle beds of Cincinnati Group.

GENUS **SPHENOTHALLUS,** (HALL.)

S. latifolius (?). (Hall.) A specimen handed me for examination by Mr. J. G. Shepard, of Lebanon, O., resembles one of the figures (2 e) of the above named species, on plate 68, Paleontology of N. Y., Vol. I, which Prof. H. says "may be the stem of this plant." The specimen before me is nearly twice as long (over 3 inches) as the figure referred to; is somewhat sack-shaped, irregular wavy surface, finely striated longitudinally, twisted and drawn in at the ends, and rounded under at the sides. It may be the *stem* of *S. latifolius*, but it certainly is *not* one of the "leaves." With more specimens to compare, if it should prove distinct, I propose for it the *specific* name *intortus*. The specimen lies on a small slab of limestone.

Found by Mr. Shepard near Lebanon, O., middle beds of Cincinnati Group.

GENUS **TRACHYUM,** (BILLINGS.)

Trachyum undosum. (sp. nov.) (James.) Fossil sub-circular in outline at the edge of the cup; irregularly and obtusely turbinate; surface rough and undulating and scattered over it, without any regularity, are circular oscula from 1 to 2 lines in diameter —some places in groups—and canals passing at various angles into and in some cases, apparently, through the fossil. The general surface occupied by very small pores, not very distinctly shown. Cup shallow, surface very irregular, with circular oscula from 1 to 2 lines in diameter, and minute pores, as on the outside. Near the middle of the cup is an appearance of something like a second growth between 2 and 3 inches in diameter and ¼ of an inch thick, where a portion is broken away. The interior shows a very delicate fibrous structure, but is so compact as to be difficult to make out clearly.

The specimen from which this description is made, is between 6 and 7 inches in diameter across the top of the cup and 3 inches in height; other specimens, seemingly the same species, are altogether different in outlines—some fragments appearing almost like flat horizontal expansions, these may be parts only, of a much larger growth; there is no distinguishable difference in the internal structure and surface markings. One small example, circular in outline at the margin of the cup (?), apparently the same species, is only one inch in diameter; cup shallow; regularly convex on the under side with 6 circular oscula, each about ½ a line in diameter, at and near the center, 3 of them confluent and others distributed irregularly over the surface.

The large *canals* in this fossil do not accord with Mr. Billings' *Generic* description of *Trachyum*, but in other respects it is so much like it as to seem best to place it in that Genus, provisionally at least.

Position and locality—Upper Silurian, Clinton Group, Clinton Co., Ohio.

GENUS **STROMATOPORA**, (De Blainville)

Stromatopora lunata. (sp. nov.) (James.) (Lunata, crescent-shape, in allusion to the curved lamellae in vertical section.) Sarcodeme, composed of thin lamellae. A vertical section shows each lamella in a general horizontal direction, in a succession of variable, low, sub-lunate arches about ½ a line in length, united at each end by either very delicate vertical dissepiments, or resting upon the lamella below; about 5 lamellae in the space of one line vertically, including the interspaces, which are wider, generally, than the thickness of the lamellae. Oscula-like canals, from 1 to 3 lines in diameter, at very irregular distances apart, passing through, apparently, the body of the fossil. The lamellae curve sharply upward all round the oscula, so as to be nearly or quite vertical at the upper aperture.

A polished under surface shows the lamellae, at one point, where they seem to be out of the horizontal direction, as arranged in curved parallel lines with numerous very fine dissepiments at various angles and distances apart.

The specimen (a fragment) from which this description is made, is sub-circular in outline, about 4 inches in diameter and ¾ of an inch thick in the middle, sloping gently off to a thin edge all round; the sloping surface weathered so as to give to the edges of the lamellae somewhat the appearance of shingles on a roof, one overlapping the other.

Position and locality—Upper Silurian, Niagara Group, Clinton Co., O.

Stromatopora Hindei. (Nicholson.) A specimen from the Niagara rocks of Clinton Co., O., resembles Prof. Nicholson's figures of this species, in his *Report upon the Paleontology of the Province of Ontario*, 1874, except that it is much larger and more massive, the upper surface more regularly striate, (due, perhaps, to weathering) and fewer oscula, but the vertical section and other features bear a close resemblance to that species.

GENUS **LYELLIA**, (Milne-Edwards.)

Lyellia Striata. (sp. nov.) (James.) Corallum, a horizontal expansion of variable thickness; upper surface undulating and covered with rather coarse sinuous striae. Tubular mammelae-form prominences, with broad bases, sometimes in contact (the bases) irregularly distributed over the surface, varying from 2 or 3 lines to over ½ an inch apart, measuring from center to center of the tubes. A vertical section shows the tubes passing in an oblique direction through the coral, with 3 or 4 vertical dissepiments, between which and the outer wall are numerous closely set tabulae. Apertures of the tubes in the center of the prominences circular, and about one line in diameter, rounding in at the margins, forming a shallow cup, in the center of which is a solid column-like substance, raised to a level with the highest part of the prominence, and occupying about half of the aperture; this central column seems to be formed by the drawing together of the vertical dissepiments at the top.

From 12 to 20, not clearly defined (in the example examined) septa are shown, which do not extend below into the body of the tube.

The coenenchyma consists of undulating laminae which are drawn closely together in places, appearing like a solid mass, then suddenly expand by regular curves and divide into many parts in an irregular manner, some of them very thin, all wavy or undulating in their horizontal course. At the points where the plates unite with the tubes they curve first upward then round over in an arching manner to the horizontal direction.

The specimen from which this description is made is a fragment about 2x3½ inches of variable thickness, ½ an inch or a little more at the thickest part. It appears as if the species may have spread over considerable horizontal surface, and have been, perhaps, more massive in some cases. Under side not observed, it being attached to a rocky substance.

Another specimen, apparently the same species, is much larger and more massive and destitute of the upper surface striae; the under surface is shown on this with the bases of the tubes projecting; this fragment is 3x8 inches in size, and at one place over 1½ inches thick.

Position and locality—Upper Silurian, Niagara Group, Clinton Co., O.

Lyellia Americana (Milne-Edwards.) I have good specimens from the Niagara Group, Clinton Co., Ohio, of what correspond very well with this species as defined by Rominger. The largest example is sub-circular in horizontal outline, of a tolerably uniform thickness of about one inch, and 10 inches in diameter On the base the tubes are shown in prominences about a line in height above the general surface, caused, apparently, by the weathering away of the coenenchyma. A longitudinal section shows the "carinated columns."

GENUS **CHAETETES,** (FISCHER.)

Chaetetes subrotundus. (sp. nov.) (James.) Corallum small, free, sub-rotund. Cut polished sections in different directions show the corallites as growing from the center of the corallum outward in every direction and increased by fission. No tabulae passing *through* the corallites apparent, they may be found, however, in other examples. Transverse disseppiments between the corallites strong. Calices unequal in size, some much larger than others, and an average of about 8 in the space of a line. In the cut sections, the spaces between the disseppiments appear like rows of minute pores arranged longitudinally between the corallites.

The examples from which this description is made, are a little over ¼ of an inch in diameter, slightly flattened; the proportions of measurement about as 5 to 6.

I am indebted to Dr. L. B. Welch, of Wilmington, O. for the type specimens of this species, who found them near Ogden Station, Clinton Co., O., Cincinnati Group.

Chaetetes lycoperdon. (Say.) The typical form of this species is, as the name indicates, decidedly puff-ball shape. Attachment at the base small, expanding rapidly at first, then gradually rounding off dome-shape or hemispherical. There are, however, variations from this outline, but the base attachment is always smaller than the fossil above—sometimes not over ¼ of an inch with the specimen ¾ or an inch in diameter ¼ or ½ an inch above the base. Calices generally circular or slightly angular, 10 to 12 in the space of a line, with groups of calices a little larger than the average, not raised above the general surface. A very few minute interstatial pores, sometimes.

Although Say's original description, or its place of publication, do not seem to be known, the name is so characteristic of the forms here referred to, it would seem proper to retain it. The ramose forms described by Prof. Hall as varieties of this species, are now considered as distinct.

Chaetetes petropolitanus. (Pander.) This species is by some placed as a syn. of the above, but it seems to be distinct. It has a broad base, often attached to shells, and has a concentrically lined or wrinkled epitheca, which I have never found in *lycoperdon;* the shape is conical, generally at a high angle—from 60 to 80 degs. but sometimes, especially young specimens, gently convex. But the base in all cases is much broader than the upper part, spreading out to a thin edge bell-shape. The corallites are ⅓ larger or twice as large as in *lycoperdon.* Calices polygonal, 6 to 8 in the space of one line, with groups of larger ones—not over 4 to a line—slightly elevated above the general surface in most specimens. The *surface* features of this species resembles *Ch. pulchellus,* Ed. & Haime, but its mode of growth is entirely different: *C. pulchellus* taking the ramose form of cylindrical, branching stems, the corallites growing from the middle outward on all sides, while *C. petropolitanus* grew from the broad base upward.

Another species or variety of this group, with calices much like *petropolitanus,* grew in an entirely different manner, turbinate in form; base attachment small. In outline this resembles some specimens of *lycoperdon,* but the calices are nearly twice as large and mostly hexagonal. If these differences prove to justify a new species, I propose the name *turbinatum* (*Chaetetes turbinatum.*)

Position and locality—Lower Silurian, Cincinnati Group, from the lowest to the highest exposed beds at Cincinnati and vicinity.

GENUS **CALLOPORA,** (HALL.)

Callopora Milfordensis. (sp. nov.) (James.) Polyzoary encrusting other bodies; frequently found on crinoidal columns; generally the wall of each cell is distinct, but sometimes they are in contact; interspaces occupied by small pores of various irregular shapes. Cell appertures in most cases elevated, oval or sub-polygonal, with no apparent regularity of arrangement, their longer diameter being in all directions on the Polyzoary, and about 1/6 of a line in size measuring in the same direction.

The specimens from which this description is made, are from ¼ to ½ a line in thickness, grown all round different species of crinoidal columns.

Found in the middle and upper beds of the Cincinnati Group near Milford, Clermont Co., O., and other localities.

GENUS **CERAMOPORA**, (HALL.)

Ceramopora Whitei. (sp. nov.) (James.) Polyzoary a thin crust grown upon foreign substances,—generally corals—sometimes spread all round, and in and over the inequalities of very irregular surfaces of bodies of considerable size—3x6 inches, less or more. The cells seem to be mostly direct, but in some places may be slightly oblique and very little elevated at the apertures. An average of about 10 cells in the space of a line measuring in any direction, very irregular in shape and size—circular, oval, triangular and other forms. Distributed irregularly over the surface are slightly elevated areolae, where the cells are generally smaller than the average on other parts. Cell walls very thin. A *few* minute tubules between some of the larger cells.

This species differs from Professor Nicholson's typical form of *C. Ohioensis* in most of its features materially. The cell apertures are disposed in a confused manner (seemingly) over the surface of various shapes and sizes, and but slightly oblique or elevated, if at all, and somewhat smaller. That species is generally found grown upon shells, this *rarely*.

C. Ohioensis is described as having the "cells arranged in intersecting diagonal lines, and disposed in a somewhat concentric manner round more or fewer central points; their upper walls thin and arched; the cell-mouths oblique, and when most perfect, semi-circular in shape. About 8 cells in the space of one line." Our species is quite different from this description, the cells *not* being arranged in "intersecting diagonal lines" in "a somewhat concentric manner round fewer or more central points."

Named in honor of C. A. White, M.D., Paleontologist of the U. S. Geological Survey.

Position and locality—Lower Silurian, Cincinnati Group, at Cincinnati.

Ceramopora radiata. (sp. nov.) (James.) Polyzoary consisting of a group of cell tubes radiating from a central point in all directions; the lines of tubes not always taking a direct course but turning a little either way at some points, with interstatial rows coming in. Tubes slender, tapering gradually and seemingly attached to each other at their bases at the central point; but outside of that point each succeeding tube springs from the under side of the one below, the lower one partly overlapping the one above, and rising at various angles as they gradually expand. Cell apertures circular or oval, the lower lip extending beyond the upper, and arranged in alternating diagonal rows; diameter of cell apertures about $\frac{1}{10}$ or $\frac{1}{12}$ of a line. Between some of the rows of tubes, near the center, are exceedingly small pores, shown more distinctly on some parts than on others, in a specimen slightly weathered.

The example from which this description is made is sub-circular in outline, about 4 lines in diameter, and lies in a depression of a fragment of coral, to which it is attached.

This species resembles *C. labeculia*, Hall, from the Niagara Group, Ind., as figured, but not described in the 28th Regents Rep. on the N. Y. State Cabinet. The cells are more distinctly individualized than that figure instead of less so, as stated by Prof. H., in reference to *labeculia*.

Position and locality—Lower Silurian, Cincinnati Group, at Cincinnati and vicinity.

GENUS **PLEUROTOMARIA**, (DE FRANCE)

Pleurotomaria Ohioensis. (James.) (Proposed for *P. trilineata*, which was preoccupied.) The most distinguishing feature of this species is the three delicate, sharp longitudinal lines on the middle of the whorls, from the aperture to the apex, which occupy a space of about ½ a line; a fourth line, less distinct, may be seen on most specimens, when perfect, about half way between the outer ones of the three and the suture. The fine transverse striae curving forward below and backward above the three lines cross the other line in one direction without interruption.

Pleurotomaria dryope. (Billings.) I have specimens resembling this species—except being smaller. They are mostly casts, but the ones with the outer shell in good condition show the characteristic curved striae. Should they prove distinct on further examination, I propose the specific name *carinata*, in allusion to the sharp, prominent keel along the center of the whorls. The casts are fully as sharply carinate as the specimens retaining the outer shell.

Position and locality—Upper beds of the Cincinnati Group, Clinton Co., O. Mr. Billings' species were from the Trenton Group, Canada.

GENUS **PTERINEA**, (GOLDFUSS.)

P. Subquadrata. (sp. nov.) (James.) Shell sub-quadrate in outline, oblique, anterior wing short, posterior wing broad and extending scarcely beyond the margin of the shell. Beak slightly projecting, umbro rather flat. Surface gently convex from the anterior margin to a line passing in a direction with the obliquity of the shell from the cardinal line back of the beak to the margin, where it becomes suddenly depressed, shoulder-like, from which line the posterior wing is spread out nearly flat. The margin is regularly rounded from the slope of the anterior wing to the backward depression Surface covered with rather prominent, sharp, slightly rugose, concentric lines, which are finer and more crowded on the posterior wing than on other parts. Right valve and interior not observed.

This species bears a slight resemblance to Conrad's description and fig. of *Pt.* (*Avicula*) *insueta*, but differs materially in the marked features of the sudden depression and broad flat surface of the posterior wing, which is less extended, and in the more crowded concentric lines and absence of longitudinal radiating striae; also in the general outline of the shell.

The specimen from which this description is made, is about 7/8 of an inch, measuring from beak to front margin, and the same from the point of the posterior wing to the anterior margin.

Position and locality—Cincinnati Group, Clinton Co., Ohio.

REMARKS ON CONSTELLARIA ANTHELOIDEA. (HALL.)

This beautiful species of fossil coral is found in abundance, and in a marked degree of perfection in the Lower Silurian rocks at Cincinnati. And, although thousands of specimens (fragments) have been collected here, it is safe to say that a single *entire* corallum has not yet been found.

Different examples are of a great variety of shapes,—palmate-digitate, flabellate, subfrondose, cylindrical and intermediate forms. and some approaching to amorphous masses; the upper and outer branches are more delicate than the others—not so thick and robust—the evidence that they were the upper and outer branches, is, the calices extend round and over the smaller ends—no fracture.

A complete or entire corallum must, apparently, have been of considerable size; probably a foot or more in height and as much laterally. (Prof. Nicholson says—Ohio Pal.—a height of 2 inches or more.)

The "stars" differ more on different specimens than the shapes of the cylindrical and flattened branches and frondose expansions. On the outer and upper branches of various forms, the rays are sometimes elevated into sharp spur-like points, from which they are graded down on different examples—becoming less and less prominent until they fall to a level with the general surface, and then sink below the surface—*depressed* instead of *elevated* stars. The number of rays to the different "stars" varies from 5 or 6 to 30, some of them appearing like elevated ridges—2 or 3 lines in length—with the rays like spur projections on each side and end; others extend all round the cylindrical branches appearing like annulations.

Different degrees of weathering—they are found in all stages—causes quite different surface appearances, but not the differences in the elevated and depressed "stars" and their outlines.

Prof. Nicholson's species, *polystomella*, seems to be one of these variety forms.

The probabilities are, that on the base and lower branches of this coral the stars varied in shape and prominence from those on the upper and outer parts. We have illustrations of this character in some of our other associated corals and Polyzoa. For example, *Chaetetes gracilis*, James; *Ch. O'Nealli*, James; *Helopora dendrina*, James, and various species of *Ptilodictya*, and others that might be named; the cell apertures on the base and upper parts being entirely different. And on different parts of the same fragment, or stem,

they vary materially sometimes, notably C. O'Nealli. The case of *Ch. quadratus*, Rominger (*Ch. rhombicus*, Nicholson), on the typical specimens the calices are arranged in beautifully curved lines like the lathe work on watch cases, whilst on some other specimens they are very irregular, like some entirely different species, and might be taken for another but for the very peculiar and unmistakable internal structure.

The writer attempted to describe a new species of *Constallaria* from the *depressed stars* variety, but after selecting from and comparing with a great number of specimens, and finding they shaded off from one to the other without any decided or positive line of difference, he gave it up.

It seems hardly possible, with the material so far collected and known, to make out more than the one decided species, viz., *C. antheloidea*, Hall, of this coral; not even a constant variety.

The best locality for *C. antheloidea* is at Cincinnati, in the city limits, in what is generally considered the middle beds of the Cincinnati Group. In the upper beds in Ohio and Indiana it is rarely found. I have, however, some fine specimens from those localities.

U. P. J.

A STRANGE FOSSIL.

About a year ago I found in the friable blue shale at Cincinnati, what may be only an appendage of an unknown animal form, yet it is so peculiar as to seem worthy of notice.

It has a bright, glossy, corneous appearance and like hard enamel. In shape it is like a miniature *jaw*, with a long tusk-like projection at the front end standing nearly at a right angle, slightly curved and sloping a little backward with a shoulder-like offset just back of the junction or angle. There are 5 comparatively long curved teeth or barbs, sloping backward, like the barbs of fish hooks, in the jaw, two of them broken but the others seem to be entire; they are about $\frac{2}{3}$ the length of the tusk. The length of the jaw is about $1\frac{1}{2}$ lines and $\frac{1}{10}$ or $\frac{1}{12}$ of a line wide, except at the shoulder, where it is nearly twice as wide. The tusk is about 1 line in length and a little more than half the thickness of the jaw at the narrowest part; the barbs still less. The jaw is of a rather dark, smoky color, the tusks and barbs lighter.

This may have been an *appendage* of an *annelid*, but it is *wholly unlike* Prof. Grinnell's figures and description of Neridavus varians.

U. P. J.

REMARKS ON HELOPORA DENDRINA, (JAMES.)

In October, 1875, the writer described a new species of *Fossil Palyzoon* from the Lower Silurian Rocks at Cincinnati—*Ptilodictya* (?) (provisionally) *dendrina;* afterwards changed before publication to the *Genus* Helopora (*Helopora dendrina*), which was read with others, before the Cincinnati Society of Natural History, August meeting, 1876, and afterwards arranged to be figured and published in the first number of the Journal of the Society, but other matter found a place there to the exclusion of my species.

The description of *Helopora dendrina* was published in the first number of this paper, July 2, 1878 Another description of, apparently, the same species was published, with figures, in S. A. Miller and C B. Dyer's Contributions to Paleontology, No. 2, July 22, 1878. The figure (pl. 4, fig. 6) resembles, very closely, the specimen from which I made the description. They (M. & D.) have named it *Bythopora fruticosa*. This name (*fruticosa*) falls into a synonym, of course.

I claim nothing on the ground of the *reading*, but the *first* publication establishes the *species*.

The specimen from which my description of H. dendrina was made, is very fine, nearly perfect, the branches being very slender and delicate, slight exposure and rubbing would have broken it up; it was protected in a peculiar manner, as stated in the description, lying in a depression in a fragment of rock. It was found by Mr. Charles Schuchert, and in his possession at the time I described it, but some time after he disposed of it, so he informed me, to Mr. C. B. Dyer. It is recorded with the description of B. fruticosa, that "*the specimen figured is from the collection of C. B. Dyer.*"

All other specimens that I have seen of this species are fragmentary U. P. J.

A CLASSIFIED LIST OF LOWER SILURIAN FOSSILS. CINCINNATI GROUP. BY JOHN MICKELBOROUGH AND A. G. WETHERBY.

A paper with the above title is published in the July number of the Journal of the Cincinnati Society of Natural History. A valuable list in its Classification and Etymology of names, and must prove useful to students, but its value and usefulness are impaired by inaccuracies, some of which will be noticed.

Beyrichia *falcigera*, Hall & Whitfield, is given as a distinct species; it is a synonym for B. *Chambersi*, Miller.

Acidaspis *anchoralis*, Miller, is given as distinct, should be synonym for A. *Cincinnatiensis*, Meek.

Orthis profundo-sulcata, Owen, is placed as a synonym for O. *biforata*, Schlotheim; it is a strongly marked variety at least

Orthis *prolongata*, Owen, is credited to James. It was printed in Owen's Catalogue, 1843, and should be *Owen.*

Orthis *inflata* and O. *Annieanna*, James, are given as "considered synonyms of species above named;" they are as marked varieties, at least, as others so placed.

Orthis *insculpta*, Hall, is considered by some to be a synonym for O. *bella-rugosa*, Conrad; it is placed as distinct in the list.

Rhynchonella *perlamellosa*, Whitfield, is given as a distinct species; it seems to be only one of the numerous forms of R. *capax*, Conrad.

Strophomena *gibbosa*, James, is given as synonym for S. *rhomboidalis*, Wilkins; it differs much from types of that species,—is found only in the lower beds of the Cincinnati Group, about 80 feet above low water mark of the Ohio river at Cincinnati; and between that horizon and some 600 feet above, vertically, (25 to 50 miles from Cincinnati) in the upper beds var. S. *tenuistriata*, Sowerby, occurs for the first time; no where within that vertical range have specimens of either S. *rhomboidalis* or var. tenuistriata yet been found, as far as known to us. S. *gibbosa* is a much more frail shell than either of the others, and differs in other respects. It might be considered a good variety at least; at any rate it marks a distinct horizon in the Cincinnati Group.

Streptorhynchus *neglecta*, James, is placed as a synonym for S. *filitexta;* we believe it to be distinct; the resemblance is quite remote, and the specimens very different from any recognized filitexta.

Streptorhynchus *vetusta*, James, is given as a synonym for S. *planumbona*, Hall; how this mistake occurred we cannot imagine; they do not resemble each other at all. *Vetusta* is somewhat like *filitexta*. And it is equally strange how S. *approximata*, James, can be confounded with S. *Subtenta*, Conrad; they are so very different.

Streptorhynchus *planumbona*, Hall, is considered by some a synonym for S. *substenta*, Conrad.

S. *plicata*, James, was dropped long ago; it is not in James' Catalogue of 1875.

Ceramopora Ohioensis is credited in the list to James; should be *Nicholson*.

Favosites gothlandica, Lam, is placed as found in the *Cincinnati Group*, which is *very* doubtful.

There are in the list not less than two names of new Genera and over *twenty-five* new species, of which no descriptions or figures have yet been published; consequently, according to accepted rules, *they* are not recognized as established Genera and species. The *reading* of descriptions before scientific bodies is not admitted as sufficient to authorize their recognition.

Another defect in the list, rendering it less valuable for reference, is the failure to arrange *species* alphabetically.

We are aware of the difficulties in compiling a list of this kind, but some, at least, of the mistake mentioned, ought to and might have been avoided, we think.

TO CORRESPONDENTS.

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CATALOGUE OF LOWER SILURIAN FOSSILS of the Cincinnati Group found at Cincinnati and vicinity—within a circuit of 40 or 50 miles. New edition much enlarged. With descriptions of some new species of Corals and Polyzoa. By U. P. JAMES, Cincinnati, April, 1875. Price 25 cents.

38,204

THE

PALEONTOLOGIST.

No. 3. CINCINNATI,—U. P. JAMES. [JANUARY 15, 1879.

The Price of this Number is 25 Cents.

DESCRIPTION OF NEW SPECIES OF FOSSILS AND REMARKS ON SOME OTHERS, FROM THE LOWER AND UPPER SILURIAN ROCKS OF OHIO, BY U. P. JAMES.

GENUS **SACCOPHYCUS,** (*gen. nov*) (JAMES)

(*Sakkos*, a bag or sack.—*Phykos*, a sea plant.)

This Genus consists of a sack-like plant; even or undulating surface, smooth, or striated longitudinally; straight or contorted; sides and ends rounded and drawn in and under.

Saccophycus intortus. (sp. nov.) (James.) (*intortus*—twisted inward.)

Sphenothallus latifolius? Hall. Pal. No. 2, Oct. 14, 1878.

This species, described and published as above stated, was referred, provisionally, to *S. latifolius*. On further examination it seems clear that it does not belong to that genus, and cannot be sp. latifolius for reasons given.

Saccophycus intortus is in the form of a long, tortuous bag or sack, with the ends drawn in; undulating, wavy surface, finely striated longitudinally; sides and ends rounded in and under.

The specimen here described is about three inches in length and one inch broad from the center to near one end, but it narrows to about half an inch near the other end; thickness unknown as it lies on and partly imbedded in a fragment of limestone, but it seems to be about a quarter of an inch.

Position and Locality—Lower Silurian, Cincinnati Group, near Lebanon, O. Found by Mr J. G. Shepard.

GENUS **LOCKEIA,** (*genus nov.*) (JAMES.)

Genus consisting of elongated, convex fossil sea-plants, rounding and tapering to sharp or obtuse points, seed-like in appearance, with or without slight longitudinal depressions, attached to the surface of rocks.

Named in honor of the late Professor John Locke of Cincinnati

Lockeia siliquaria. (sp. nov.) (James.) (*siliquaria*—pod-like.)

This species consists of convex, elongated elevations on the surface of indurated clay, or limestone, from ⅛ to ½ an inch long, ½ a line to 1½ lines broad at the base, and ½ a line to 1 line high in the center; sloping and tapering to sharp, or more or less obtuse points at each end, and either rounded or rather sharply ridged longitudinally, and scattered about promiscuously (seemingly) at every possible angle with each other; sometimes arranged in the form of stars—one in the center and five others placed quite regularly around it with their longer axes pointing inward; in some other cases they are in groups close together, or lying one partly over the other; others are half an inch or more apart

Slabs are found from an inch to one or two feet or more, either way with one surface covered with this fossil in the manner stated, which are sometimes likened to grains of wheat. It is of common occurrence on the bank of the Ohio River, in Ky, opposite the lower part of Cincinnati, about half way between low and high water mark, but not found at any other horizon that I know of. Lower Silurian, Cincinnati Group.

GENUS **PALEOPHYCUS,** (HALL.)

Paleophycus flexuosus. (sp. nov.) (James.) (*flexuosus*—bent, crooked.)

This fossil consists of a regular series of slightly rounded or flattened stems, which may have been cylindrical and became flattened by pressure. The stems lie nearly parallel to each other in their flexuous course across the slabs of blue shale, sometimes anastomosing (*very* seldom bifurcating) and are of nearly uniform size from end to end, about one line in width and the same distance apart.

Slabs from ¼ to ½ an inch thick are made up of a succession of thin lamellae, composed, seemingly, entirely of this fossil, each lamella being ¼ of a line, more or less, in thickness. The stems of the different layers do not always lie parallel with each other, varying but slightly in some cases, in others from 30 to 40 degrees. The general appearance of the surface might be compared to that of straw laid down regularly with spaces between, and more or less compressed, and in the same manner a succession of layers.

The largest specimen I have seen is 9x12 inches, parts of it being scaled off so as to show the lamellae very finely; no doubt much larger masses were made up in the same manner, as the stems extend to the margins without any appearance of the ends of growths, and the edges of the slabs are angular, as if broken from larger ones.

This is an exceedingly interesting fossil. The appearance is as if the plants grew of a uniform size in a compact mass, occasionally united by lateral stems, very seldom bifurcating or branching. How they came to be laid down so evenly laminated and with so little disturbance of arrangement is not apparent.

Found in the Cincinnati Group, Hamilton Co., O., near Milford, at a hillside cut of the Little Miami R. R.

GENUS **STROMATOPORA,** (DE BLAINVILLE.)

Stromatopora (?) lichenoides. (sp. nov.) (James.) (*lichenoides*—lichen-like.)

Sarcodeme thin expansions grown upon corals, (all so far observed) very irregular in outline; surface rugose or undulating, and marked by exceedingly small pores of very irregular shapes; in some cases circular oscula-like openings much larger than the pores. Portions of the surface of some specimens have the appearance of very delicate striae. In some cases around the margin are somewhat larger pores, of much more regular and uniform shapes, than on the general surface, which resemble the calices of some corals, but very much smaller than the calices of the corals on which they are built.

Different examples vary in size from ⅛ of an inch to ½ an inch in diameter and from ¼ to ½ a line or more in thickness.

This is not a very rare species in the upper beds of the Cincinnati Group, where the best and most characteristic specimens are found. Occasionally found at Cincinnati.

Stromatopora scabra. (sp. nov.) (James.) (*scabra*—rough surfaced.)

Sarcodeme composed of a thin crust grown upon foreign substances, one line or less in thickness, made up, apparently, of very thin laminae, but this feature is difficult to determine satisfactorily from the two examples examined. Distributed over the surface are prominent, conical, or elongated monticules, elevated from ½ a line to one line above the general surface, and from one to two lines apart measuring from center to center. Surface, including the slopes of the monticules, covered with closely set paillae which mostly have small circular openings at the tops.

The general appearance of this fossil is rough, somewhat like a portion of the surface of an alligator's skin in miniature.

This species resembles *S. papillata*, James, in the feature of the papillae covering the general surface, but the latter is destitute of the prominent monticules, and is thinner and much less rugged in appearance; there seems to be no reason to doubt the distinct specific difference.

One of the specimens used for this description is built upon coral, nearly 2x2 inches, the other is attached to a fragment of limestone and is over 2 inches one way by nearly an inch the other. Mr. W. H. Bean informs me that he found one of them at a horizon 10 to 20 feet below the large Orthis biforata bed near Lebanon, Warren Co., O., (Cincinnati Group), the other at a higher horizon, but in the same vicinity.

These typical specimens are in Mr. Bean's cabinet at Lebanon.

GENUS **ALVEOLITES,** (LAMARCK.)

Alveolites expansa. (sp nov.) (James.) (*expansa*—spread out.)

Corallum, a flat or undulating expansion, irregular in outline, 6 inches or more in diameter, varying in thickness from less than one to over two lines. Corallites very oblique and more or less sinuous in their direction from the base or central axis to the surface. Calices very narrow, slightly curved, elongated slits, showing, generally, when a little weathered, a tooth-like projection in the middle of the upper lip, and arranged sometimes in series of short curved rows in a more or less alternating manner. About 4 calices in the space of a line. Walls of corallites thick.

Although the specimen from which this description is made was found spread over the surface of a rock—from which it readily scaled off—it is not certain that it was *encrusting*, as there is an appearance of something like a central axis from which the corallites grew in different directions to opposite surfaces, in a very oblique manner; portions of the side next the rock show calices similar to the other side, but not so distinct, as it is mostly covered by, apparently, indurated clay.

Found by Dr. L. B. Welch and the author in a thin stratum of the Upper Silurian Formation, Clinton Group, near Wilmington, Clinton Co., O.

GENUS **FISTULIPORA,** (McCOY.)

Fistulipora Siluriana. (sp. nov.) (James.)

(*siluriana*—in allusion to the Silurian Formation.)

Corallum composed of irregular expansions grown upon foreign substances —generally other corals—from ½ a line to 2 lines or more in thickness. Perfect specimens show the cell walls rather thick, and raised considerably above the general surface on one side, sloping off to the opposite side. Calices circular or oval, 6 to 8 in the space of one line including interspaces In some cases the walls of the corallites are in contact, but generally they are separated about half their diameter. Coenenchyma occupied, generally, by minute pores, but in some cases weathered specimens show very thin web like disseppiments. The calices are sometimes arranged in rows of 5 or 6, but generally they are irregularly placed with the higher parts standing in different positions in relation to each other. Looking directly at the surface the cell walls of perfect specimens appear somewhat like many small vertical, closely set, obliquely truncated tubes with distinct solid walls. A detached example shows a strongly marked, wrinkled and striated epitheca, and three superimposed layers.

Some of the calices of this species are occupied by substances, rounded on top with very small central openings and distinct borders below the tops of the apertures. Specimens slightly worn resemble, in some cases, *F. multipora*, sp. James, and are occasionally grown on the same bodies, but the prominent obliquely truncated corallites, and absence of groups of small pores occupying the places of the larger cells in F. multipora, distinguish it from that species, in which they do not project above the general surface, and are mostly more angular.

Found on the hills at Cincinnati, some 300 or 400 feet above low water mark of the Ohio River.

GENUS **CHAETETES**, (FISCHER.)

Chaetetes minutus. (sp. nov.) (James.) (*minutus*—small.)

Corallum (the parts observed) consisting of very small, cylindrical, branching stems. Perfect examples show sharp spines on the upper edges of the thin walls of the corallites, which have an upward oblique direction, as shown by a longitudinal section; the central part of the stem is very compact—internal structure not made out under a good magnifier. Calices variable in size and shape, from sub-circular to long oval, sometimes much drawn out, and in some cases seemingly confluent. About 10 or 12 calices in the space of a line measuring longitudinally—their longer diameter—but much smaller, generally, in a transverse direction.

Examples, so far observed, measure from 2 to 4 lines in length and from ¼ to ½ a line in diameter.

Found near Loveland, Clermont Co., O., Cincinnati Group.

Chaetetes crustulatus. (James) (sp.) Paleontologist No. 1, July, 1878.

In the original description of this species it is stated that it has "no surface prominences of any kind." Since that time I have seen examples with slight elevations, elongated longitudinally, but having all the other characteristic features of the typical form.

I have also discovered, what was not then apparent, in a number of undetermined specimens, other features of the species, consisting of parallel lines about ⅛ of a line apart, with connecting walls, at various angles about the same space apart. The lines are sometimes straight, others curved or tortuous. These lines are at the bases or central axis of the corallites. Of this I have positive evidence in cases where the coral has divided—*partly* scaled off—showing both base, or interior and outer surface structure *in the same individual* example. The parallel lines and connecting walls are sometimes raised and sharp, thread-like in appearance, showing the foundation (laid off in outline) of the corallum; in other cases they are even with the surface showing through what may be an exceedingly delicate, thin epitheca. Altogether these are very interesting features of the species.

Chaetetes lycopodites. (sp.) (Vanuxem.) Not Chaetetes lycoperdon, Say.

In the second number (Sept. 15) of the Paleontologist we made some remarks on the above named fossil species. Since that date Dr. C. A. White, U. S. Paleontologist, has kindly furnished the following facts in regard to its history, which we are permitted to publish:

"The Lower Silurian fossil that has become generally known as *Chaetetes lycoperdon* and attributed to Say, was never published by him by that name, nor by any other. The late T. A. Conrad, in a private letter, informed me that Say, before his death, placed a specimen of that fossil in the cabinet of the Acad Nat. Sci., Phila. labeled "*Chaetetes lycoperdon*," where it remained for several years. This name was first *published* by Prof. Hall in Vol. 1, Pal. New York in 1847, where it attributed the name to Say, but does not refer to it as Say's M. S. name That species was first published by Vanuxem as *Favosites lycopodites* in his report on the Geology of the 3d district of New York, p. 46, 1842, where he also gave a good figure of it. The specific name is therefore Vanuxem's, and ought to be written *Chaetetes lycopodites*, Vanuxem sp."

GENUS **PTILODICTYA**, (LONSDALE.)

Ptilodictya nodosa. (sp. nov.) (James.) (*nodosa*—knotty.)

Polyzoary consisting of a flattened, straight, unbranched frond, with a pointed base, expanding upward to a width of 5 or 6 lines; length 1½ inches. The base is finely striated to the height of about 1½ lines, bearing very small elongated pores between the striae; above, for a space of about 2 lines more, there are two parallel lines close together, and between each two series of

double lines is a row of oval or circular pores; above that point the pores are nearly circular and arranged in sinuous rows. About 3 lines above the base two rows of nodes commence, which increase to 4 rows at about half the length of the Polyzoary. The nodes are prominent, in appearance like small cones, a little over one line apart from one apex to another; the sides of the nodes carry the same sized cells as on the general surface, but the tops have many very small puncture-like openings. About 8 cell apertures in the space of a line measuring in either direction, which extend to the edges of the frond, there being no striated or solid borders. The center of the frond, longitudinally, is somewhat convex, but flattens out rather abruptly above the base to thin edges.

A small portion of the upper part of the specimen here described is covered with the rock on which it lies, otherwise it seems to be perfect, and finely preserved, (the one side). Another smaller example, not so well preserved, has the upper part broken away.

Locality and position—Lower Silurian, Cincinnati Group, Clinton Co, O. Collected by Dr. L. B. Welch of Wilmington, O., in whose fine cabinet the specimens now are.

Ptilodictya platyphylla. (sp. nov.) (James.) (*platyphilla*—expanded leaf-like.)

Polyzoary consisting of a thin, unbranched, two-edged frond, starting from a pointed base and expanding rapidly outward and upward; from ½ a line to one line in thickness in the center, to thin sharp edges at the borders, and a central laminar axis; celluliferous on both faces Surface covered with conspicuous rounded tubercles about one line apart, measuring from center to center. Cell apertures oval, about 7 in the space of one line measuring their longer diameter, and arranged in rows between quite strong, comparatively, elevated lines; the tops of the tubercles have more or less rather inconspicuous minute pores in the specimens so far examined.

Most examples obtained of this species are divided at the central axis, showing, in some cases, the bases of the rows of cells and the parallel lines between through a thin film, and very fine concentric striae; in other cases the film and concentric striae have been removed, showing the parallel lines more plainly, and the bases of the cells have a subimbricating diamond shape or pointed appearance.

In some cases of *casts* (or moulds) of the outer surfaces the calices have left prominences, and the parallel lines and tubercles depressions, which give the specimen a very pretty appearance under a magnifier of low power.

The examples used for this description are not entire in any case; the largest is about two inches across at the broadest part, irregular in outline and partly covered by the rock in which it is imbedded; all are broken away at some point. Full dimensions unknown. All are more or less covered with the rock which seems to have formed around the Polyzoary The central axis is generally shown, the outer surfaces much less frequently, owing, seemingly, to the stronger adhesion to the rock. No detached specimens observed.

Position and locality—Upper Silurian, Clinton Group, Clinton Co., O.

GENUS **ESCHARINA**, (MILNE-EDWARDS.)

Escharina (?) distorta. (sp. nov.) (James) (*distorta*—distorted.)

Polyzoary consists of thin expansions, contorted and curved in almost every possible manner; celluliferous on both faces, and a central laminar axis, which is finely striated in one direction and more coarsely transversely; some of the transverse striae or wrinkles are quite strong and more prominent than others. The series of finer striae, as seen on the most perfect specimens, bifurcate frequently and sometimes anastomose, and seem to radiate from different points in various directions; the transverse lines or wrinkles are concentrically arranged, and are more or less sinuous.

The cell walls at the outer surface of the only specimens observed showing that feature, are abraded. Calices oval or circular and arranged, sometimes, in short, straight or curved rows in different directions, 5 or 6 in the space of one line including interspaces; dis-

tributed over the surface, a line or more apart, are small irregularly shaped maculae bearing no cells or pores of any kind that have been observed. The structure of the cells cannot be made out from the many examples so far examined, owing, perhaps, to the manner of the lime crystalization.

This fossil must have attained quite large dimensions, growing, apparently in an erect position. Dr. Welch informs me that he has fragments, broken from a mass of a single polyzoary *as large as a salt barrel.* It divides readily at the *central laminar axis*, the outer surfaces adhering mostly to the rock which seems to have formed in and around it; this adherence to the rock and slight cohesion at the central laminar axis, explains the common occurrence of the exposure of the latter and the rarity of the outer surfaces showing calices.

This seems to be quite an abundant fossil in the rocks of the Clinton Group—Upper Silurian, near Wilmington, Clinton Co., O.

GENUS **SAGENELLA,** (HALL.)

Sagenella striata. (sp. nov.) (James.) (*striata*—minutely fluted.)

Polyzoary consisting of thin expansions of various forms, irregular in outline. Grown upon foreign substances—mostly corals—from ½ a line to one line or more in thickness in the middle, and thinning out to almost nothing at the borders. Surface ornamented by very fine sinuous striae, which radiate from a central or sub-central elevation to the very thin irregular margins. In some cases the cells between the striae can hardly be made out, in others, however, they are distinct—*long* in proportion to width—resembling the description and figure of *S. membranacea*, sp. Hall. (Pal. N. Y., Vol. 2, pp. 172.

At the subcentral prominences, from which the striae radiate, there are generally circular depressions, one line, more or less, in diameter, with a small pit, sometimes, in the center, at which point the surface striae commence. This circular depression has somewhat the appearance of the base attachment of a column, but nothing like a column has been noticed in my case, that I am aware of, and the fact of the surface striae extending uniformly to the central point is opposed to such a view.

The size of different specimens vary from ¼ to ¾ of an inch in diameter, conforming to the surfaces of the objects to which they are attached—flat, undulating or cylindrical.

The examples collected by the writer were all found at the horizon of the hill tops at Cincinnati. Cincinnati Group.

GENUS **DICTYONEMA,** (HALL.)

Dictyonema irregularis. (Hall.) Canadian Organic Remains. Decade II, 1855.

The writer has in his cabinet a good specimen resembling very closely the above named species, as defined and figured by Prof. Hall, but much larger in outline—more expanded—found Sept. 1877 in place, in a bed of blue shale, near Symmes station, (M. & C. R. R.) Hamilton Co., Ohio, Cincinnati Group. The variations seem so slight as to not justify a new species. Prof. Hall's type specimens were found in the Quebec Group, Lower Silurian, Canada.

Another small specimen of the same *Genus*, found in the bed of Obanon Cr., Clermont Co., O., differs materially but there is not enough of it for satisfactory description.

GENUS **CRANIA,** (RETZIUS.)

Crania costata. (sp. nov.) (James.) (*costata*—ribbed.)

Shell elliptical and regular in outline, prominently convex. Apex of the dorsal valve situated about ⅓ the distance from the cardinal border, and nearly central measuring transversely. The shorter slopes more abrupt than the longer. Surface marked by rather coarse, simple, sinuous costae. Ventral valve not observed. Size of the example from which this description is made ½x⅝ of an inch. Attached to a fragment of shale.

This species differs from *C. laelia*, Hall, in the very much coarser costae, which seem to cross the shell in one direction, (not radiating from the apex), in the outline of the shell, in the less eccentric apex, and much larger size. Altogether different in general appearance.

Position and locality—Lower Silurian, Cincinnati Group. Found by Dr. L. B. Welch of Wilmington, Clinton Co., O., near that place. The type specimen is in the finder's cabinet.

Crania asperula (sp. nov.) (James.) (*asperula*—roughish.)

Shell subcircular in outline, moderately convex. Apex of dorsal valve close to the cardinal margin. Surface marked by rather coarse, rough, slightly curved striae. The roughish surface is caused partly by irregular, closely set transverse lines crossing the longitudinal striae, and partly by variations of the latter. The striae are drawn closely together at the cardinal margin, giving it a somewhat crenulated appearance. Ventral valve unknown.

Size of the specimen from which this description is made about ¼ of an inch in diameter in either direction. Attached to a fragment of limestone.

This species differs widely from any that I know of, except a slight resemblance to *C. alternata*. The type specimen is in the cabinet of Dr. L. B. Welch, the discoverer.

Position and locality—Lower Silurian, Cincinnati Group, Clinton Co., O.

Carnia alternata. (sp. nov.) (James.)

(*alternata*—in allusion to the larger and smaller striae.)

Shell angular, sub-hexagonal or sub-circular in outline. Dorsal valve moderately and evenly convex. Apex at the cardinal margin. Surface marked by coarse rounded striae, arranged in an alternating manner, about every other one being larger and more prominent than the one intervening. All of the larger striae extend directly across the shell and part of the smaller, but in some cases the latter come in by implantation about the middle. The striae are closely drawn together at the cardinal border in a puckered manner and slightly bent to one side, the ends showing distinctly. Ventral valve and interior not observed.

This species resembles the preceding only in the drawing in of the striae at the cardinal border; in all other features it is very different.

The example used for this description is attached to a fragment of limestone and measures in size 4x5 lines

Found in the upper part of the Cincinnati Group, Clinton Co., O.

GENUS **MODIOLOPSIS,** (HALL.)

Modiolopsis cuneiformis. (sp. nov.) (James.)

(*cuneiformis*—tapering in the form of a wedge.)

Shell small, thin, subelliptical in outline, narrowing from about the middle to the posterior end; umbones low; beaks slightly projecting and quite close together; hinge line slightly curved upward and about half the length of the shell; posterior umbonal ridge well defined; posterior dorsal slope regularly rounded to the basal margin. Anterior end forward of the umbones short and evenly rounded to the basal margin, which curves gently to the posterior end. Widest part of the shell a little back of the umbones.

This description is made from very symmetrical and perfect *casts*. Outer shell markings unknown. The larger of two specimens is 1¼ inch long from the anterior end to the posterior end, and ½ an inch wide from the hing line to the basal margin, measuring just back of the umbones. Greatest thickness through ¼ of an inch; the other specimen is about half these dimensions. The posterior end may have been more pointed than appears in the casts.

This species differs from *M. Cincinnatiensis*, Hall and Whitfield, in the less proportional width of the posterior portion, the evenly rounded posterior end, the evenly curved basal margin, less prominent beaks and umbones, and less thickness of the shell generally. And nearly the same differences may be stated in comparing with *M. anodontoides*, Conrad.

Position and locality—Lower Silurian, Cincinnati Group. Found by Mr Lewis C. Chamberlin (the possessor of the specimens now), near Lebanon, Warren Co, Ohio

Modiolopsis subspatulata. (sp. nov.) (James.) (*spatulata*—blade-shaped.)

Shell subovate in outline; length more than twice the breath, which is nearly or quite equal from just in front of the beaks to near the posterior end—the broadest part being near the middle, measuring from the hinge line to the basal border. The anterior margin rounds abruptly from the extremity of the hinge line to the basal border which makes a slight and regular curve to near the posterior end where it rounds off to the cardinal line slightly narrower than the other end. Valves depressed convex and flattened towards the posterior end. Umbones low; umbonal ridge inconspicuous with a slight depression passing obliquely to the posterior basal margin. Cardinal line nearly straight and extending ⅔ or more of the entire length of the shell. Surface slightly and regularly rounding from the hinge line to the basal border, and marked by rather broad, indistinct, concentric lines of growth. Beaks small, slightly angular, projecting conspicuously above the hinge line, incurved, nearly in contact, and situated near the anterior end.

Two examples used for this description are 2 inches in length and nearly an inch in breadth, and about ⅜ of an inch thick measuring through the umbones. Two others, seemingly the same species, are larger and more robust, with stronger lines of growth, the umbonal ridge more conspicuous and much thicker through the body of the shell, the valves being more convex.

Locality—Clinton Co. O., and other places in the Cincinnati Group.

BIBLIOGRAPHY.

A "broadside" sheet which has been in the possession of the writer a long time—20 years or more—laid by with other papers and overlooked until recently, seems to be of sufficient interest to Paleontologists, at least to collectors of this region to justify this notice.

The sheet contains 73 figures of Lower and Upper Silurian (?) (Cincinnati and Niagara Groups) fossils; said to have been drawn and engraved by John Van Cleve, deceased, of Dayton, O., some 30 years or more ago, but it has no date nor author's name, nor place of issue or publication. (Orthography as printed.)

The figures are made up from 7 genera and 22 species, as follows:

Genus Agracia, sp boletiformis, 1 fig. *Genus Astrae*, sp. concinna 2 figs—fleuxosa, 1 fig. *Genus Aulopora*, sp. spicata, 2 figs.—serpens, 2 figs. *Genus Calamopora*, sp. alveolaris, 4 figs.—gothlandica, 2 figs.—basaltica, 3 figs.—infundibulifera, 2 figs.—polymorphia, 10 figs.—favosa, 3 figs.—spongites, 8 figs.—fibrosa, 4 figs. *Genus Catenipora*, sp. escharoides, 2 figs.--labyrinthica, 2 figs. *Genus Cellepora*, sp. bipunctata, 2 figs. *Genus Ceripora*, sp. verrucosa, 2 figs.—milleporacea, 6 figs.—gracilis, 3 figs.—mammillata, 6 figs—muricata, 3 figs.—constellata, 3 figs.

The drawings and engravings are excellent and represent the fossils finely. It seems strange that the author should have neglected to place his name, date and place of publication to such creditable, artistic work.

CATALOGUE OF GEOLOGICAL SPECIMENS.

Illustrating the formations of the Ohio Valley. By D.D.Owen, New Harmony, Ind., April, 1843.

This catalogue gives, in a tabulated form, a list of 340 species of fossils of different formations, beginning with the Lower Silurian and continuing to and including the drift; but those of the Cincinnati Group are the ones of more special interest to us now. Some of the names seem to be abandoned, others are still retained. The Dr. failed to give authorities or references in any case, so that by whom or at what time the names were adopted does not appear; probably some of them were his own, but no descriptions accompany them, and most likely were never made out.

The different horizons are given at which the Cincinnati Group fossils were found. Below is a list of the *Genera* and species of this group in Ohio, Indiana and Ky. (Orthography as printed.)

Strophomena, sp. (undetermined)—sp. alternata—sp. parva—sp. versailles—sp. Indianensis—sp convexa—sp. rugosa. *Isotelus*, sp. gigas—sp. megistos—sp. planus. *Lingula*, sp. Lewesii. *Mytulus?* *Cryptolithus*, sp. tesselatus. *Fucoides*. *Triarthrus*, sp. Bechii. *Orthis*, sp. striata—sp. callactes—sp. elegantula—sp. minuta—sp. orbicularis—sp. suborbicularis—sp. eccentrica—sp alternata—sp. alata—O. (?) sp. plano-convexa. *Graptiolites*, in marlite. *Bellerophon*, sp. bilobatus—sp. (acutus?) *Icosidactylocrinites*, sp. recticularis. *Decadactylocrinites*, sp. planus. *Eutrochi*. *Ceripora*, sp. muricata—sp. muricata ramosa—sp. milleporacea—sp, rugosa—sp. astraformis. *Pterinea*, sp. carinata. *Trochus? Turbo*, sp. bicarinatus. *Delthyris*, sp. trilobata—sp. prolongata—sp. profundo sulcata—sp. plicata. *Atrypa*, sp. minuta—sp. striata. *Atrypa? Conotubularia*, (Ormoceras? of Stokes). *Orthoceratites*. *Calymene*, sp. senaria—sp. macrophthalma—sp. downingae. *Asaphus* sp. caudatus—(sp. undetermined). *Paradoxides*. *Ceraurus*, sp. pleurexanthemus—sp. crossotos. *Turritella*, sp. obsoleta *Unio? Avicula*. *Cyathophyllum*, sp. certatites? *Favosites*, sp. fibrosa.

The Dr.'s object in making this catalogue, as stated, was to offer the fossils in exchange for minerals, a list of which is printed of such as he was willing to receive.

BOOK NOTICE.

AN ELEMENTARY GEOLOGY, *Designed especially for the Interior States*. By E. B. Andrews, L. L D of the Ohio Geological Corps, and late Professor of Geology in Marietta College. Cincinnati, Van Antwerp, Bragg & Co., 1878.

The author says in his preface:—"The distinctive feature of this work is its limitation. It is designed for students and readers of the Interior States * * * By thus limiting the scope of the work, it is believed that a much better book for beginners may be made than if far more were attempted."

It is profusely illustrated–432 engravings, including sections and maps—and handsomely printed on paper of fine quality, and neatly and substantially bound. The illustrations are, generally, accurate and artistic—finely engraved—but some of them do not represent the fossils as definitely as they should. And it should be stated how much they are *enlarged* or *reduced*, in order to give a correct idea to the student or collector of their appearance in the rocks; this should especially be done in the case of minute forms like *Beyrichia occulifera*, which is represented in the figure as 1 inch by $\frac{5}{8}$ of an inch in size, without alluding to the amount of enlargement; the largest specimens of this fossil are not over $\frac{1}{12}$ of an inch long and $\frac{1}{20}$ broad, requiring a magnifier to distinguish them clearly on the surface of rocks. The figure 141, *Ambonychia alata*, is not correct, it represents *A. beliastriata* more nearly; the outline of *A.* (Anomalodonta) *alata*, and surface markings are very different.

Geologists and Paleontologists are not in accord in regard to "*Land Plants*" being found in the *Lower Silurian Rocks*. The author states this as "*undoubted*." ? But these are slight and unimportant defects compared to the great value of the work in teaching the geological and paleontological features of the vast region referred to. It is hoped the book may have a wide circulation and come into general use in schools throughout the country.

38,264

THE
PALEONTOLOGIST.

No. 4. CINCINNATI.—U. P. JAMES. [JULY 10, 1879.

The Price of this Number is 25 Cents.

DESCRIPTIONS OF NEWLY DISCOVERED FOSSILS—ON GEOLOGICAL NOMENCLATURE—AND SUPPLEMENT TO CATALOGUE.

BY U. P. JAMES.

GENUS BRACHIOSPONGIA. MARSH.

Brachiospongia tuberculata. (sp. nov.) James.
(tuberculata—warty.)

Fossil consisting of a sub-circular body with nine arms projecting horizontally somewhat like the spokes of a wagon-wheel, and when placed upon its edge has some resemblance to a clumsily constructed, massive wagon-wheel destitute of tire and felloes. The body is between 5 and 6 inches in diameter, one arm broken off close to the body, the others left from 1 to 2 inches in length, all having been broken away to such lengths; but the broken, detached end of one was found, which fits closely to the place of fracture, and makes the length of that arm nearly 3½ inches, where it bifurcates; length of *branches* of that arm unknown, both being broken away just beyond the bifurcation. The specimen is about two inches thick through the thickest part of the body, and the arms from 1¼ to 1½ inches in diameter at their junction, tapering very little, if any, to the fractured ends, except where weathered; in fact the one showing the bifurcation thickens towards the end and is two-fifths wider at the bifurcation than where it starts from the body.

Prominent tubercles from ⅛ to ¼ of an inch above the general surface, from ¼ to ½ an inch broad at their bases, and from ¼ to ½ an inch apart at the bases are distributed irregularly over the surface of the body and arms, also a few pit-like cavities of irregular shapes. One side has, evidently, been exposed to the weather and action of water for some length of time, and become somewhat worn away; on the worn portion the tubercles are all removed. The general surface of the fossil is rough, but with a good magnifier it is difficult to determine whether the roughness may have been caused by pores, the appearance resembles fine pappilæ, but I am unable to detect any openings; and the internal structure, at the fractures seems destitute of any organized arrangement, it is compact and granular like in appearance.

A very fine specimen of B. (Scyphia), *digitata*, Owen in Mr. C. B. Dyer's collection, has hollow body and fingers. B. *tuberculata* may have been hollow, but, if so, became filled with foreign matter, as the specimen shows nothing of the kind now. A marked feature of B. digitata is, the fingers or arms curve outward and downward and taper towards the ends whilst in this sp. they project directly outward from the body and do not taper. B. digitata has none of the tubercles that are so prominent on the surface of tuberculata; the latter is much more massive than the former, but the number of arms are the same on each.

Prof. Marsh, in an article describing the *Genus Brachiospongia* (Am. Jr. of Sci. and Arts, Vol. 44, 2d series, p. 88), refers to B. *digitata*, Owen, and mentions two other species for which he proposes the names B. *Roemerana* and B. *Lyoni*, and says, "A full description of these specimens with illustrations, will appear in an early number of this Journal." I am unable to find these descriptions and figures in any of the succeeding volumes of the Journal.

Locality. Dr. L. B. Welch of Wilmington, O., to whom this specimen belongs, informs me that it was found near that place, in the beded rock, near "Todd's fork," a branch of the Little Miami River. Cincinnati Group.

GENUS **ZAPHRENTIS.** RAFINESQUE.

ZAPHRENTIS (?) ohioensis. (sp. nov.) James.

Corallum small, simple, expanding quite rapidly from the base upward; sharply curved about the middle; subcylindrical; epitheca thin; slight encircling undulations and numerous fine encircling lines crossing the small, closely set, longitudinal sinuous costæ. Margin of cup thin, but the interior, and the septa not observed owing to those features, of the examples examined, being covered with rock or other corals; the base is covered also in the same manner.

Size about ⅜ of an inch in diameter across the cup, and about one inch in length, taking the outer curve.

This seems to be a rare species, three specimens only being known to the writer; one in Dr. R. M. Byrnes' collection and two in the writer's.

Found at Mt. Auburn, Cincinnati.

GENUS **ORTHIS.** DALMAN.

Orthis neglecta, (sp. nov.) James.

This shell has been placed as *O. perveta*, Conrad; but it seems to be distinctly different, compared with identified specimens of perveta from other localities.

The shell is transversely sub-oval in outline. Cardinal line a little less than the greatest breadth below, and generally sharply defined at the extremities. Area sub-triangular, rather broad at the beak but very narrow at the points of the hinge line. Dorsal valve, convex; beak slightly projecting and not incurved. Ventral valve a little more convex generally, than the other, with a slight mesial sinus in some cases causing a slight sinuosity at the front margin; beak prominent, projecting and incurved; foramen triangular. Both valves covered with fine radiating striæ which are increased between the umbo and margin, by implantation, to three or four times their number near the beak. Between the radiating striæ fine transverse lines may be seen, under a magnifier, giving to the striæ a sort of serrated appearance on all examples noticed. These transverse lines *may* have extended *over* the striæ, and as they are very delicate, become weathered, or rubbed off. Specimens collected vary in size from ⅜ to ¾ of an inch in breadth.

This species differ from O. *plicatella*, and O. *fissicosta*, Hall; in being uniformly more nearly equal in breadth and length, and the greater number and finer radiating striæ. In general appearance the difference strikes the eye at once. Found on the hills about Cincinnati.

GEOLOGICAL NOMENCLATURE.

(*The Cincinnati Group*—The "Hudson River Group.")

At a special (called) meeting of the *Cincinnati Society of Natural History* January 23, 1879, a committee was appointed to report on the above subject; and at the same meeting the committee made a report, stating:

"That the fossils found in the strata, for twenty feet or more above low water mark of the Ohio River, in the First Ward of the City of Cincinnati, and on Crawfish Creek, in the eastern part of the city, and in Taylor's Creek, east of Newport, Ky., at an elevation of more than fifty feet above low water mark in the Ohio River, indicate the age of the Utica Slate Group of New York."*

The only evidence here produced to prove such "indication" is the occurrence of a single identified species, (*Triarthrus becki,*) and that is found in all three of the New York groups—the Trenton, Utica Slate and Hudson River—the other species mentioned as in the specified limits are unknown in the New York groups.

The Report further says:

"Above the range of the *Triarthrus becki*, the fossils, as well as the position of the rocks, indicate the age of the Hudson River Group of New York, and we have no hesitation in so referring them, and entertain no doubt of the correctness of the reference."

No evidence whatever is here offered in support of the "reference" of the rocks in question to the Hudson River Group of New York. And the committee come to

"The conclusion, * * that all the Lower Silurian Rocks, which we have had under consideration, are to be referred to the Trenton, Utica Slate and Hudson River Groups, and that the name 'Cincinnati Group' should be dropped."

This is, certainly, a summary way of setting aside the name for an important series of rocks—a name now generally accepted and adopted, and published in many Text Books and Reports of Geological Surveys, and known over the world.

Prof. James Hall says: (Pal. N. Y. Vol. 1) in reference to this matter:

"At the west, particularly in Ohio and Indiana, the augmentation of calcareous matter has made it impossible to draw any line of demarkation which shall correspond with the three divisions so obviously marked by the lithological characters in New York."

Every collector in the Cincinnati Group knows that particular species of fossils are confined to well defined horizons, and not found above nor below, which would require the making of a number of groups of the Cincinnati Strata, should the rule proposed by the committee for establishing the name, *Utica Slate Group*, be adopted.

If *anything* is shown in favor of dropping the name, "*Cincinnati Group*," and adopting the New York nomenclature, it would seem more appropriate to take the *Trenton* Group, *not* Utica Slate, nor Hudson River; the proportion of Trenton fossils in the Cincinnati being more than as *two* to *one* of the Utica Slate or Hudson River. But the Report says, correctly:

"The Trenton Group is not exposed at Cincinnati, nor at any point in Ohio west of the city."

*It is difficult to make out from this how much space is intended to be included in the proposed division.

It may be mentioned as a fact that there are about 500, perhaps over 500 described species of fossils found in the Cincinnati Group, within a radius of 50 miles of Cincinnati, of which only about 100 species are recognized as identical with species found in the three New York Groups, (about 65 of the 100 are confined to the Trenton, 18 to the Utica Slate and Hudson River, the remainder of the 100 in common to the three groups), thus leaving 400 or more species found in the Cincinnati Group that are *unknown* in the New York Groups.

The evidence all points to the wisdom in establishing the name *Cincinnati Group*, and the importance of retaining it.

It seems reasonable to suppose that eminent Geologists and Paleontologists of the high standing of Professors F. B. Meek, and A. H. Worthen knew what they were doing in proposing the name, and had the best of evidence and soundest reasons in its favor.

Since the above article was in type, we have received from the author a Treatise on *The Utica Slate and Related Formations, &c.** The subject is quite elaborately discussed, but we do not find anything in it to change our views. It is stated that the *Utica Slate* beds in New York and other eastern localites, are noted for the large number of *Graptolites*, and are described as "*Black Bituminous Slates.*" At Cincinnati, the beds referred to are noted for the *rarity* of Graptolites, and the "Shales" have none of the Black Bituminous character, and *most* of the *many* fossil forms are different.

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*"The Utica Slate and Related Formations.—Fossils of the Utica Slate and Metamorphoses of Triarthrus Becki. By C. D. Walcott." 8 vo. pp. 38, with two plates. The two plates, with 38 figures of fossils, are finely executed. The 16 figures of Triarthrus becki, illustrating the author's views, are of special interest, showing that species at different stages of growth, from the young of less than a line in length to a fully developed individual of over *two inches* in length.

SUPPLEMENT

— TO —

Catalogue of Lower Silurian Fossils

— OF THE —

CINCINNATI GROUP.

Found at Cincinnati and within a radius of forty or fifty miles. Containing new Genera and about 150 New Species, described since the publication of the catalogue, April, 1875, and other identified species, synonyms, etc.

By U. P. JAMES, July 10, 1879.

(The numbers on the left hand margin refer to their proper places in the catalogue. Some of the species are repeated here in order to correctly place late synonyms.)

PLANTÆ.

Genus BUTHOTREPHIS, (HALL.)

o B—filciformis. James.

Genus LICROPHYCUS. (BILLINGS.)

4 L—flabellum. Miller & Dyer.

Genus PALAEOPHYCUS. (HALL.)

4*a* P—flexuosus. James.

Genus RUSOPHYCUS. (HALL.)

5*a* R—asper. Miller & Dyer.

Genus SCOLITHUS. (HALDEMAN.)

8*a* S—tuberosus. Miller & Dyer.

Genus SACCOPHYCUS. (JAMES.)

8*b* S—intortus. James.

Genus LOCKEIA. (JAMES.)

8*c* L—siliquaria. James.

Genus SPHENOPHYLLUM. (BROIGNART.)

8*d* L—primeavum. Lesquereux.

Genus PROTOSTIGMA. (LESQ.)

8*f* P—sigillaroides. Lesq.

Genus BLASTOPHYCUS. (M. & D.)

8*g* B—diadematus. Miller & Dyer.

Genus TRICHOPHYCUS. (M. & D.)

8*h* T—lanosus. Miller & Dyer.

8*i* T—sulcatum. Miller & Dyer.

Genus ARTHRARIA. (BILLINGS.)

8*k* A—biclavata. Miller.

(The published figure of this species appears much as if copied from a specimen just from the turning lathe—a remarkable growth for a Sea-Plant.)

Genus PSILOPHYTUM. (DAWES.)

8*l* P—gracillium. Lesq.

Genus DACTYLOPHYCUS. (M. & D.)

8*m* D—tridigitatum. Miller & Dyer.

8*n* D—quadripartatum. Miller & Dyer.

Genus HELIOPHYCUS. (M. & D.)

8*o* H—stelliforme. Miller & Dyer.

Genus DYSTACOPHYCUS. (M. & D.)

8*p* D—Mamillanum. Miller & Dyer.

Genus CHLŒPHYCUS. (M. & D.)

8*q* C—plumosum. Miller & Dyer.

Genus ARISTOPHYCUS. (M. & D.)

8*r* A—ramosum. Miller & Dyer.

8*s* A—var. germanum. Miller & Dyer.

PROTOZOA.

SPONGIDA.

Genus ASTYLOSPONGIA. (RŒMER.)

8*t* A—tumidus. James.

Genus MICROSPONGIA. (M. & D.)

8*u* M—gregaria. Miller & Dyer.

Genus STROMATOPORA. (DEBLAINVILLE)

8*w* S—lichenoides. James.

8*x* S—papillata. James.

8*y* S—scabra. James.

Genus BRACHIOSPONGIA (MARSH.)

8*v* B—tuberculata James.

RADIATA.

POLYPI.

Genus STELLIPORA. (HALL.)

9 S—antheloidea. Hall.
Syn. S. *polystomella*. Nicholson.

Genus DICTYONEMA. (HALL.)

9*a* D—irregulare. Hall.

Genus ZAPHRENTIS. (RAFENESQUE.)

10*a* Z—ohioensis. James.

Genus CHÆTETES. (FISCHER.)

14*a* C—calceolus Miller & Dyer.

19*a* C—crustulatus. James.

21*a* C—decipiens. Rominger.
Syn. C. *compressus.* Ulrich.
23*a* C—filiasa D'Orbigny.
Syn. C. *indianaensis.* Dennis.
27 C—lycopodites. Vanuxum.
not C. *lycoperdon.* Say.)
28*a* C meeki. James.
28*b* C—minutus. James.
37*a* C—quadratus. Rominger.
38 Syn. C. *rhombicus.* Nicholson.
41*a* C—subrotundus. James.
41*b* C—tuberculatus. Edwards & Haime.
19 Syn. C *corticans.* Nicholson.
41*c* C—varians. James.
41*d* C—venusta. Ulrich.

Genus DE KAYI. (EDWARDS & HAIME.)

12 D—(not Chætetes) attritus. Nicholson.

Genus HELIOLITUS. (GUETTARD.)

50*a* H—sphepardi. James.

Genus INOCAULUS. (HALL.)

50*b* I—arbusculla. Ulrich.

Genus FISTULIPORA. (MCCOY.)

50*c* F—multipora. James.
Syn. F *flabellata.* Ulrich.

(At the time of publication of Sp. *multipora* the writer had noticed only the encrusting forms, but afterwards found others. Some seem to have grown from a small base in an erect position, celluliferous on both sides, in a flabellate form, occasionally in a crimped manner like a fan partly opened. The expanded examples celluliferous on both sides seem to be more common than the encrusting forms.)

50*d* F—siluriana. James.

Genus CALLOPORA. (HALL.)

50*e* C—cincinnatiensis. Ulrich.
50*f* C—milfordensis. James.

ECHINODERMATA.

Genus GLYPTOCRINUS. (HALL.)

50*g* G—angularis. Miller & Dyer.
50*a* G—dyeri var. sub-leavis. Miller.
57*a* G—shaferi. Miller.

Genus HETEROCRINUS. (HALL.)

58*a* H—constrictus var. compactus. Meek.
Syn. H. *isodactylus.* Miller.
60*a* H—geniculatus. Ulrich.

Genus DENDROCRINUS. (HALL.)

73*a* D (?)—curtus. Ulrich.

Genus CODASTER. (MCCOY.)

73*b* C—pulchellus. Miller & Dyer.

Genus AGELACRINUS. (VANUXEM.)

74*a* A—holbrooki. James.
75*a* A—septembrachiatus. Miller & Dyer.

Genus HEMICYSTITES. (HALL.)

79 H—granulatus, instead of *granulosus.* Hall.
80 H—stellatus, Hall, instead of H. altus. Meek.

Genus CYCLOCYSTOIDES. (BILLINGS.)

84*a* C—bellulus. Miller & Dyer.
84*b* C—magnus. Miller & Dyer.
84*c* C—minus. Miller & Dyer.
84*d* C—mundulus. Miller & Dyer.
84*e* C—parvus. Miller & Dyer.

Genus ANOMALOIDES. (ULRICH.)

84*f* A—reticulatus. Ulrich,

Genus PALAEASTERINA. (MCCOY.)

84*g* P—approximata. Miller & Dyer.
84*h* P—speciosa. Miller & Dyer.

Genus PALÆASTER. (HALL.)

84*i* P—clarkei. Miller.
84*k* P—dubius. Miller & Dyer.
85*a* P—finei. Ulrich.
88*a* P—longibrachiatus. Miller.
89*a* P—simplex. Miller & Dyer.
89*b* P—spinulosus. Miller & Dyer.

Genus PROTASTER. (FORBES.)

90*a* P—flexuosa. Miller & Dyer.
Syn. P. (Protasterina) *fimbriata.* Ulrich.

(This species bears a close resemblance to P. *granuliferus* Meek. Pal. O. Vol. 1. The specimen described and figured by Meek was imperfect but the parts shown seem to indicate the same species. If this view is correct, P. *flexuosa* is a Synonym also.)

MOLLUSCA.

POLYZOA.

Genus PTILODICTYA. (LONSDALE.)

98*a* Pt—flexuosa. James.
98*b* Pt fragilis. Billings.
98*c* Pt—granulosa James.
98*d* Pt—hilli. James.
98*e* Pt—internodia. Miller & Dyer.
98*f* Pt—monticulopora. Dennis.
Syn. Pt. *magnifica.* Miller.
98*g* Pt—nodosa. James.
98*h* Pt parallela. James.
98*i* Pt—perelegans. Ulrich.
98*k* Pt—plumaria. James.

Genus CERAMOPORA. (HALL.)

99*a* C—alternata. James.
99*b* C (?)—beani. James.
99*c* C—concentrica. James.
100*a* C (?)—irregularis James.
102*a* C—radiata. James
102*b* C—whitei. James.

Genus HIPPOTHOA (LAMOUROUX.)

107*a* H—delicatula. James.

Genus HELOPORA. (HALL.)

108*a* H—dendrina. James.
Syn. H. (Bythopora) *fruticosa.* M.& D.
108*b* H—meeki. James.
108*c* H—parvula. James.
108*d* H—tenuis. James.

Genus INTRICARIA. (DEFRANCE.)

108*e* I—clathrata. Miller & Dyer.

Genus SAGENELLA. (HALL.)

108*f* S—striata. James.
Syn. S. (Crateropora) *lineata.* Ulrich.
Syn. S. (———) *expansa.* Ulrich.

S. (Crateropora), *erecta.* Ulrich, seems to be another Syn. for the same Sp. The writer has what he thinks evidence of this in specimens partly striated, and partly showing cells much as figured by Mr. Ulrich.

Genus RAPALONARIA. (ULRICH.)

108*g* R—venosa. Ulrich.

PTEROPODA.

Genus CONULARIA. (MILLER.)

115*a* C—formosa. Miller & Dyer.
Syn. C *doani.* Dennis.

CEPHALOPODA.

Genus ORTHOCERAS. (BREYNIUS.)

125*a* O—hindei. James.
126*a* O—meeki. Miller.

Genus ENDOCERAS. (HALL.)

131*a* E—magniventrum. Hall.

Genus TROCHOLITES. (CONRAD.)

137*a* T—circularis Miller & Dyer.
137*b* T—minusculus. Miller & Dyer.

Genus CYRTOCERAS. (GOLDFUSS.)

138*a* C—amoneum. Miller.
139 C—magister. Miller.
(not C. *obscurum*, the latter preoccupied.)

GASTEROPODA.

Genus CYCLONEMA. (HALL.)

143 C—*conica.* Miller.

(Mr. Miller seems to have abandoned this name as it is not placed in his Catalogue of Palæozoic Fossils. It is one of the forms of C. fluctuata.)

144*a* C—minor. James.

Genus PLEUROTOMARIA. (DEFRANCE.)

152*a* P—dryope. Billings.
155 P (?)—parvulus; should read 184 *Cyclora* parvula. Hall.
159 P—ohioensis. James. not *trilineata*—the latter preoccupied.

Genus MURCHISONIA. (D'ARCHIAC & VERNEUIL.)

164 M—milleri. Hall. not *bicincta*—the latter preoccupied.
165*a* M—multigruma. Miller.

Genus BELLEROPHON. (MONTFORT.)

171*a* B—morrowensis. Miller & Dyer.

Genus CYRTOLITES. (CONRAD.)

178*a* C—magnum. Miller.
178*b* C—nitidens. Ulrich.

Genus RAPHISTOMA. (HALL.)

180*a* R—planispira. Dennis.
180*b* R—staminium. Hall.

Genus CYCLORA. (HALL.)

181*a* C—depressa. Ulrich.

BRACHIOPODA.

Genus STROPHOMENA. (RAFINESQUE.)

198*a* S (?)—ulrichi. James.

Genus LEPTÆNA. (DALMAN.)

211 L—aspera. James.
Syn. L. *plicatella*, Ulrich.

(This seems to be the young of L. aspera, or possibly of L. Sericea, Sowerby.)

Genus ORTHIS (DALMAN.)

214*a* O—acuminata. James.
225 O—emacerata. Hall.
Syn. 230 O. *meeki.* Miller.
229 O—jugosa. James.

A description of this species was read at a meeting of the *Western Academy of Natural Sciences*, June, 1854, but the Society not printing its proceedings the description was not published. I now give some of the conspicuous features of the shell:

Transversely sub-oval in outline: length and breadth about as 6 to 7; cardinal line less than the widest part below, sometimes not over ⅔; regularly rounded from the cardinal line to the lateral margins and to the front. More or less sinuous in front, caused by a rather broad mesial sinus in the dorsal valve, which is plano-convex, and a mesial ridge on the ventral valve, quite sharp in some cases, in others but little conspicuous above the regular prominent convexity. Beak of the ventral valve projecting and incurved, that of the dorsal valve very slightly projecting and almost imperceptibly incurved. Area triangular. Foramen in the ventral valve triangular. Surface of both valves covered with rather fine radiating striæ which divide two or three times before reaching the margins, and are crossed by much finer transverse concentric lines, conspicuous under a magnifier on unworn examples. The outer striæ at the beak form a short curve and terminate on the cardinal line.

Different examples vary in size from ¼ of an inch to one inch in diameter, and a thickness through the middle of the valves from ⅛ to ⅜ of an inch.

Prof. Hall, (Pal. N. Y. Vol. I.) referred this shell to O. *testudinaria.* Dalman.

Mr. Meek says, (Pal. O. Vol. I.) "A careful comparison with Mr. Davidson's figures of English specimens referred to O. *testudinaria* leads me to doubt whether they can be properly included in the same species with the latter."

This is an abundant fossil in the upper beds of the Cincinnati group.

236 O—neglecta. James.
(not O. *perveta.* Con.)
224 O—anniana. James.
249 O—inflata. James.

(These two, 244 and 249 are, probably, varieties of O. acutilirata. Con. 243.)

Genus RHYNCHONELLA. (FISCHER.)

252 R—capax. Conrad.
Syn. R. *perlamellosa.* Whitfield.

Genus ZYGOSPIRA. (HALL.)

261*a* Z—concentrica. Ulrich.
263*a* Z—var. kentuckensis. James.

Genus TREMATIS. (SHARPE.)

266*a* T—quincuncialis. Miller & Dyer.

Genus CRANIA. (RETZIUS.)

268*a* C—alternata. James.
268*b* C—asperula. James.
268*c* C—costata. James.
272*a* C—parallela. Ulrich.
272*b* C—percarinata. Ulrich.
272*c* C—reticularis. Miller.
273*a* C—socialis. Ulrich.

Genus DISCINA. (LAMARCK.)
275*a* D—sublamellosa. Ulrich.
275*b* D—tenuistriata. Ulrich.

LAMELLIBRANCHIATA.

Genus CYPRICARDITES. (CONRAD.)
277*a* C—quadrangularis. Whitfield.

Genus TELLINOMYA. (HALL.)
286 T—pectunculoides. Hall.
Syn. T. *cingulata*. Ulrich.

Genus CLEIDOPHORUS. (HALL.)
287*a* C—ellipticus. Ulrich.
287*b* C—major. Ulrich.

Genus SEDGWICKIA. (MCCOY.)
296*a* S (?)—lunulata, Whitfield.

Genus CUNEAMYA. (HALL & WHITFIELD)
297*a* C—curta. Whitfield.

Genus MODIOLOPSIS. (HALL.)
302*a* M—cuneiformis. James.
307*a* M—spatulatus. James.

Genus AMBONYCHIA. (HALL.)
315*a* A—retrorsa. Miller.

Genus PTERINEA. (GOLDFUSS.)
317*a* P—mucronata. Ulrich.
317*b* P—subquadrata. James.

Genus ORTHODESMA. (H & W.)
326*a* O—mickelboroughi. Whitfield.
327*a* O—subovale. Ulrich.

Genus NUCULITES. (CONRAD.)
330*a* N—yoldiaformis. Ulrich.

Genus ANGELLUM. (MILLER.)
330*b* A—cuneatum. Miller.

ARTICULATA.

ANNELIDA.

Genus SERPULITES. (MCLEAY.)
335 S—(serpula) jamesi. Nicholson.

(The writer sent specimens of this fossil to Prof. Nicholson in 1873, at the time he was Professor of Natural History in University College, Toronto, Canada. He proposed to publish a description under the above name. I have never seen the description, and the Professor may have changed his mind. The fossil seems to be quite different from typical forms of any species of *Conchicolites* or *Ortonia*, being contorted and curved in almost every possible manner.)

Genus SPIRORBIS. (LAMARCK.)
335*a* S—cincinnatiensis. Miller & Dyer.
335*b* S—lovelandensis. James.
Syn. S. (Microceras) *minutissimum*. Ulrich.

Genus NERIDAVUS. (GRINNELL.)
335*c* N—varians. Grinnell.

Genus WALCOTTIA. (MILLER & DYER.)
335*d* W—cookana. Miller & Dyer.
335*f* W—rugosa. Miller & Dyer.

Genus EOTROPHONIA. (ULRICH.)
335*g* E—stigera. Ulrich.

Genus PROTOSCOLEX. (ULRICH.)
335*h* P—covingtonensis. Ulrich.
335*i* P—ornatum. Ulrich.
335*k* P—simplex. Ulrich.
335*l* P—tenuis. Ulrich.

CRUSTACEA.

Genus ACIDASPIS. (MURCHISON.)
338 A—cincinnatiensis. Meek.
Syn. A. *anchoralis*. Miller.

Genus LICHAS. (DALMAN.)
334*a* L—harrisi. Miller.

Genus TRINUCLEUS. (LHWYD.)
346 T—concentricus. Eaton.
Syn. T. *bellulus*. Ulrich.

Genus LEPERDITIA. (ROUALT.)
353*a* L—bivertex. Ulrich.
354*a* L—crepiformis. Ulrich.
356*a* L—radiata. Ulrich.
356*b* L—unicornis. Ulrich.

Genus BEYRICHIA. (MCCOY.)
356*c* B—ciliata. Emmons.
364. Syn. B. *tumifrons*. Hall.
356*d* B—cincinnatiensis. Miller.
357 B—chambersi. Miller.
359 Syn. B. *falcigera*. H. & W.
360*a* B—persulcata. Ulrich.
361*a* B—regularis. Emmons.
361 Syn. B. *quadliriata*. H. & W.

Genus CYTHERE. (MULLER.)
365*a* C—irregularis. Miller.

Genus PLUMULITES. (BARRANDE.)
365*b* P—jamesi. Hall & Whitfield.

(This species was erroneously printed in the Catalogue opposite No. 161.)

Genus ENPLOURA. (WETHERBY.)
81 E—(Anomalocistices)balanoides. Meek

(Prof. W. proposes the above new Genus for this remarkable fossil, taking it from the *Echinodermata* and placing it with the *Crustacea*. See Jour. Cin. Soc. Nat. Hist. Jan. 1879.)

CLASS UNCERTAIN.

Genus LEPIDOLITES. (ULRICH.)
368*a* L—dickhauti. Ulrich.
368*b* L—elongatus. Ulrich.

The following numbers may be stricken from the Catalogue as not found, or clearly identified yet within the area indicated:
Nos. 94, 100, 145, 234, 236, 271.

Price of Catalogue with Supplement.....25 cents.
Without Supplement.....15 "
Supplement separate.....10 "

38,204

THE PALEONTOLOGIST.

No. 5. CINCINNATI.—U. P. JAMES. [June 10, 1881.

The Price of this Number is 25 Cents.

CONTRIBUTIONS TO PALEONTOLOGY: FOSSILS OF THE LOWER SILURIAN FORMATION: OHIO, INDIANA AND KENTUCKY. By U. P. JAMES.

GENUS SCOLITHUS. HALDEMAN.

SCOLITHUS LINEARIS, Hall. (Pal. of N. Y., vol. i., p. 2, pl. 1.)

In his description, Prof. Hall says: "This species is apparently confined to the Potsdam Sandstone, though usually unassociated with any other fossil." And found in the eastern part of N.Y., in N. J., Penna., Md., Va., and Tenn.

The same species, apparently, is found *in place* in a fine state of preservation, on the *under* side of an extensive stratum of blue shale, in the bed of Crawfish run, eastern part of Cincinnati, 80 feet or so above low water mark of the Ohio river, *Cincinnati Group*.

Slabs several feet long, or broad, may be taken from the bed. The fossils are shown in strong, raised lines, from 1-24th to over ½ an inch or more wide, *generally* straight, and parallel to each other, but not always so. Other markings, perhaps distinct from this species, are distributed over the surface; some appear like Annelid trails, depressed, thread-like, or ⅛th of an inch or more wide; some like flattened or rounded stems covered with straight or oblique striæ, or spiral-like lines; others expanding laterally upward, with longitudinal striæ; others shapeless, contorted elevations. The appearance like (broken) "pegs driven into the rock," mentioned by Prof. H., is shown, also, but in an irregular instead of a "regular" manner.

All of the forms here referred to are found on the *under* side of the bedded shale, resting on a bed of fine, soft blue clay, which overlies a hard, somewhat massive, stratum of crystalline limestone. No other fossils observed in the stratum with this, but different Genera and many species are found abundantly immediately below and above.

If, owing to the different Geological horizon, or otherwise, these forms shall prove to be distinct from *S. linearis*, I propose the name *dispar* for the species.

SCOLITHUS DELICATULUS, sp. nov. James.

This species consists of small, cylindrical stems, from half a line to one line in diameter, passing vertically through the strata, irregularly arranged from ⅛ to ¼ of an inch apart, more or less. The appear-

ance is, as if soft mud, forming the strata, had deposited gently around the plants without disturbing their erect position.

The slab specimens used for this description vary from 1/8 to over 1/2 an inch in thickness, surface slightly undulating. On the under side the plants are broken off even with the surface, or leaving small, shallow pits; on the upper side they are elevated from half a line to over one line. Other markings, on the upper surface, resemble Annelid trails.

Position and locality: Upper part of the Cincinnati Group, Lower Silurian formation, Dearborn county, Ind.

GENUS **ASTYLOSPONGIA**. Roemer.

ASTYLOSPONGIA SUBROTUNDUS, James.

Chætetes subrotundus, James (Paleontologist, p. 11, Sept. 14, 1878.)

This species is referred to, at this time, for the purpose of correcting a mistake caused by the close resemblance of the surface markings to some species of *Chætetes*, and the structure of the interior not being examined and considered, at the time, with sufficient care. On further investigation, there seems no doubt as to its being a *sponge*.

GENUS **MONTICULIPORA**. D'Orbigny.

MONTICULIPORA (*Chætetes*) WHITFIELDI; sp. nov. James.

Compare *Chætetes barrandei*, Nicholson (Paleontology of the Province of Ontario, p. 60, fig. 17*c*.)

The many fragments found of the corallum of this species are very variable in form, and branched very irregularly. Sometimes the branches are quite close to each other, and then an inch or more apart, often rounded off at the ends. Different examples vary in size from 1/8 to 3/4 of an inch or more in diameter, with tumid swellings in some cases, and others flattened as if they had been hollow. The calices vary greatly in size and shape, polygonal, oval, circular, pentagonal, and other forms, from 5 to 8 in the space of one line, with more or less of interstitial tubuli. In some cases, groups of calices larger than the average, distributed irregularly over the surface, and, occasionally, groups of from 6 to 10 or more of the small tubular openings. No monticules, or surface elevations observed, but these may occur in other examples. Walls of corallites thin.

The interior shows the outer walls of the tubes conspicuously wrinkled transversely, and more or less sinuous longitudinally, in cases where specimens have been broken in a longitudinal direction, and the tubes not splintered.* Cut, sliced, polished sections show the wrinkles obscurely, if at all, and have a fibrous appearance, with but few irregularly placed tabulæ at variable distances apart. The growth of the corallites, commencing in the center, is in a longitudinal direction with an outward inclination, opening on the surface obliquely.

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* This feature of wrinkled or rugose tube walls is shown in some other species *when similarly fractured.*

In the writer's catalogue of Lower Silurian Fossils—Cincinnati Group, published April, 1875, this species was placed as *Chœtetes barrandei*, Nicholson. It resembles, somewhat, Prof. N.'s description and figure of the surface markings of that species, but on further close examination the two seem to differ materially. *Chœtetes barrandei* is from a higher formation, the *Devonian, Hamilton Group*, Canada.

This species has been, by some, referred to *Chœtetes rugosus*, Hall, from the *lower part* of the Trenton Limestone, N. Y. (Pal. N. Y., vol. i., p. 67, pl. 24, fig. 2), but on comparison with the type form of that species I am informed that they are not identical. And in his description, Prof. H. says, "the tubes radiate almost vertically from a central axis; diaphragms numerous, regular." These features are altogether different from the interior structure of *M. whitfieldi*. And the professor's figure of the tube walls of *rugosus* differs *materially*, also, from the former.

The surface markings of this species, at first sight, resembles, somewhat, some specimens of *M.* (*Chœtetes*) *pulchellus*, Ed. & H., but on close examination the difference is readily seen. In internal structure they are not at all alike.

Position and locality: Lower Silurian Formation, Cincinnati Group, at Cincinnati, between about 25 and 100 feet above low water mark of the Ohio river. Quite a common species at two or three localities.

Named in honor of the distinguished paleontologist, Prof. R. P. Whitfield.

Monticulipora (*Chætetes*) meeki, James.

Chætetes meeki, James (Paleontologist, July 2, 1878).

The above name was proposed for this species, as here referred to, in case the specimens then examined should prove different from sp. *C. gracilis*, which they were compared to and somewhat resemble in some respects. But after further comparison and examination of a large number of specimens, since that publication, the conclusion is, they are distinctly different.

The cell walls of *C. gracilis* are very thin, and the apertures, of *unworn* examples, have spine-like projections on the margins; abraded specimens do not show the spines.

The margins of cell apertures of *unworn* specimens of *C. meeki*, are thin and sharp, but *not spinous*, and the tube walls thicker than those of *gracilis*; the surface of *C. meeki* has stellate spaces, slightly or not at all raised, where the calices are larger than the average, and the inter-spaces thicker. Such spaces, larger calices and thicker tube walls are not seen on *C. gracilis*. The numerous stems and branches of *C. meeki* are much larger and stronger than *gracilis*, and are often hollow, sometimes flattened by pressure, when not filled with clay. Hollow specimens of *gracilis* are *not* found. The calices of the latter are smaller (about 12 in the space of one line) than *meeki*, of which there are 9 or 10 in the same space. Most specimens, of both species, are more or less weathered or abraded when found; margins of calices rarely perfect.

C. meeki is found abundantly in the upper beds of the Cincinnati

Group, in Clinton and Warren counties, Ohio. *C. gracilis* is quite as abundant on the hills at and near Cincinnati. The two are not found associated, as far as known to the writer.

MONTICULIPORA (*Chætetes*) VARIANS, James.

CHÆTETES VARIANS, James. (Paleontologist, July 2, 1878.)

In the brief description of this species, referred to above, it was mentioned as resembling *Chætetes jamesi*, Nicholson (Pal. of Ohio, vol. ii.) After more careful examinations, and comparisons of many specimens, since that date, the writer is fully convinced that the two are distinctly different from each other. In mode of growth they differ widely; the stems of *C. jamesi* grew in a cylindrical form with tumid swellings, and branched frequently, sometimes dichotomously, at variable distances and angles, the branches dividing often, in a similar manner, the stems, in some cases, hollow; the hollow ones being filled with clay or flattened by pressure. *C. varians* never shows any such mode of branching; the growth was sometimes in an irregularly, somewhat contorted, flattened, lobate form, two or three inches across, springing from a narrow cylindrical base, and giving off rounded or sub-cylindrical branches in a digitate manner; others spread over other corals, or shells, and grew in very irregular, amorphous shapes, from one to four or five inches in diameter, throwing out shoots, or branches in various directions; others in thin layers (seemingly the beginnings of corallums), on other substances, reaching over the edge at one side, where the branches are thrown out; other specimens spread out in a frondose manner, with a piece of thin coral, or shell for a central object, showing both faces equally celluliferous; still other various forms might be mentioned, but these seem sufficient to illustrate the wide difference between the two species.

The tube walls are much stronger in *C. jamesi* than *varians*; the calices of the latter are more regular in outline; generally subcircular, oval or polygonal, of which there are five or six in the space of one line, measuring in any direction. In the case of some of the sub-frondose forms, grown upon both sides of other corals or shells, where ground off or broken away, the tubes are shown as growing direct from the central object, and opening at the surface at irregular angles. *Most examples* have only a few scattering interstitial pores between the larger cells, but in the case of one observed specimen, however, many of the small pores are shown.

The best localities, as far as known to the writer, for this species, are near Blanchester and Clarksville, Clinton county, Ohio. *Upper* part of Cincinnati Group, where it is abundant; whilst *C. jamesi* is found only in the *lower* beds.

GENUS **DEKAYIA**. EDWARDS & HAIME.

DEKAYIA MACULATA, sp. nov. James.

Corallum composed of cylindrical, or sub-cylindrical stems from two

to four, or more, lines in diameter, branching frequently, in a dichotomous manner or otherwise. Surface exhibiting conspicuous, regularly rounded elevations, a little over half a line in diameter at the base, and about one line and a half apart from center to center, which are occupied by maculæ composed of irregularly shaped pores much smaller than those on other parts of the corallum. The whole surface has a roughened aspect, caused by the small, solid, column-like elevations at the angles of many of the calices. Walls of corallites, thin. Calices, subcircular or polygonal, variable in size, eight or ten in the space of one line between the monticules, with a very few small interstitial tubuli. A transverse section shows the corallites as radiating, apparently, from a central axis to the surface.

The most decided difference between this species and *D. attritus*, Nicholson (Pal. of O., vol. ii., p. 194; Annals & Mag. of Nat. Hist., Aug. 1876, p. 93; Palæozoic Tabulate Corals., pp. 298-300), is the maculæ of minute pores, occupying the monticules, distributed regularly over the surface.

Found near Loveland, O., middle beds of the Cincinnati Group, Lower Silurian Formation.

GENUS PTILODICTYA. Lonsdale.

Ptilodictya antiqua, sp. nov. James.

Polyzoary a flattened, two-edged, branching frond, celluliferous on both faces; transverse section acutely elliptical; a little more or a little less than half a line in thickness in the middle; faces of the frond very gently curved to thin, sharp edges. Cells oval, arranged in longitudinal rows between strong, parallel, more or less sinuous lines, which are increased by implantation where the frond widens, and at the junction or angles of the branches: cell walls oblique and thin, and sharp at top margins, lower lip raised to a level with the longitudinal elevated lines, upper lip depressed: seven or eight cells in the space of one line, measuring in a longitudinal direction, and nine or ten transversely. Maculæ about one line apart distributed over the surface, very little or none at all raised. The sharp edges of the frond, where perfect, are obliquely striated, not being reached by either the pores or elevated lines.

The example used for this description is about a quarter of an inch broad just above the first branch, and widens out to nearly half an inch four or five lines above, and is somewhat twisted, and curved from side to side. The *twisted* feature may not be the normal form, but caused by pressure. Dimensions of the Polyzoary unknown, the base and top being both broken away, but the form and surface markings, as described, are so decided as to avoid, it would seem, mistaking this for any other described species.

W. M. Linney, Esq., of Harrodsburg, Ky., who found this specimen, with others, in that vicinity, names the horizon as the upper part of the *Trenton Group*, Lower Silurian.

PTILODICTYA CLEAVELANDI, sp. nov. James.

Polyzoary, as far as observed, consisting of slightly oval, or flattened two-edged fronds, about half a line wide, and ¼ to ½ an inch long. giving off short lateral branches, varying from nearly right to acute angles, from half a line to one line apart, arranged, generally, in an alternating manner, but in some cases opposite to each other. Fronds celluliferous on both sides, with five or six rows on each face of the main stem, of oval, or sub-circular cells, arranged alternately, and four or five rows on the branches. No elevated or dividing line at the lateral margins of the fronds, as in some other species of this Genus. Four or five cell apertures, in the space of half a line, measuring diagonally across the frond. The best preserved specimens show the cell walls as distinct, and a depressed, sinuous line between, with the margins of the cell mouths slightly raised. Internal structure not observed.

This species bears some resemblance to *Pt. shaferi*, Meek (Pal. of O., vol. i., p. 69, pl. 5), but differs materially in the *rounded, non*-striate, instead of flat, sharp *striate* edges of the fronds of that species; and the single depressed line between the cell apertures, instead of a striate surface.

Named in honor of W. P. Cleaveland, Esq., who has devoted much time to making microscopic sections and slides of the corals and allied forms of the Cincinnati Group.

Found at Cincinnati and other localities in the Cincinnati Group, between 80 and 200 feet above low water mark of the Ohio river.

PTILODICTYA KENTUCKYENSIS, sp. nov. James.

Polyzoary of this species, so much as observed, a minute, flattened, two-edged frond, springing from a sharply-pointed base, and bifurcating at an angle of about 45 degrees, less than half a line above; each division giving off an outward lateral branch about half a line farther above; stems about half a line wide, slightly raised in the middle, and rounding gently from one edge to the other, with three or four rows of long, oval-shaped pores, of which three occupy the space of half a line, measuring their longer diameter (longitudinally). Margins of cell walls thin; cell mouths not raised. An indistinct depresssed line between some of the pores. Height from the base to a point in the middle, between the two divisions, a little over one line; breadth, measuring from the outer margins, about the same, forming, in outline, two sides of an equilateral triangle.

Locality: Bank of the Ohio river, opposite the lower part of Cincinnati, about 10 or 15 feet above low water mark, in a bed of blue shale. Cincinnati Group, Lower Silurian formation.

PTILODICTYA CLINTONENSIS, sp. nov. James.

Polyzoary a straight, convex, two-edged, unbranched frond, commencing at a pointed, cylindrical base, widening and flattening above; elliptical in transverse section at the upper part. Cells arranged in longitudinal

rows between straight, parallel, elevated lines. At the base, to a height of a little over a line, there are only a few, much elongated pores, and no elevated lines, giving to that part of the frond a sub-solid appearance; above that, to a distance of one line more, there are from six to eight rows of cells, and higher on the frond they are increased to about ten rows, the additional rows commencing at the margins as the frond expands. The cells are oval or sub-circular, and the mouths slightly raised, 6 or 7 occupying the space of one line, measuring in a longitudinal direction. Length of the specimens used for this description, 5½ lines, width a little over one line at the broadest part.

This species differs from *Ptilodictya flagellum*, Nicholson (Pal. Ohio, vol. ii., p. 262, pl. 25, fig. 4), in being *straight* instead of *falciform*, and the base *not* "*bent from side to side in a flexuous manner*," as that species is described and figured.

Locality: Clinton county, Ohio, in the upper beds of the Cincinnati Group, Lower Silurian Formation.

PTILODICTYA (?) CINCINNATIENSES, sp. nov. James.

Polyzoary, the parts examined, consisting of sub-cylindrical, or cylindrical stems, giving off lateral branches from half a line to one line apart, at an angle, generally, of about 45 degrees; branches varying in length from half a line to over one line; diameter of stems about half a line. The pores vary from long oval to sub-circular in shape, and are arranged in alternating rows, three or four in the space of half a line measuring their longer diameter (longitudinally), and nearly twice that number transversely; separated, generally, about their own diameter apart: margins of cell mouths not raised on any of the specimens examined: only a single, depressed, sinuous line between the pores in most cases, but occasionally there are two causing one elevated line and giving to such examples the appearance of a striated surface. The specimens used for this description are from two to three lines in length, and have a *jointed* appearance at the lower end in all cases, and sometimes at the upper.

The surface markings of some specimens of this species resemble, somewhat, *Ptilodictya cleavelandi*, but the stems are generally nearly cylindrical, whilst of that species they are always flattened, and the pores of this are more elongated and more widely separated. Some examples are more or less flattened by pressure, apparently.

Found on the Cincinnati hills, between 200 and 350 feet above low water mark of the Ohio river, and at other localities in the Cincinnati Group, at about the same horizon.

PTILODICTYA GRAHAMI, sp. nov. James.

Polyzoary commencing at a rather bluntly-pointed base, slightly curved to one side, gradually expanding to a height of about one line, where a very short, spur-like branch is given off; about half a line higher it branches dichotomously at an angle of about 45 degrees, and half a

line farther above, one of the divisions give off a short, outward, lateral branch, at nearly a right angle—probably the other division had a similar branch, but it is broken away just at that place. This is as much as is shown of the Polyzoary, which lies on a small slab of shale, and is a two-edged frond above the first short branch, and nearly round at the base. The base is finely striate, with very small elongate pores, which increase in size upward, till the point above the first branch is passed, where they become of an oval form, their longer diameter being in a longitudinal direction with the stem; cell wall margins distinct, with a single depressed sinuous line between. The pores are arranged in longitudinal alternating rows, and extend to the lateral margins, which are thin, but not sharp. Four or five cells in the space of half a line, measuring diagonally across the frond, which is half a line, or a little more, wide, and three lines high from the point of the base to the upper part of the example used for this description.

Named in honor of the late George Graham, of Cincinnati.

Found in the lower part of the Cincinnati Group, at Cincinnati, about 80 feet above low water mark of the Ohio river.

PTILODICTYA DUBIA, sp. nov. James.

Polyzoary a flattened, two-edged, branching frond, springing from an attenuated base, gently curving to a height of one line, where a short rudimentary branch is given off; above that point the stem is straight, with alternating lateral branches about half a line apart, standing at nearly right angles with the main stem. Surface gently convex to rounded thin edges; very finely striated, and small pores to a height of one line; above that part the pores are larger, oval in shape, their longer diamater in a longitudinal direction, four or five rows on the main stem, arranged in an alternating manner, and four or five pores in the space of half a line, measuring diagonally across the frond, about their own diameter apart, extending to the side margins, there being no nonporiferous border; mouths of cell walls distinct and slightly raised.

The example used for this description is half a line wide above the first branch, and a little over two lines high where broken off—full dimensions unknown. The *striæ* and *pores* on the base resemble *Pt. grahami*, but in other respects it is very different, particularly the branches.

This may be the lower part and base of sp. *Pt. cleavelandi*; the surface markings of the upper portion, and the lateral branches resembling some specimens of that species, but in the absence of positive evidence it is thought desirable to describe it provisionally at any rate, under the above name.

Found at Cincinnati, Cincinnati Group, 80 to 100 feet above low water mark of the Ohio river.

PTILODICTYA TERES, sp. nov. James.

Polyzoary a straight or slightly bent, unbranched, two-edged frond, commencing at a pointed base; the lower part cylindrical, then ex-

panding and flattening very gently upward; solid, apparently, to the height of about one line, with very fine longitudinal surface striæ extending that far. Six or seven rows of oval pores, on the upper part, arranged in an alternating manner between exceedingly delicate raised lines. About eight calices in the space of a line, above the striate base, including interspaces which are equal to the longer diameter of the cells. The upper part is elliptical in transverse section. The fine striæ, and raised lines require a good magnifier to be seen,—they are not visible to the naked eye.

The example used for this description is nearly half an inch long, and from half a line to one line wide above the solid (?) base.

Found in the upper part of the Cincinnati Group, Clinton county, Ohio.

GENUS ORTHIS. DALMAN.

ORTHIS (?) LINNEYI, sp. nov. James.

Shell sub-oval in outline, breadth and length about as 4 to 3; cardinal line less than half the broadest part of the shell; regularly and evenly rounded margin from the terminations of the cardinal line to the front; cardinal area short and confined to the ventral valve. Umbone of ventral valve prominent, shell curving sharply to the beak which projects beyond that of the other valve and is incurved; a mesial sinus commencing near the beak, narrow and shallow at first, but widening and deepening to the front margin; deltidium triagonal, and rather broad. Beak of the dorsal valve projecting very little, if any, beyond the cardinal line, and but slightly incurved; a mesial elevation commencing rather low at the umbone, but becoming prominent near and at the front; front margin quite sinuous, caused by the mesial sinus of the ventral valve, and the prominent mesial elevation on the dorsal valve. Each valve covered by about 23 rather coarse, simple plications, three of which are in the sinus, and the same number on the mesial elevation.

This species bears some resemblance to some forms of *O. biforata*, var. *lynx*, Eichwald, but it differs, conspicuously, in the more prominent umbone and projecting beak of the ventral valve, and short cardinal area.

The two specimens used for this description are about one inch broad, and ¾ inch high, very regular and symmetrical in form, showing no marks of distortion. They were found by Mr. W. M. Linney, of Harrodsburg, Ky., in the upper part of the Cincinnati Group, Boyle county, Ky. The specific name is given in honor of the discoverer.

GENUS STREPTORHYNCHUS. KING.

STREPTORHYNCHUS NEGLECTA, James.

Strophomena neglecta, James (Catalogue of Lower Silurian Fossils, Sept. 1871).

Strophomena neglecta—filitexta, Meek (Pal. of O., vol. i., p. 83, 1873.)

Shell resupinate; cardinal line longer than the greatest breadth of the

shell farther forward, and more or less deflected at the extremities of different specimens; lateral margins sloping inward at first, then rounding regularly to the front. Cardinal line of the *dorsal* valve linear, straight and slightly projecting over the area of the other valve; umbone flat, slightly concave near the beak in most cases, more or less highly convex at the middle, of different examples, and curving abruptly to the lateral and front margins. Surface covered with crowded, radiating striæ, which are fine and delicate at and just below the beak, becoming larger as they advance toward the margins where they are rounded and strong; striæ increased, as the surface widens, by implantation, but not always of a uniform size; in some cases they vary considerably, and are irregularly arranged, from one to three or four of the smaller placed between two of the larger. Unworn examples show the whole surface covered with very fine, delicate, sharp, crowded, concentric, raised lines, crossing the radiating striæ, which are distinctly seen under an ordinary magnifier. About ten of the radiating striæ in the space of one line, at a quarter of an inch forward of the beak, and three or four near the free margins.

Ventral valve: a strongly marked deltidium; cardinal area flat and moderately broad, sloping gently each way from the projecting beak, to the extremities of the lateral margins, and standing at an angle of 70 degrees or more with the dorsal valve; convex near the beak, and on the umbone; and different examples more or less deeply concave near the middle, curving, to correspond with the other valve, to the free margins. Surface of this valve covered with radiating striæ and concentric lines, similar to the dorsal valve.

The only feature of the *interior* of this species that can be referred to at this time, is the deltoid process of the dorsal valve, which differs materially from specimens and figures of other species; it is prominent, stands at a high angle with the valve, is bi-lobed, each lobe divided by a deep, strong depression or slit, commencing at the beak and widening to the ends of the lobes.

The breadth of the shell along the cardinal line, of different specimens, varies from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches, and from 1 to over $1\frac{1}{2}$ inches from beak to front. Other examples, supposed to be the young of this species, are much smaller. In outline and dimensions most of the specimens resemble some forms of *Strophomena alternata*, Conrad.

Some of these specimens, with other species, were loaned to the late Mr. Meek, and used in making up his descriptions for the first volume of Ohio Paleontology. In referring to this species, he said:

"I am left in some doubt, however, whether the form called *S. neglecta*, in Mr. James' list, is the same species as the *filitexta*, not having seen specimens showing its internal characters. Most of Mr. James' type specimens of that shell show little or no difference of form from those here referred to *S. filitexta*. One of them, however, is much more elongated on the hinge line, and evidently had more acutely angular lateral extremities. They all, likewise, have nearly the same-sized striæ, but the striæ are much more distinctly crenated by the crossing of

their more sharply defined, and rather more distant concentric microscopic lines."

Since the above quotation was published, the writer has found a number of other good characteristic specimens, the examination of which convinces him that the species is distinct from *S. filitexta* and others. The large specimens are thinner and lighter than the large ones of *filitexta*, the cardinal area not so broad, cardinal line, generally, more extended, and the shell more deflected at the extremities; surface striæ less strong, and the concentric lines finer and more distinct; the ventral valve more convex on the umbone, and more deeply concave near the middle; the dorsal valve more depressed on the umbone, and more highly convex near the middle.

Position and locality: Upper part of the Cincinnati Group, near Blanchester, Clinton county, O., and other places at the same horizon.

STREPTORHYNCHUS APPROXIMATA, James.

Strophomena approximata, James (Catalogue of Lower Silurian Fossils, Cincinnati Group, Sept. 1871).

Streptorhynchus approximata, James (revised ed. of same catalogue, April, 1875).

Shell, resupinate; sub-triagonal in outline; greatest breadth at or a little below the hinge line, where the shell is deflected; lateral margins rounding to the front, which may be slightly produced; cardinal area of the *dorsal* valve narrow; cardinal line straight to the deflected extremities; cardinal area of the *ventral* valve flat, and about two lines wide at the prominent beak, narrowing quite rapidly to the lateral points, and standing at an angle of 70 or 80 degrees to the other valve, with a strong prominent deltoid elevation at the middle. *Dorsal* valve flat on the umbone and convex toward the front, then sloping quite rapidly to the free margins. *Ventral* valve flat or a little convex forward of the beak, concave at the middle, then rising rather abruptly to the lateral and front margins. Both valves covered with rather coarse, rounded, more or less sinuous, radiating striæ, which increase in number, by implantation toward the free margins, and are crossed by fine concentric raised lines. More or less of rather inconspicuous wrinkles along and at right angles with the cardinal line on both valves. Interior not observed.

The largest specimen used for this description, is nearly two inches broad just below the hinge line, and one and a quarter inch from the point of the beak of the ventral valve to the front margin.

This species bears some resemblance to *S. filitexta*, Hall; but it is more angular in outline, more convex, and in other features it appears to be quite different.

The type specimen of this species was found in the upper part of the Cincinnati Group, Dearborn county, Ind.

GENUS **WALCOTTIA**. MILLER & DYER.

WALCOTTIA SULCATA, sp. nov. James.

This species consists of sub-cylindical, slightly tortuous forms, with a longitudinal groove along the center of the exposed part; a series of fine, closely arranged transverse or gently oblique striæ, commencing, apparently, at the bottom of the groove, and passing over the higher rounded surface to the embedded portion on each side.

The specimen used for this description is two inches in length, and one line in diameter: at one end it is broken away, the other end buried in the shale.

This species differs materially from *W. rugosa*, M. & D. (Jour. of Cin. Soc. of Nat. Hist. Apr. 1878), in the features of the longitudinal groove, the uniform width and the transverse striæ.

Found at about 80 feet above low water mark of the Ohio river, in the eastern part of Cincinnati.

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DESCRIPTIONS OF TEN NEW SPECIES OF MONTICULIPORA. FROM THE CINCINNATI GROUP. OHIO, INDEX, ETC. By U. P. JAMES.

GENUS MONTICULIPORA. D'ORBIGNY.

MONTICULIPORA (*Heterotrypa*) CLINTONENSIS, sp. nov. James.

The parts of the corallum found of this species vary much in shape; some are flattened, undulating expansions, from one to two inches in one direction by three to four inches the other; fractured specimens show the corallites springing from an imaginary central axis in an apparently confused manner; taking a slightly outward, tortuous course at first, then curving abruptly and directly to the surface; others are thickened, contorted, amorphous forms, with the corallites, centrally, much twisted; others appear as if subcylindrical branches had been thrown out in places; transverse sections showing the tubes as curving at first, then radiating in every direction to the surface. Cell apertures of various shapes, the walls being indented or expanded in a very irregular manner; about eight cells in the space of one line, with more or less small interstitial tubuli at the angles of the larger tubes; rounded, conspicuous monticules, more or less prominent, distributed irregularly over the surface, about one line apart, from center to center, and occupied by calices of the average size.

Sections of the interior of a flattened example three eighths of an inch thick, show the walls of the tubes, in the central portion, longitudinally, as very thin with remote tabulæ, taking a slight outward direction until reaching within a little less than one eighth of an inch of the surface where they make an abrupt curve and pass directly to the surface; immediately above the curve the walls become much thickened, and the complete tabulæ numerous; a little higher the tabulæ are not so much crowded, but higher still they again become more numerous, but not so regular as the first, and so continue to near the surface. Some of the smaller tubes are more closely tabulate than the larger, others not so close. The walls of some of the corallites divide as they leave the central part just above the abrupt curve, and again higher, all being more or less tortuous. In transverse section of the *central* part the tubes are angular, thin walled, and none of the small interstitial tubules; strikingly different from the thickened walls above the curve, and show numerous dissepiments. Tube walls of *tangential* section thick and very irregular shapes, indented or expanded in a remarkable manner; in some cases appearing three lobed, others four lobed. Section a little below the

tangential the cells become somewhat more regular in shape, approaching to oval or subcircular, and still lower, just above the abrupt curve, they are still more regular in outline; the small circular cells at the angles of the corallites are shown more or less numerous in the three last named transverse sections.

The tangential section, and perhaps the central part of this species, resembles M. sp. *implicata*, Ulrich, as described and figured by Prof. Nicholson ("Moticulipora," p. 147), but in other features it differs *widely*; particularly in the mode of growth, the surface markings, and especially the *tabulation* of the tubes after leaving the central part.

The example used, *principally*, for this description, is one of the expanded, flattened forms.

The writer found 47 fragments of this species that he has reason for believing were parts of one corallum, being all within an area of about 15 inches in diameter. No attempt has been made at restoration, as it is hardly possible that all the fragments were collected, being mingled with a mass of clay.

Locality—Upper part of the Cincinnati Group, Clinton Co., O.

MONTICULIPORA (*Heterotrypa*) CIRCULARIS, sp. nov. James.

Corallum, concavo convex; the concavity of the base corresponding with the convex upper surface, causing an even thickness of from less than half a line to about one line in different specimens; size, varying from one fourth of an inch to one inch in diameter; circular in outline; surface, even and destitute of "monticules," or groups of larger calices than the average; apertures of cells of unworn specimens, sharp, but they are seldom found in that condition, nearly all, as far as observed, being more or less abraded, showing the cell walls as much thickened; calices, subcircular, or somewhat angular in some cases, uniform in size, seven or eight in the space of one line, sometimes arranged in regular, slightly curved rows of from 4 to 12 or more; no minute tube apertures observed. The concave base of unworn examples is covered with a very thin, delicate epitheca, showing very fine concentric lines, and radiating striæ, worn ones show the bases of the corallites. Specimens partly embedded in the surface of rocks are as often found base upward as downward; detached specimens are not uncommon, all indicating the free habit of the species.

Sections of the *interior* show two series of tubes, a larger and a smaller, the larger, only, being noticeable at the *surface*. In *tangential* section the larger tubes are mostly circular with distinct borders; the smaller, which surround the others in some cases, are the most numerous, and vary greatly in shape. In a transverse section, taken just *above the base* the larger tubes seem to be slightly expanded, and the smaller not occupying so much space, otherwise it is very much like the *tangential* section. In *vertical* section the tubes take a somewhat bent or tortuous course, and are tabulate from the base to the upper surface, the smaller ones generally more closely than the larger. In most cases, the tabulæ

are horizontal, but in some they take an oblique or bent course across the corallites.

Some specimens found associated with this exhibit a *slight* tendency to forming "monticules," but in other respects they seem identical.

In outline and habit of growth this resembles M. sp. *discoidea*, James, but in other respects it is materially different, particularly the *interior* structure.

Found by the writer in the upper beds of the Cincinnati Group, Clinton and Warren counties, Ohio.

MONTICULIPORA (*Heterotrypa*) O'NEALLI ? var. COMMUNIS. James.

Corallum, as generally found, much broken, cylindrical or subcylindrical stems from one to three lines in diameter, branching at variable distances in different directions at acute angles, but masses of considerable size—from one inch to six or eight inches or more in diameter—are sometimes found, in which the stems anastomose frequently in a very irregular manner. Most specimens exhibit maculæ or "monticules," raised very little or none at all above the general surface, occupied by calices much larger than the average, and sometimes clusters of the smaller tubules. Calices generally oval or subcircular, occasionally somewhat angular; interstitial tubuli numerous, sometimes nearly or quite surrounding the larger cells, and of various shapes: an average of about six calices in the space of one line in the longitudinal direction of the stem, and seven or eight transversely. Apertures of cell walls thin at the surface of unworn specimens, but thickened immediately below, as shown by abraded examples, mostly found in that condition.

In tangential section the cells are oval or subcircular, walls much thickened and distinctly defined by a dividing space, interstitial tubuli circular or angular. Section of a cylindrical stem, cut longitudinally, shows the corallites as very thin walled centrally, and taking a longitudinal direction with a very slight outward inclination till near the surface, where they make a decided curve and open obliquely. Tabulæ remote in the axial part, none observed in the space of one fourth of an inch in the example used for this description, but near the surface they become distinct, in some cases depressed or bent downward in the middle, or taking an oblique direction across the corallites; the smaller tubes are more closely tabulate. In a transverse section of the axial portion the tubes are thin walled, circular or angular, and occupied by cruciform dissepiments, the interstitial pores variable in shape.

The interior structure of this species bears quite a close resemblance to M. sp. *o'nealli*, James, but the exterior differs materially, in being of a much more robust habit, in the maculæ of larger calices, and groups of small pores. It is considered, by some, to be M. (Chætetes) sp. *approximata*, Nicholson, but, clearly, it is not the form described and figured by Prof. N. as *appoximatus* in the 2d vol. of Ohio Paleontology, 1875, and again in his valuable work on "Monticulipora," 1881, where

he gives it (approximata) as a synonym for M. sp. *ramosa*, var. *dalei*, E. & H.

Found most abundant at Cincinnati, between 200 and 300 feet above low-water mark of the Ohio river.

MONTICULIPORA (*Heterotrypa* ?) ECCENTRICA, sp. nov. James.

Corallum, plano, or slightly concavo convex; subcircular in outline, from one to two lines in diameter, half a line or less in thickness; generally found adhering to or slightly embedded on the surface of fragments of rock, often base upward, and, when thus presented, the base is seen to be flat or slightly concave, with a very thin epitheca, showing fine, delicate concentric lines, having an *eccentric* starting point near the margin, resembling, somewhat, the beak and lines of some small brachiopods; it shows, also, fine radiating lines from the eccentric point; the bases of the corallites may be seen through the epitheca; the margins of some specimens have a serrate appearance, caused by the projections of the cell apertures of the upper surface. The upper surface is gently convex, and occupied by circular calices, seven or eight in the space of one line, of uniform size, or a few of the center ones slightly larger than on other parts, and more or less of minute interstitial tubes. Apertures of cell walls, thin.

In *tangential* section the tubes are oval, walls somewhat thickened, and distinctly separated, and filled with a dark substance, the spaces between occupied by curved or angular lines joined to the tube walls. *Vertical* section the corallities curve slightly at the base, then take an oblique course to the upper surface; tabulæ horizontal in the small tubes, but mostly oblique in the larger. Owing to the small size and thinness of the corallum, it is difficult to make altogether satisfactory sections of the interior of this species.

The examples used for this description were found by the writer near Columbia Avenue, Cincinnati, some 200 feet above low-water mark of the Ohio river.

MONTICULIPORA (*Heterotrypa*) WINCHELLI, sp. nov. James.

Corallum subcircular in outline at the base, spreading to a thin edge, and rounding upward and over the apex, somewhat dome-shape. Base attached to shells, generally Brachiopods, or other foreign substances; when removed by decay of the shell, or otherwise, the bases of the corallites show very thin walls. In a *fractured* section the corallites are seen to curve slightly outward from the base, or take a perpendicular course so as to open direct at the surface. Apertures of cell walls, thin; 8 to 10 polygonal or subcircular calices, with more or less interstitial tubes in the space of one line; "monticules," slightly, or not at all, elevated, distributed over the surface, occupied by groups of calices somewhat larger than the average.

A tangential section shows two series of tubes, the larger, and much the most numerous, are oval or subcircular, with thin walls, the smaller, angular, of various shapes, and crowded between the others; "spiniform" corallites numerous, showing, in most cases, minute circular open centres.

In vertical section the cell walls are seen to be irregularly thickened in places, and sometimes of a duplex character; some dividing at different heights, forming cells of full size at the surface; the cells so formed are the most closely tabulate at the narrow parts, but the tabulæ become the same as in the larger tubes as the tubes widen to the same dimensions. Tabulæ complete, but not horizontal, passing at various angles from one wall to the other of the tubes, in some cases curving regularly downward in the middle, or forming an acute angle.

The example used for this description is a little over an inch in diameter across the base, and one half an inch in height, and was found near Lynchburg, Highland Co., Ohio, in the upper part of the Cincinnati Group, by W. P. Cleaveland, Esq., who made, and kindly presented to the writer, a splendid microscopic slide of sections of the species, and at the same time proposed the name of Prof. Alex. Winchell, of Ann Arbor, Mich., for its name, in whose honor it is given.

In *external* form and features this species resembles, quite closely, M. *selwyni*, or var. *hospitalis*, Nicholson, but the *internal* structure is very different.

MONTICULIPORA (*Heterotrypa ?*) CLEAVELANDI, sp. nov. James.

Corallum somewhat lobate, or amorphous, throwing off flattened or cylindrical branches in various directions; rounded "monticules," more or less conspicuous, distributed over the surface about one line apart from center to center, occupied by calices that are larger than on other parts; 10 to 12 calices, polygonal or subcircular in shape, in the space of one line. No minute interstitial pores observed at the surface.

A tangential section shows the polygonal form of the tubes with tolerably thick walls, and, sparingly, small angular and spiniform corallites.

In longitudinal and vertical sections the tube walls, in the axial portion, are seen to be somewhat tortuous and very thin, and the tubes inclined gently outward, but curve more rapidly as they approach the surface, and open in a slightly oblique direction, or nearly at right angles with their course in the center of a cylindrical branch; tabulæ complete and numerous throughout, but more closely set toward and near the surface than centrally; in some cases direct across the tubes, in others curved downward or upward in the middle, and others more or less oblique.

A transverse section of a cylindrical branch, shows, in the axial region, the tubes as polygonal and thin walled, and, sparingly, the smaller angular tubes; the outer portion of the section shows the corallites vertically with the walls somewhat thickened.

The specimens used for this description were found in the upper part of the Cincinnati Group, near Lynchburg, Highland county, Ohio, by W. P. Cleaveland, Esq., in whose honor the name is given. The largest example is nearly 2½ inches, by 2 inches in size, showing where the cylindrical and flattened branches have been broken away.

The writer is indebted to Mr. Cleaveland for three excellent microscopic slides of sections of this species, cut from different specimens, showing some variations in the internal structure, owing, probably, to the different angles at which they were cut, and different thickness of the sections.

MONTICULIPORA (*Monotrypa*) WORTHENI, sp. nov. James.

Corallum consisting of cylindrical or flattened stems, from one to two lines in diameter, branching at irregular intervals, sometimes dichotomously; surface occupied by small, prominent monticules, arranged in alternating, longitudinal rows, about one line apart; calices subcircular or angular, from 10 to 12 in the space of one line. Slopes of monticules occupied by calices of the ordinary size or slightly larger, but the apices are, apparently, solid. No interstitial tubuli observed in the specimens examined. Margins of apertures of corallites tolerably thick.

In a longitudinal section of the *interior* the tube walls are very thin, simple and somewhat wavy or tortuous, with a gentle outward inclination each way from the axial part, but near the surface the outward curve is more rapid, and the walls much thickened, showing a duplex character; the tubes opening at the surface more or less obliquely. No tabulæ observed in the central region, and but few in the outer part of the thickened walls. In *tangential* section the cells are suboval, or subcircular, thick walled, and each surrounded by a distinct open space: faint indications of small "spiniform" corallites distributed, sparsely, at the angles of some of the larger tubes. A *transverse* section shows the very thin walls of the corallites in the central region, of various angular shapes, and the sudden thickening of the walls, and duplex character, and few direct, horizontal tabulæ near the surface.

Externally, at first sight, this species resembles *M. ramosa*, D'Orbigny var. *dalei*, E. & H., but when examined under a magnifier the marked difference is apparent. *Internally*, they differ widely.

The specimens used for this description were found by W. P. Cleaveland, Esq., near Lynchburg, Highland Co., Ohio, in the upper part of the Cincinnati Group.

Named in honor of the distinguished geologist and paleontologist, Prof. A. H. Worthen, Director of the Illinois Geological Survey.

MONTICULIPORA (*Monotrypa*) WELCHI, sp. nov. James.

The corallum of this species varies greatly in outline and surface markings; base expanded and subcircular in outline; the under side flat or more or less concave, covered with a thin epitheca concentrically wrinkled and finely striate; outer margin of the corallum thin at the base; rise of

the upper surface very gentle at first, in most cases forming quite a flat expansion all round, becoming more abrupt further inward and upward, and conical or dome shape above at angles (in cases of the cone shaped forms) of from 35 to 75 or 80 degrees; broken away in most cases, at heights varying—different examples—from one half an inch to over one inch above the center of the base, showing, with rare exceptions, the continued growth of the corallum, to what extent not apparent, but, from the various shaped fragments found with similar, general, surface markings and internal structure, the evidence is that it did not grow very high or much expanded, but threw out blunt projections in different directions. Distributed over the *surface* are maculæ of groups of calices, larger than the average, occupied in the center, in many cases, but not always, by a few small pores; the maculæ from being even with the general surface are often raised, gradually, from one specimen to another, to decided, conspicuous "*monticules*," irregularly arranged from one to two lines apart. Margins of cell apertures, of unworn specimens, thin and sharp. Calices polygonal, 7 or 8 in the space of one line, except the larger ones in the groups, which are, in some cases, nearly double that size; very few small interstitial tubes noticed.

A *vertical* section of the *interior*, taken from the basal part of a specimen where it has attained the thickness of ¼ of an inch, shows the corallites to be direct from the base to the outer, upper surface; the walls thin and slightly curved; the tabulæ, which are as thick as the tube walls *in this section*, are numerous, complete and generally horizontal across the tubes, but occasionally they pass in an oblique direction, and at different widths apart, sometimes having the appearance of bands. There is no difference of tabulation between the larger and smaller tubes, one no more numerous than the other. A section taken from the upper part of the specimen, at the height of one inch from the center of the base, shows the walls of corallites and tabulation identically the same as above described. In *tangential* section the corallites are thin-walled, polygonal in shape, varying in size as on the outer surface; no "spiniform" tubes observed. A *transverse* section, near the base, shows the tubes very much the same as the tangential, with the exception of the walls not being quite so sharply defined. In a *longitudinal* section taken from a specimen of an upper projection, appearing to have a tendency to branch, the tubes, in the central region, have, at first, a confused appearance, but change as they curve abruptly and pass directly to the surface; in this section the tube-walls become thickened toward the surface, but the tabulæ are the same as in the lower sections, unless, perhaps slightly more numerous. A transverse section of the same specimen, where the shape is subcylindrical, shows the walls of corallites to be thin in the axial region, but thickened outwardly with no apparent difference in tabulation. In a section taken from another sub-cylindrical specimen, the only difference appreciable is the slightly more remote tabulæ of the central region.

Some specimens of this species resemble, quite closely, some examples of sp. *patasiformis*, Nicholson, and it may prove to be only a variety.

Prof. N. says: "There are no small interstitial corallites of any kind" in the latter, whilst in sp. *welchi* a moderate number are shown. And there are other features in which they differ more or less, particularly the upper projections of many specimens.

The largest example used for this description is nearly 3 inches in diameter across the base, others vary in size from that down to ½ an inch; the broken off projections above are many sizes and forms—subcylindrical, lobate, flattened expansions and amorphous—from ¼ of an inch to one inch or more in diameter, or across.

Named in honor of Dr. L. B. Welch, of Wilmington, Ohio.

Found in Cincinnati, at from about 100 to 250 feet above low-water mark of the Ohio river.

MONTICULIPORA (*Monotrypa?*) SUBFUSIFORMIS, sp. nov. James.

Corallum cylindrical; generally straight, but curved in some cases; subfusiform in outline, different examples varying considerably in shape, some being quite sharply pointed at both ends, others at one end only, the opposite end being blunt and abruptly rounded; some have a slight projection at one end, but *unlike* a base, the cells extending over every part. Specimens collected vary in size from one fourth of an inch to nearly an inch in length, and from one half a line to one and a half lines in diameter at the thickest part. Calices oval or subcircular, 10 or 12 in the space of one line, without any regular arrangement; cell walls tolerably thick.

In tangential section the corallites are seen to be more or less polygonal, and distinctly separated, the spaces occupied by fine lines passing between the tubes which are filled with an opaque substance.

A longitudinal section, cut through the center, shows the cell walls in the axial portion as very thin, somewhat tortuous, and seemingly confused, until nearing the surface, where the tubes become more distinct, and curve either directly or somewhat obliquely to the surface. In the central part no tabulæ observed, but the vertical tubes nearer the surface are closely, but faintly tabulate. In a transverse section the delicate cell walls of the *central* portion have a chain-like reticulated appearance.

This singular little species the writer found in the upper part of the Cincinnati Group, in Clinton and Warren counties, Ohio.

MONTICULIPORA (*Monotrypa*) DYCHEI, sp. nov. James.

The corallum of the type specimen of this species is subfusiform in general outline, with rough, nodular swellings, and low, compressed ridges, and annular constrictions: *parasitic*, a crinoid stem the central, or subcentral object, upon and around which it is grown: tapering at each end to a little more than the size of the stem—about three eighths of an inch at one end, and one fourth of an inch at the other. When found the specimen was broken into five pieces, exhibiting clearly the parasitic habit, the stem seen as passing entirely through, from end to

end. The corallites radiate from the central object, and have a slight upward inclination at first, then curve directly to the outer surface. Slightly raised, rounded monticules, about one line apart from center to center, irregularly distributed over the surface, occupied by calices somewhat larger than the average. Margins of cell apertures thin and sharp: no interstitial tubes observed. Calices polygonal and averaging about eight to ten in the space of one line.

A microscopic section of the *interior* shows the tubes to be thin-walled throughout, of a somewhat duplex character, and *very few*, remote, indistinct tabulæ. In tangential section the cell walls are angular: no spiniform corallites noticed.

The specimen used for this description is seven inches long, over two inches in diameter at the thickest swelling, and one half to three fourths of an inch at the narrowest constriction.

Found by Dr. T. D. Dyche, in company with the writer, near Lebanon, Warren Co., O. Cincinnati group.

Named in honor of the discoverer.

CORRECTIONS.

Pleurotomaria, sp. *carinata*, James. On page 12 *Pal.*, this species is described as resembling sp. *dryope*, Billings. Further examination of additional examples, since collected, show it to be distinct.

Modiolopsis, sp. *oblonga*, James. This specific name proposed in place of *subspatulata* (see *Pal.* page 23), pre-occupied by one of Prof. Hall's species.

Plumulites, sp. *jamesi*, Hall & Whitfield, wrongly placed in the catalogue, p. 6, No. 161. See correction on page 12 of catalogue, No. 365*b*.

Anomalocystites—Enoploura. Dr. Henry Woodward (*Geological Magazine*, May, 1880) decides that Prof. Meek was not in error in describing species *balanoides* under the Genus *Anomalocystites*, as stated by Prof. A. G. Wetherby (*Journal of the Cin. Soc. of Nat. Hist.*, Jan. & July, 1879), and that he (Prof. W.) was wrong in removing the species to his new Genus *Enoploura*, which seems now to have no foundation, and naturally drops out of sight.

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☞ **Attention is called to the divisions in this index.**

The following *species* re-described and figured by Prof. Nicholson, in the *Annals & Mag. of Nat. Hist.*, Aug., 1876, *Palæozoic Corals*, 1879, and *Monticulipora*, 1881—*calycula—cincinnatiensis—clavacoidea—clathratula—crustulata*, and *discoidea—gracilis—o'nealli*.

38,204

THE PALEONTOLOGIST.

No. 7. CINCINNATI.—U. P. JAMES. [April 16, 1883

DESCRIPTIONS OF NEW SPECIES OF FOSSILS FROM THE CINCINNATI GROUP, OHIO AND KENTUCKY.

BY U. P. JAMES.

GENUS MONTICULIPORA. D'ORBIGNY.

MONTICULIPORA KENTUCKENSIS, sp. nov. James.

(Plate II., figs. 1, 1*a* and 1*b*.)

The fragments of the corallum of this species used for this description are cylindrical stems, about $\frac{1}{8}$th of an inch in diameter, a little more or less, branching dichotomously sometimes: in one case a flattened subcircular form, throwing off branches in different directions, with a central opening, indicating an anastomosing habit of growth. Calices polygonal, of various irregular forms, and somewhat variable in size; about 8 cells in the space of one line: low monticules distributed irregularly over the surface, in some cases occupied by calices of the ordinary size on other parts. No interstitial tubules observed at the surface, but all the specimens collected are more or less weathered, so as to prevent determining this point satisfactorily. Walls of tubes comparatively thick at the apertures.

A long section of the interior shows the tubes in the center as diverging very slightly from the longitudinal direction of the stem, but the outward inclination increases as they advance, some of them opening obliquely at the surface, others at right angles with their course in the axial region: some of the walls bifurcate as they near the surface, forming tubes pointed at their bases, but with apertures of full average size. The tube walls are comparatively and evenly thick throughout, and the cells strongly tabulate from the center to the surface, but immediately at the surface more closely than the axial region; this is particularly the case in the pointed tubes formed by the division of the walls. In some cases the central tube is nearly twice the size of adjoining ones. The tabulæ pass directly across the tubes from wall to wall.

The tangential section shows the thick walled angular cells, with some variation in size, and occasionally what might be considered a "spiniform" corallite.

This species differs from other associated slender branching corals, from the Cincinnati Group, in the equally thick tube walls and tabulæ throughout, instead of very thin walls and remote or no tabulæ centrally, as in the former; also in the surface features.

Collected by my son, Joseph F. James, near Paris, Ky.

MONTICULIPORA CIRCULARIS. James.

The Paleontologist, September 12, 1882.

A synonym for this *species*, under the name *Harrisi* (Calloporella harrisi), Ulrich, is published in the Journal of the Cincinnati Society of Natural History, for April, 1883.

GENUS AGELACRINUS. VANUXEM.

AGELACRINUS WARRENENSIS, sp. nov. James.

(Plate II., figs. 3 and 3*a*.)

Body circular, varying in diameter from 1/4th of an inch to 1/2 an inch or more. Attached to the convex valves of Strophomena, and, probably, other foreign substances; the under side concave, or otherwise, conforming to the surface grown upon. Disc composed of many squamiform plates, overlaping inward from the periphery; the plates of the outer margin very small and arranged in a narrow rim all round, the larger plates taking their place abruptly. About one line or a little more inward the surface becomes suddenly depressed, causing quite a sharp outward ridge, in most cases all round, by the projecting edges of the plates; and then rises, gently at first, but abruptly nearer and to the center, forming a somewhat prominent dome. The rays or arms nearly hidden by the imbricating plates in all the specimens examined; but occasionally some of the arms are partly but indistinctly shown, as is the case in the figured specimen. The ovarian aperture is hidden, probably, in the same way, it not being shown in any one of the specimens. All but one of the ten examples used for this description show the above specified characters, and that one is, evidently, in an abnormal condition by lateral pressure.

Found by Dr. T. D. Dyche, of Lebanon, Warren Co., O., in beds of the Cincinnati Group, equivalent to the tops of hills at Cincinnati. The type specimens are in Dr. Dyche's fine collection.

GENUS HELOPORA. HALL.

HELOPORA HARRISI, sp. nov. James.

(Plate II., figs. 2, 2*a* and 2*b*.)

The numerous well defined sections of this species, lying upon and embedded in the surface of a small slab of limestone, examined for this description, consist of delicate stems, with generally a single row of much elongated oval cells, on the *exposed* face, but occasionally—seldom—two rows are shown: the number of rows of cells on any one section undetermined, two at least, and may be three or four on some or all specimens; the difficulty in ascertaining this point definitely is in not being able to obtain detached examples, owing to the extreme delicacy of the stems; in removing them from the slab they crumble into small

particles. The fragments or sections of branches are from one to two lines in length, and from 1-8th to 1-10th of a line in breadth, with about 6 of the oval elongated cell apertures to one line. Sides of the specimens drawn together at the ends of apertures, giving them a chain-like appearance, resembling, somewhat, a transverse section of a single row of tubes of Halysites; sometimes this feature is less pronounced than in most cases, the sides then being nearly parallel, and not drawn in or but slightly so. Occasionally the sections show swollen terminations. They are, no doubt parts or joints (?) of a Polyzoary of considerable size, as indicated by the profusion of fragments on both sides of the slab about 4x4½ inches.

Exceedingly fine longitudinal lines may be seen on the general surface, with a good lens.

This species differs from *Helopora tenuis*, James, in the elongated instead of circular cell apertures, the constrictions between the cells, and the absence of a striated nonporiferous face as shown on one side of that species; also in the larger size of the stems.

The writer is indebted to I. H. Harris, Esq., of Waynesville, Ohio, for the slab of fine specimens used for this description. Found near that place, in the upper part of the Cincinnati Group. The name is given in honor of the donor.

TRACKS OF CRUSTACEAN (?)

(Plate II., fig. 4.)

The small slab of bluish brown shale, from which the drawing was made, was found by the writer near Eden Park Reservoir, Cincinnati, about 200 feet above low water mark of the Ohio river. After finding, it was split in the middle in the line of stratification, and, consequently, has not been weathered or abraded at all; both matrix and cast are clear and distinctly defined. The determination of the character of the creature that made these *tracks*, will not at this time be attempted—probably a *Crustacean*.

Cincinnati Group. Lower Silurian formation.

PLATE I.

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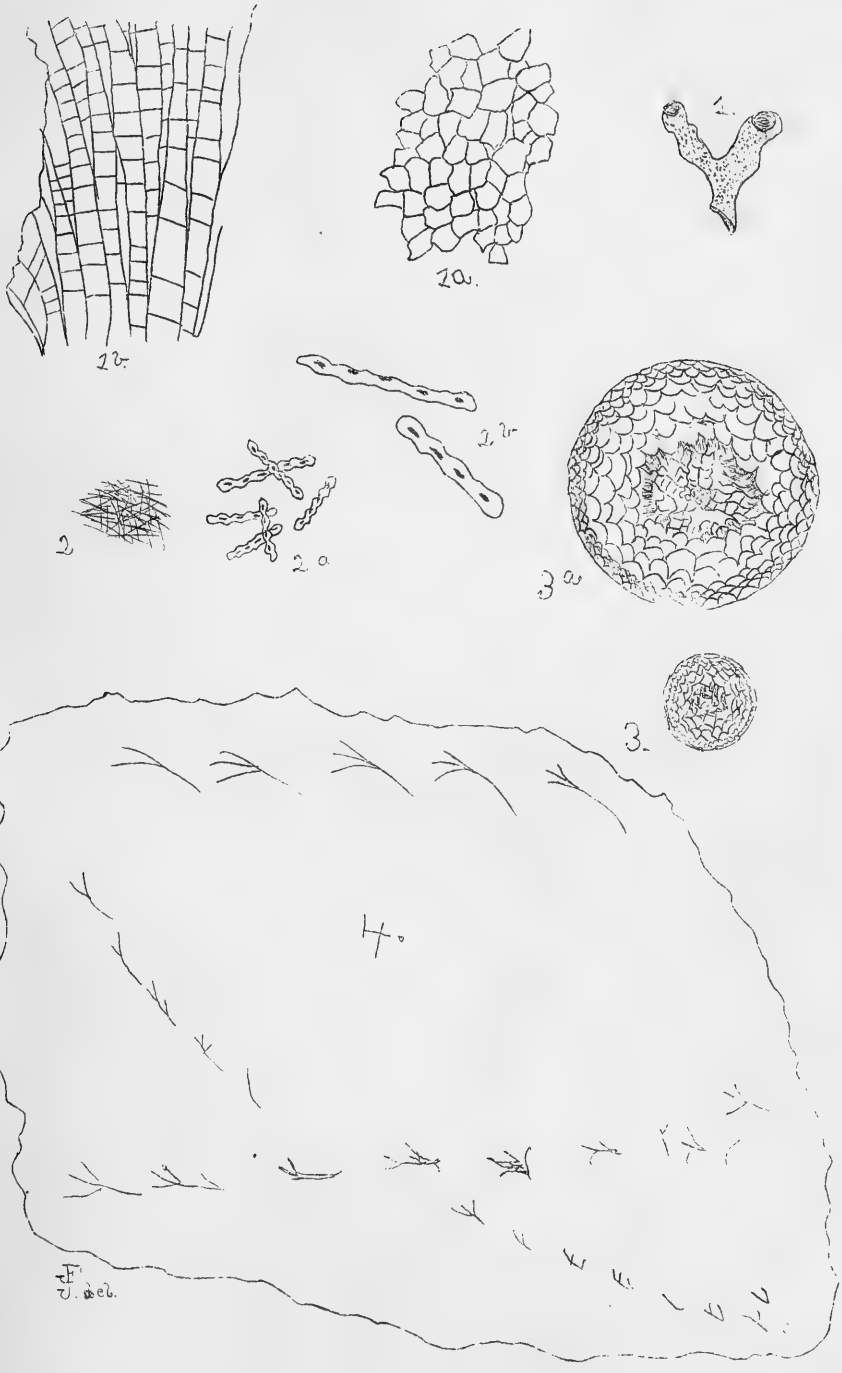
Fig. 2. Helopora harrisi, James. A group of stems. Natural size. 2*a*, highly magnified. 2*b*, two branches much more enlarged..... 58

Fig. 3. Agelacrinus warrenensis, James. Natural size. 3*a*, same specimen enlarged.. 58

Fig. 4. Tracks of Crustacean (?) Natural size..... 59


1.
1a.
2.
3a.
4.
4a.
4b.
4c.
5.
6.
6a.
7.
8.
9.
J.E.J. Del.


1b.
1a.
1.
1b.
2.
2a.
3a.
3.
4.

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