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TABULATE CORALS OF THE SILICA SHALE
(MIDDLE DEVONIAN) OF NORTHWESTERN OHIO
AND SOUTHEASTERN MICHIGAN

BY
ERWIN C. STUMM



MUSEUM OF PALEONTOLOGY
THE UNIVERSITY OF MICHIGAN
ANN ARBOR

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4. Tabulate Corals of the Silica Shale (Middle Devonian) of Northwestern Ohio and Southeastern Michigan, by Erwin C. Stumm, pages 86-104, with 5 plates.

TABULATE CORALS OF THE SILICA SHALE (MIDDLE
DEVONIAN) OF NORTHWESTERN OHIO AND
SOUTHEASTERN MICHIGAN

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ERWIN C. STUMM

ABSTRACT

The Silica Shale of Middle Devonian age, located in northwestern Ohio and southeastern Michigan, contains numerous tabulate corals of which only five species have been described. The present paper redescribes these species and describes a new subspecies of *Favosites*, a new species of *Procteria*, a new species of *Striatopora*, four new species of *Trachypora*, two new species of *Cladopora*, and one new species of *Aulocystis*.

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INTRODUCTION

EVER SINCE THE Silica Shale was exposed by quarrying operations of the Sandusky (now Medusa) Portland Cement Company about 1920 at Silica, Lucas County, Ohio, it has been an excellent source of beautifully preserved fossils of Hamilton age. The soft calcareous shale weathers quickly and exposes fossils, most of which have been replaced by calcite or pyrite, or a combination of these.

Fossils from the shale were first studied by Grace Anne Stewart (1927), who described all species that had been assembled at The Ohio State University since the opening of the quarry. Subsequently, she described a few additional species in several short papers.

Ehlers, Stumm, and Kesling (1951) divided the entire formation into 25 units. The basal 6 units are limestone known informally as the "blue" limestone. Few tabulate corals are present in these units. They are not studied in this paper.

Rugose corals are common in the "blue" limestone but not in the calcareous shale above except along the contact between the two. On the other hand, the tabulate corals, apparently having a greater tolerance for the clay in the Silica Shale, range with irregular distribution from units 7 to 25. They are the subject of this paper.

The exteriors of the tabulate corals are beautifully preserved, but the interiors of many of them are either partly or wholly replaced by secondary pyrite. Therefore, adequate thin sections are exceedingly difficult to make.

The outcrop area of the Silica Shale extends northward under the drift across the Michigan border to a point just west of Dundee, Monroe County, then swings northeastward through London Township, Monroe County, and Augusta Township, Washtenaw County. From there the outcrop pattern swings eastward north of the Wayne County airport and through Detroit beneath Waterworks Park and Belle Isle.

From Belle Isle the Silica Shale extends eastward under Lake St. Clair. Throughout its entire distribution in this part of Michigan it is covered with 40 to over 150 feet of drift, and so no permanent surface outcrop is present in Michigan at this time. The quarrying operations of Martin-Marietta in Augusta Township, Washtenaw County, in preparation for a new cement plant, are expected to give Michigan its first permanent surface occurrence of the Silica Shale.

Two temporary occurrences in Michigan have yielded Silica Shale fossils. One of these was at Waterworks Park.

Between 1928 and 1930 The Detroit Water Supply Department sank a shaft at Waterworks Park along the Detroit River shore just opposite the northeast part of Belle Isle.

Previously, during the summer of 1925, preliminary bore holes had determined the presence of the Silica Shale at this locality (Ehlers and Cooley, 1927).

Dr. Ehlers made frequent visits to the area during the sinking of the shaft and collected many samples and fossils. The following section was made by Dr. Ehlers at that time.

Description of Waterworks Park section

	Ft.	In.
Filling (soil and rock)	20	0
Glacial Drift		
14. Clay, yellow	2	
13. Clay, blue, with small pebbles and some patches of sand	82	0
12. Clay ("hard pan" of engineers), stiff, bluish-gray, arenaceous, with numerous small pebbles and a few boulders. <i>Spirifer bowmockeri</i> Stewart and other fossils characteristic of the Silica Shale of Ohio present	4	0
11. Clay, blue, with many blocks of limestone and a few boulders of igneous and metamorphic rocks. Numerous blocks of bluish-gray, argillaceous limestone with Silica Shale fossils are present, especially near the base of the interval. These blocks of limestone were derived from thin layers of limestone within a bluish-gray shale. This shale, which was an upward continuation of the shale of interval 10, was reduced to a clay by weathering prior to the advent of the Wisconsin glacier; shearing planes in the clay indicate that the glacier squeezed the soft material	19	0
Silica Formation		
10. Shale, bluish-gray, with scattered crystals of pyrite and a few remains of <i>Chonetes fragilis</i> Stewart and ostracods	2	6

9. Shale, bluish-gray, with numerous disseminated crystals of pyrite. <i>Chonetes fragilis</i> zonule	0	6
8. Shale, bluish-gray, with scattered crystals of pyrite and a few small lenses (1 to 2 inches in thickness) of pyrite. Shale has a few oblique joints and a splintery fracture tending to be parallel to the bedding	14	10
7. Shale, bluish-gray, with numerous disseminated crystals of pyrite. <i>Ceratopora</i> zonule	0	8
6. Shale, bluish-gray, with scattered crystals of pyrite. Nodules of pyrite 1 to 4 inches in length and ½ to 1 inch in thickness are present in a band about 4 feet below top of interval. Lower part of interval calcareous. <i>Tropidoleptus carinatus</i> zonule	15	6
5. Limestone, massive, crystalline, bluish-gray, containing simple corals, <i>Atrypa</i> sp., and <i>Tropidoleptus carinatus</i>	5	4
4. Limestone, crystalline, dark bluish-gray, crumbly, with some argillaceous bands and hydrogen sulphide-bearing water ..	2	6
Dundee Limestone		
3. Limestone, massive, crystalline, buff and fossiliferous, especially in lower part	4	2
2. Limestone, massive, crystalline, bluish-gray to buff-gray, fossiliferous	7	0
1. Limestone, massive, crystalline, gray to buff-gray, fossiliferous	5	4

The only other temporary surface occurrence of the Silica Shale from which fossils were collected was in material recovered from a well drilling, 1 mile south of Cone, Monroe County, Michigan. The holotype of *Pleurodictyum (Procteria) cornu* Stumm was described from here.

ACKNOWLEDGMENTS

I wish to thank Dr. G. M. Ehlers for the stratigraphic section of the Waterworks Park shaft, Detroit, Mich.

I also wish to thank Mrs. Ruth Berner Chilman, Mrs. Edward Drovédahl, and Mr. Steven Mitchell of Detroit, and Mr. Willard Widener of Toledo, Ohio, for the gift of specimens used in this report. Mrs. Chilman has been of tremendous help in donating many of the best specimens illustrated in this paper.

My appreciation is also due to Drs. L. B. Kellum, C. A. Arnold, and R. V. Kesling for critically reading the manuscript.

The specimens from the Detroit Waterworks Park Shaft were originally studied by the late Virginia Kline in an unpublished Ph.D. thesis at the University of Michigan in 1935.

All illustrated specimens are deposited in the Museum of Paleontology, The University of Michigan.

SYSTEMATIC DESCRIPTIONS

Phylum COELENTERATA

Class ANTHOZOA

Order TABULATA

Family Favositidae

Genus *Favosites* Lamarck***Favosites turbinatus lucasensis* subsp. nov.**

(Pl. V; Figs. 1-4)

Description.—Corallum massive with a prominent basal attachment scar. Basal part of corallum with a low, spreading growth form, above with almost vertical growth to a relatively flat top. Entire corallum with a maximum diameter of 9 cm and a maximum height of 8 cm. Corallites radially arranged as in typical *F. turbinatus* but larger, averaging about 2.5 mm in diameter to less than 2 mm in *F. turbinatus*.

Walls of corallites thinner than in typical *F. turbinatus*. Tabulae thin, horizontal, evenly spaced at an average of 2 mm apart. Mural pores uniserial.

Remarks.—The unusual growth form of this subspecies is the most distinctive feature. The larger corallites with thinner walls and tabulae can also serve to distinguish this subspecies from typical *F. turbinatus*.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio.

Type.—Holotype UMMP 55028.

Genus *Pleurodictyum* GoldfussSubgenus *Procteria* Davis*Pleurodictyum (Procteria) cornu* Stumm

(Pl. II, Fig. 23)

Pleurodictyum (Procteria) cornu Stumm. 1950, *partim*, p. 213, Pl. V, Figs. 1-6; 12-15.

Remarks.—Since the original description (Stumm, 1950, p. 213) the holotype has been cleaned by modern methods and shows much better the conical corallites, the large, numerous mural pores, the thin walls, and the hornlike peaks at the junctions of the corallites.

Occurrence.—Middle Devonian (Silica Shale), southeastern Michigan and northwestern Ohio.

Type.—Holotype UMMP 26406.

Pleurodictyum (Procteria) plana sp. nov.

(Pl. II, Figs. 17-22)

Description.—Corallum discoid, small, ranging from .05 cm to about 1.5 cm in diameter and from 3 to 5 mm in maximum height. Corallites 2 to 4 mm in diameter, with relatively straight walls and flat bases. Walls relatively thick with well developed septal ridges. Horns at junctions of corallites similar to those in *P. (P.) cornu* but thicker. Mural pores relatively larger than those in *P. (P.) cornu*. No tabulae observed.

Remarks.—This little species is distinguished from *P. (P.) cornu* by the shorter corallites having thick walls which are relatively straight and flat topped. The septal ridges are far more distinct than those of *P. (P.) cornu*, which have been reduced to rows of spines.

Occurrence.—Middle Devonian (Silica Shale), southeastern Michigan and northwestern Ohio. A single specimen was found by Steven Mitchell, a student at Wayne State University, from the Arkona Shale. This specimen has been donated by the finder to the Museum of Paleontology, The University of Michigan. It is the first specimen of *Procteria* to be reported from the Hamilton Group of the Thedford-Arkona region.

Types.—Holotype UMMP 53022; paratypes UMMP 53020, 53021, and 53023.

Genus *Striatopora* Hall**Striatopora intermittens** sp. nov.

(Pl. III, Figs. 1-8)

Description.—Corallum dendroid with staghorn growth habit. Stems ranging from 4 to 8 mm in diameter, composed of closely set corallites. Apertures of corallites ranging from 1 to 1.5 mm in diameter, composed of a shallow, funnel shaped peripheral platform and a vertical axial pit. Some apertures with 12 relatively distinct septal ridges, others with partly developed faint ridges, and others with no ridges visible. Mural pores relatively large, irregularly scattered on peripheral platforms.

Internal structures obscure as seen in thin section because of excessive secondary pyritization, but tabulae appearing to be horizontal and relatively closely set. Corallites inclined at a steep angle between axis and periphery.

Remarks.—The species is distinguished from *S. linneana* Billings, its nearest relative, in being much smaller and in having obscure septal ridges, or lacking them altogether.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio and southeastern Michigan.

Types.—Holotype UMMP 17048; paratypes UMMP 17047, 53061, 53062, and 53789.

Genus *Planalveolitella* Stumm

Planalveolitella parasitica Stumm

(Pl. II, Fig. 16)

Remarks.—This species, which typically encrusts nautiloid shells, was recently described (Stumm, 1966, in press). An illustration of the holotype is here included for completeness.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio.

Type.—Holotype UMMP 53043.

Genus *Trachypora* Edwards and Haime

Trachypora silicensis sp. nov.

(Pl. I, Fig. 1; Pl. II, Figs. 1–3)

Description.—Corallum composed of anastomosing cylindrical stems growing upward from a palmate basal attachment. Stems ranging from 0.6 to 4 cm in diameter. Relatively closely set, round apertures occur with random orientation on all sides of stems. Apertures with a uniform diameter of about 3 mm. Margins of apertures even with sides of stem, neither elevated nor depressed. Sides of stems between apertures smooth. In transverse section apertures filled with closely set complete or incomplete tabulae between the axis and two-thirds the distance to the periphery. The tabulae are also visible in longitudinal section where complete tabulae alternate with zones of small, cystose tabellae. No other internal structures visible.

Remarks.—In size and growth habit *T. silicensis* is similar to *T. alternans* Rominger. However, the latter species has irregularly distributed pustules and radial ridges around some of the apertures. In addition, the apertures on *T. silicensis* average considerably larger than those on *T. alternans*.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio and southeastern Michigan.

Types.—Holotype UMMP 53063; paratypes UMMP 17049, 53064.

Trachypora alpenensis Stumm and Hunt

(Pl. III, Figs. 9–15)

For description see Stumm and Hunt, 1958, p. 174.

Remarks.—Several specimens of this distinctive species have been collected from the Silica Shale. The characteristic right-angled branching is well shown on some of them. The thin sections of the Silica Shale specimens do not add any information on the species. This is due to secondary pyritization, so characteristic of Silica Shale fossils.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio.

Types.—Hypotypes UMMP 53075, 53077, 53789, and 53791.

***Trachypora labyrinthica* sp. nov.**

(Pl. IV, Figs. 1-4)

Description.—Corallum with dendritic to palmate growth habit. Stems irregularly flattened with nodular protuberances. Corallites circular, cylindrical, averaging 0.5 mm in diameter, extending along surface of stems with a reptant, aulopoid growth habit. Exterior parts of corallites crossing over each other to form an irregularly anastomosing network. Some corallites with umbellate branching on surface portions. Apertures round with thin, vertical walls. In transverse section anastomosing corallites are round or oval. In longitudinal section corallites show very thin, horizontal, widely spaced tabulae. Mural pores apparently widely spaced.

Remarks.—This unusual species combines the structures of trachyporid and aulopoid corals. The species is placed in *Trachypora* because of the erect growth habit of the corallum, the apparent presence of mural pores, and the presence of tabulae.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio.

Types.—Holotype UMMP 55024; paratypes UMMP 55025 and 55026.

***Trachypora minutissima* sp. nov.**

(Pl. II, Fig. 15)

Description.—Corallum dendroid, composed of tiny, smooth stems averaging 0.5 mm in diameter. Stems diverging at an acute angle, rather than at right angles as exemplified by *T. proboscidualis* (Rominger) a closely related species. Apertures relatively evenly spaced at about 1 mm apart and each aperture possesses a long, spoon-shaped lower lip. Because of the very small size of the stems it has been impossible to obtain adequate thin sections.

Remarks.—*T. minutissima* is related to both *T. proboscidualis* (Rominger) and *T. tuberculata* Stumm but differs from both in several respects. *T. proboscidualis* has larger, longitudinally striated stems which diverge

at right angles from the parent, and *T. tuberculata* also has larger stems, an anastomosing growth habit, and has the surface of the stem covered with tubercles.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio.

Type.—Holotype UMMP 53786.

***Trachypora? projectata* sp. nov.**

(Pl. IV, Figs. 13–18)

Description.—Corallum dendroid, composed of cylindrical or slightly flattened stems ranging from 3 to 5 mm in diameter. Stems composed of highly oblique corallites whose apertures are spaced about 1 mm apart. Apertures with an elevated marginal rim and a vertical axial pit. Surface of stems between apertures smooth or slightly undulating but without ridges or tubercles. In transverse section the corallites are closely crowded, round or oval in outline. In longitudinal section corallites apparently without tabulae. Mural pores relatively small, irregularly scattered.

Remarks.—The apparent lack of tabulae is unusual, and for this reason the species is questionably referred to as *Trachypora*.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio.

Types.—Holotype UMMP 53785; paratypes UMMP 53054, 53069, 53070, and 53071.

Genus *Cladopora* Hall

***Cladopora minutissima* sp. nov.**

(Pl. IV, Figs. 5–8)

Description.—Corallum apparently dendroid, known only from isolated stems. Stems circular, ranging from 1.8 to 2 mm in diameter. Apertures lunate with a short lower lip. Diameter of apertures ranging from .3 to .5 mm. Corallites very steeply inclined to surface of stem. In transverse section corallites round with thin to medium walls. In longitudinal section corallites very steeply to almost vertically inclined. Tabulae absent. Mural pores irregularly scattered.

Remarks.—This species is unusually small for the genus. It is similar to *C. bella* Stumm from the Bell Shale of Michigan, but the stems are less than one-half as wide and so are the apertures.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio.

Types.—Holotype UMMP 53790.

Cladopora crassa sp. nov.

(Pl. IV, Figs. 9-12)

Description.—Corallum dendroid composed of relatively thick stems ranging from 7 to 2 mm in diameter. Corallites steeply inclined to sides of stems, with lunate apertures having a prominent, almost vertical lower lip. Apertures ranging from 1.5 to almost 2.5 mm in diameter. Sides of apertures smooth with irregularly scattered mural pores. In transverse section corallites round with thick walls. In longitudinal section tabulae lacking, mural pores prominent.

Remarks.—To the writer's knowledge this is the largest species of *Cladopora* in the Devonian of North America. Large-celled species formerly assigned to this genus were found to possess tabulae (Stumm, 1965) and have been assigned to the genus *Alveolites*.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio.

Types.—Holotype UMMP 53788; paratype UMMP 53787.

Family Auloporidae

Genus *Aulocystis* Schlüter

For generic diagnosis see Watkins (1959, p. 795).

Aulocystis jacksoni (Grabau)

(Pl. II, Figs. 4-7)

For synonymy of the species see Watkins (1959, p. 796).

Remarks.—This is one of the most widespread species of *Aulocystis* in the upper Middle Devonian strata of eastern north America. It is described in detail by Watkins (1959, p. 796). The specimens from the Silica Shale are robust and especially numerous in the lower part of the formation. The branching of the buds almost at right angles to the side of the parent corallite is a very distinctive feature of the species. The large elongate dissepiments and numerous septal spines are also characteristic.

Occurrence.—Middle Devonian (Silica Shale), northwestern Ohio and southeastern Michigan.

Types.—Hypotypes UMMP 44308, 53045, and 53046.

Aulocystis auloporoidea (Davis)

(Pl. II, Figs. 12-14)

Drymopora auloporoidea Davis 1887 *partim* Pl. 72, Figs. 1-11, *non* fig. 12; Werner, 1936, p. 60; Stumm, *in* Stumm, Fenton, Fenton, and Okulitch, 1947, Cards 58, 59.

Ceratopora flabellata Greene, 1902, p. 75, Pl. 25, Figs. 2-4; Stewart, 1927, p. 20, Pl. 1, Fig. 5; Stumm, in Stumm, Fenton, Fenton, and Okulitch, 1947, Card 69.

Aulocystis cooperi Watkins, 1959, pp. 799-800, Pl. 109, Figs. 4-6.

Aulocystis auloporoidea Stumm, 1965, p. 81, Pl. 78, Figs. 5-6. For description see Watkins 1959, pp. 799-800.

For description see Watkins 1959, pp. 799-800.

Remarks.—Watkins (1959) introduced the name *A. cooperi* largely on the basis that the interiors of *A. auloporoidea* were imperfectly preserved and could not be used for comparison. Since then the Guy Campbell collection of fossil invertebrates from the Falls of the Ohio, obtained by the Museum of Paleontology, The University of Michigan, has been found to contain many specimens of this species, some showing internal structures. *Aulocystis cooperi* appears to be conspecific with *A. auloporoidea*. The tendency of the corallites to remain in close contact up to the bases of the calyxes is the most characteristic feature of the species.

Occurrence.—Middle Devonian (Silica Shale), southeastern Michigan and northwestern Ohio. A lens-shaped bioherm composed almost entirely of this species, located in unit 18 of the Silica Shale at the north quarry of the Medusa Portland Cement Company at Silica, Ohio, with a maximum thickness of 12 feet and a maximum diameter of about 100 feet, was recently destroyed by quarrying operations.

Types.—Hypotypes UMMP 53048 and 53051.

Aulocystis lucasensis sp. nov.

(Pl. II, Figs. 8-11)

Description.—Corallum dendroid, corallites widely branching almost in the manner of *A. jacksoni*. Branching apparently in one plane, giving corallum a fanlike appearance. Corallites subcylindrical, from 1.5 to 2.5 mm in diameter and 1 cm in maximum length between branches. Exteriors with horizontal closely set, distinct growth lines. Calyxes small, circular, averaging about 2 mm in diameter. In transverse section dissepiments appearing as short chords. In longitudinal section dissepiments few, elongate, close to the periphery. No septal spines observed.

Remarks.—This unusually small species is distinct in its flabelliform branching habit, the sparseness of the dissepiments, and the absence of septal spines.

Occurrence.—Middle Devonian (Silica Shale), southeastern Michigan and northwestern Ohio.

Types.—Holotype UMMP 53047; paratypes UMMP 17030 and 17031.

Genus *Aulopora* Goldfuss*Aulopora microbuccinata* Watkins

(Pl. III, Figs. 16-19)

Aulopora serpens, Stewart, 1938, p. 79, Pl. 19, Figs. 2-3, *non A. serpens* Goldfuss.*Aulopora microbuccinata* Watkins, 1959, pp. 802-803, Pl. III, Figs. 21-22.

For description see Watkins, 1959, pp. 802-803.

Remarks.—The species is the most prolific of the tabulate corals of the Silica Shale. It is found encrusting rugose corals, brachiopods, and bryozoans. All of the specimens studied by the author appear to be without tabulae.

Occurrence.—Middle Devonian (Silica Shale), southeastern Michigan and northwestern Ohio. Also common in the Traverse Group of northern Michigan.

Types.—Hypotypes UMMP 17044, 53055, 53056, and 53793.

REFERENCES CITED

- DAVIS, W. J. 1887. Kentucky Fossil Corals—a Monograph of Fossil Corals of the Silurian and Devonian rocks of Kentucky, Part II. Kentucky Geol. Sur.
- EHLERS, G. M., STUMM, E. C., and KESLING, R. V. 1951. Devonian rocks of southeastern Michigan and northwestern Ohio. Guidebook for the stratigraphic field trip, Geol. Soc. America, Detroit meeting.
- and COOLEY, M. E. 1927. Discovery of a Hamilton fauna in southeastern Michigan. Contrib. Mus. Paleontology, Univ. Mich., Vol. II, no. 13.
- GREENE, G. K. 1898-1904. Contributions to Indiana Paleontology. Vol. 1. New Albany, Indiana. Ewing and Zeller.
- STEWART, G. A. 1927. Fauna of the Silica Shale of Lucas County. Geol. Surv. Ohio, 4th Ser. Bull. 32.
- STUMM, E. C. 1950. Corals of the Devonian Traverse Group of Michigan. Part III, *Antholites*, *Pleurodictyum*, and *Procteria*. Contrib. Mus. Paleontol., Univ. Mich., Vol. VIII, No. 8.
- , 1965. Silurian and Devonian corals of the Falls of the Ohio. Geol. Soc. America, Mem. 93.
- , 1966. *Planalveolitella*, a new genus of Devonian tabulate corals, with a revision of the species *Planalveolites foughtii* (Edwards and Haime). Contrib. Mus. Paleontol., Univ. Mich., Vol. 21, No. 2.
- , FENTON, C. L., FENTON, M. A., and OKULITCH, VLADIMIR. 1947. Type Invertebrate Fossils of North America (Devonian) Tabulata, Part I. Wagner Free Inst. Sci., Philadelphia.

- , and HUNT, A. S. 1958. Corals of the Devonian Traverse Group of Michigan. Part V, *Trachypora*. *Ibid.*, Vol. XIV, No. 11.
- WATKINS, J. L. 1959. Middle Devonian auloporid corals from the Traverse Group of Michigan. *Journ. Paleontol.*, Vol. 33, No. 5.
- WERNER, COURTNEY. 1936. Synonymy of the mid-Devonian tabulate corals of the Falls of the Ohio. *Wash. Univ. Studies, new ser., Science and Technology*, No. 9.

Manuscript received May 24, 1966

EXPLANATION OF PLATE I

(Figure $\times 1$)

	PAGE
<i>Trachypora silicensis</i> sp. nov.	93
FIG. 1. Side view of almost complete corallum showing anastomosing growth habit. Holotype UMMP 53063. Silica Shale, bed 7, Medusa quarry, Silica, Ohio. Specimen presented to the Museum of Paleontology by Mr. Millard Widener of Toledo, Ohio.	

EXPLANATION OF PLATE II

	PAGE
<i>Trachypora silicensis</i> sp. nov.	93
FIG. 1. Upper branches of a corallum. Paratype UMMP 17049. <i>Tropidoleptus carinatus</i> zone. Waterworks Park shaft, Detroit, Mich. $\times 1$. Collected by G. M. Ehlers.	
FIG. 2. Transverse section of a corallum showing tabulae and tabellae. Paratype UMMP 53064. Unit 7, Medusa quarry, Silica, Ohio. $\times 2$.	
FIG. 3. Longitudinal section of same specimen, $\times 2$.	
<i>Aulocystis jacksoni</i> (Grabau)	96
FIG. 4. Side view of specimen showing branching habit. Hypotype UMMP 53045, <i>Tropidoleptus carinatus</i> zone, Waterworks Park shaft, Detroit, Mich. $\times 1$.	
FIG. 5. View of another specimen with right-angle branching. Hypotype UMMP 53046. Unit 7, Medusa quarry, Silica, Ohio.	
FIG. 6. Transverse section of a specimen showing septal spines. Hypotype UMMP 44308. Unit 7, Medusa quarry, Silica, Ohio.	
FIG. 7. Longitudinal section of same specimen showing numerous elongate dissepiments.	
<i>Aulocystis lucasensis</i> sp. nov.	97
FIG. 8. Fragment of corallum with a few branches. Paratype UMMP 17030. <i>Tropidoleptus carinatus</i> zone, Waterworks Park shaft, Detroit, Mich. $\times 1$. Collected by G. M. Ehlers.	

PLATE I

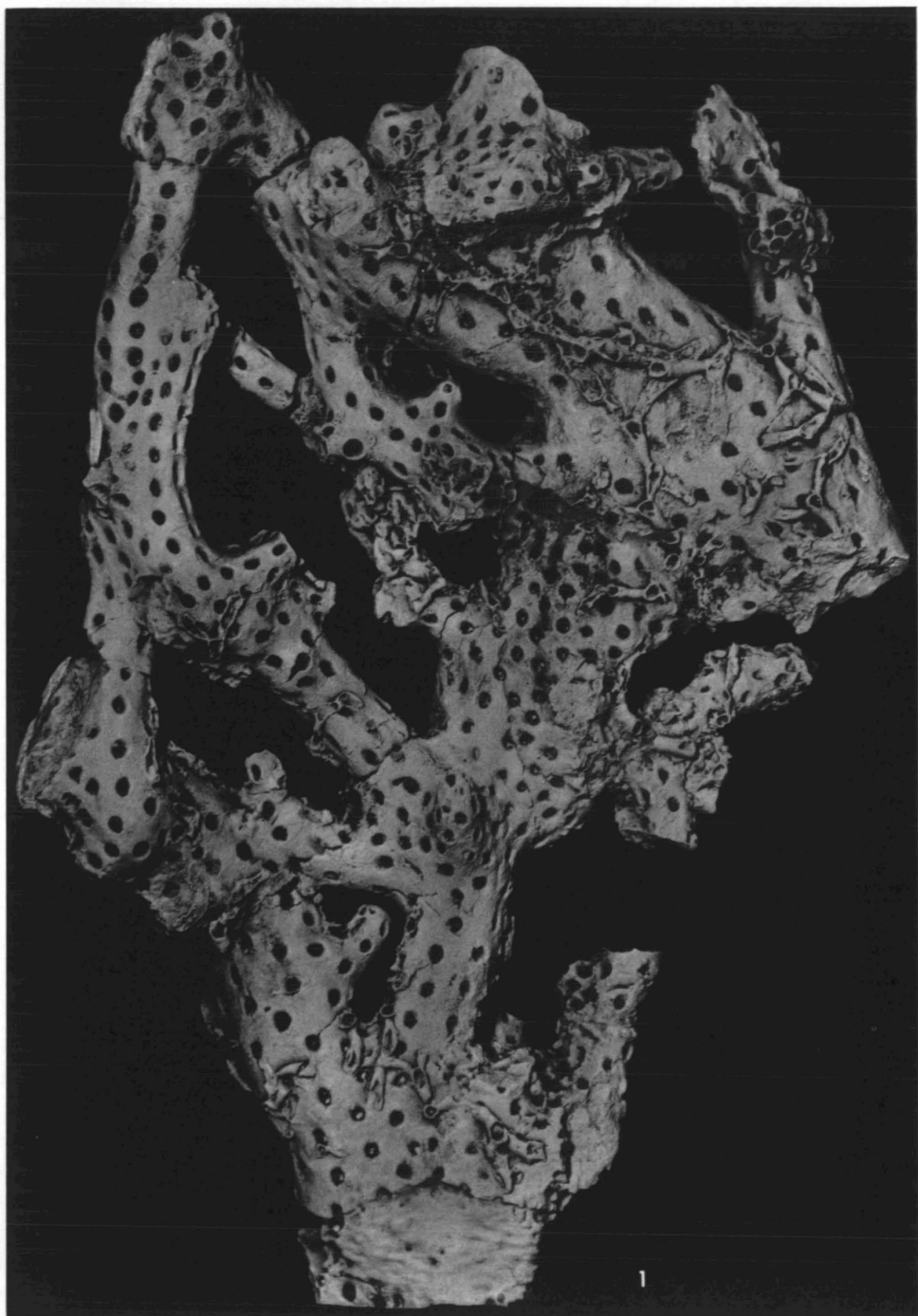


PLATE II

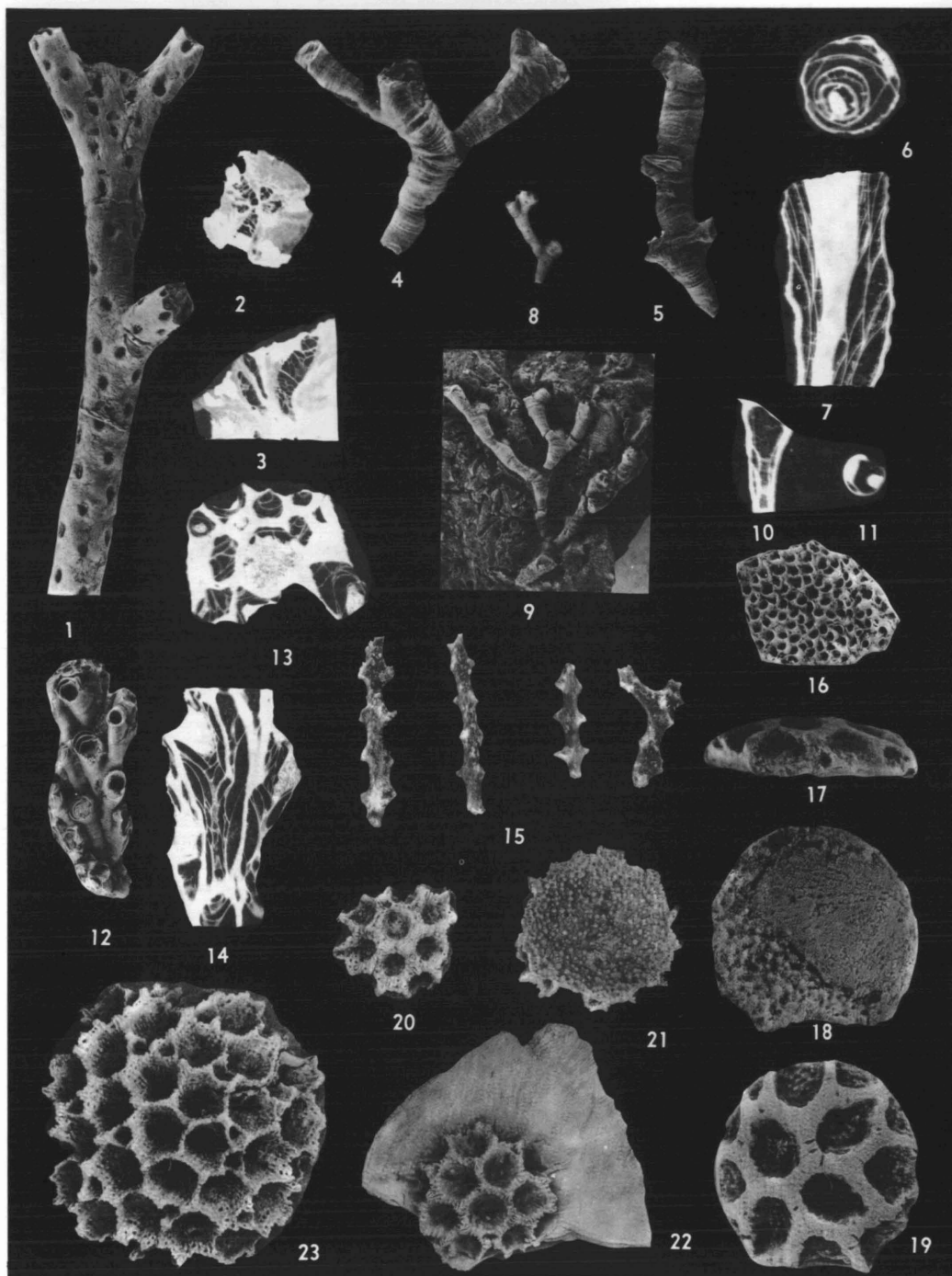


FIG. 9. Relatively complete corallum showing fanlike growth habit. Holotype UMMP 53047, zone 18, north Medusa quarry, Silica, Ohio. $\times 1$. Collected by Mrs. Ruth Berner Chilman.

FIG. 10. Longitudinal section of a specimen showing sparse dissepiments. Paratype UMMP 17031. *Tropidoleptus carinatus* zone, Waterworks Park shaft, Detroit, Mich. $\times 2$. Collected by G. M. Ehlers.

FIG. 11. Transverse section of same specimen. $\times 2$.

Aulocystis auloporoidea (Davis) 96

FIG. 12. Specimen showing closely set corallites. Hypotype UMMP 53051. From bioherm in Unit 18, north Medusa quarry, Silica, Ohio. $\times 1$. Collected by Mrs. Ruth Berner Chilman.

FIG. 13. Transverse section of another specimen from same horizon and locality. Hypotype UMMP 53048. $\times 2$.

FIG. 14. Longitudinal section of same specimen. $\times 2$.

Trachypora minutissima sp. nov. 94

FIG. 15. Four fragments from a dendritic colony. Holotype UMMP 53786. Unit 7, north Medusa Quarry, Silica, Ohio. $\times 4$. Collected by Mrs. Ruth Berner Chilman.

Planalveolitella parasitica Stumm 93

FIG. 16. Distal view of holotype UMMP 53043, Units 7-15, north Medusa quarry, Silica, Ohio. $\times 1$.

Pleurodictyum (Procteria) plana sp. nov. 92

FIG. 17. Side view of a specimen showing discord form. Paratype UMMP 55020. Arkona Shale, about 30 feet below top, Hill No. 4, along Ausable River, near Arkona, Ont. $\times 4$. Collected by Steven Mitchell.

FIG. 18. Proximal view of same specimen showing attachment scar to brachiopod valve. $\times 4$.

FIG. 19. Distal view of same specimen, somewhat waterworn, showing thick walls and septal ridges. $\times 4$.

FIG. 20. Distal view of small specimen with unusually thick walls. Paratype UMMP 55023, Unit 7, north Medusa quarry, Silica, Ohio. $\times 2$.

FIG. 21. Proximal view of another specimen. Paratype UMMP 55021. Same occurrence as original of Fig. 20. $\times 2$.

FIG. 22. Distal view of well preserved specimen with prominent septal ridges. Specimen attached to valve of a brachiopod. Holotype UMMP 55022. Same occurrence as original of Fig. 20. $\times 2$.

Pleurodictyum (Procteria) cornu Stumm 91

FIG. 23. Distal view of holotype UMMP 26406. Well drilling 1 mile S. of Cone, Monroe County, Mich. $\times 2$.

EXPLANATION OF PLATE III

- | | PAGE |
|--|------|
| <i>Striatopora intermittens</i> sp. nov. | 92 |
| FIG. 1. Stem of corallum showing well-developed septal ridges in the calyxes of some of the corallites. Holotype UMMP 17048. <i>Tropidoleptus carinatus</i> zone, Waterworks Park shaft, Detroit, Mich. \times 3. Collected by G. M. Ehlers. | |
| FIG. 2. Same specimen \times 1. | |
| FIG. 3. Longitudinal section showing steeply inclined corallites and horizontal tabulae. (The white areas in this and the following 3 sections are due to secondary pyritization.) Paratype UMMP 53061. Unit 7, Medusa quarry, Silica, Ohio. | |
| FIG. 4. Transverse section of same specimen. | |
| FIG. 5. Transverse section of another specimen. Paratype UMMP 17047. Same occurrence as holotype. | |
| FIG. 6. Longitudinal section of same specimen. | |
| FIG. 7. Stem of corallum showing faint septal ridges in a few of the corallites. Paratype UMMP 53062. Unit 7, Medusa quarry, Silica, Ohio. \times 2. | |
| FIG. 8. Another stem of a corallum of the same species from the same horizon and locality. Paratype UMMP 53789. \times 2. | |
| <i>Trachypora alpenensis</i> Stumm and Hunt | 93 |
| FIG. 9. Stem with several branches showing near right-angled budding. Hypotype UMMP 53791. Unit 18, Medusa quarry, Silica, Ohio. \times 3. | |
| FIG. 10. Single elongate stem. Hypotype UMMP 53075. Same occurrence as original of Fig. 9. \times 1. | |
| FIG. 11. Same specimen. \times 3. | |
| FIG. 12. Longitudinal section showing extremely thick walls between apertures. Hypotype UMMP 53789. Same occurrence as original of Fig. 9. \times 3. | |
| FIG. 13. Transverse section of same specimen, \times 3. | |
| FIG. 14. Transverse section of another specimen. Hypotype UMMP 53077. Same occurrence as original of Fig. 9. (White areas in this and following section due to secondary pyritization.) | |
| FIG. 15. Longitudinal section of same specimen. | |
| <i>Aulopora microbuccinata</i> Watkins | 98 |
| FIG. 16. Typical specimen encrusting a brachiopod valve. Hypotype UMMP 53056. Unit 7, Medusa quarry, Silica, Ohio. \times 1. | |
| FIG. 17. Unusually well preserved specimen encrusting brachial valve of a <i>Pholidostrophia</i> . Hypotype UMMP 17044. <i>Tropidoleptus carinatus</i> zone, Waterworks Parks shaft, Detroit, Mich. \times 1. Collected by G. M. Ehlers. | |
| FIG. 18. Weathered specimen with irregularly spaced tubercles on inside of wall. No tabulae present. Hypotype UMMP 53055. Same occurrence as original of Fig. 16. \times 1. | |
| FIG. 19. Partly weathered specimen encrusting a <i>Protopleptostrophia</i> . Hypotype UMMP 53793. Same occurrence as original of Fig. 16. \times 2. | |

PLATE III

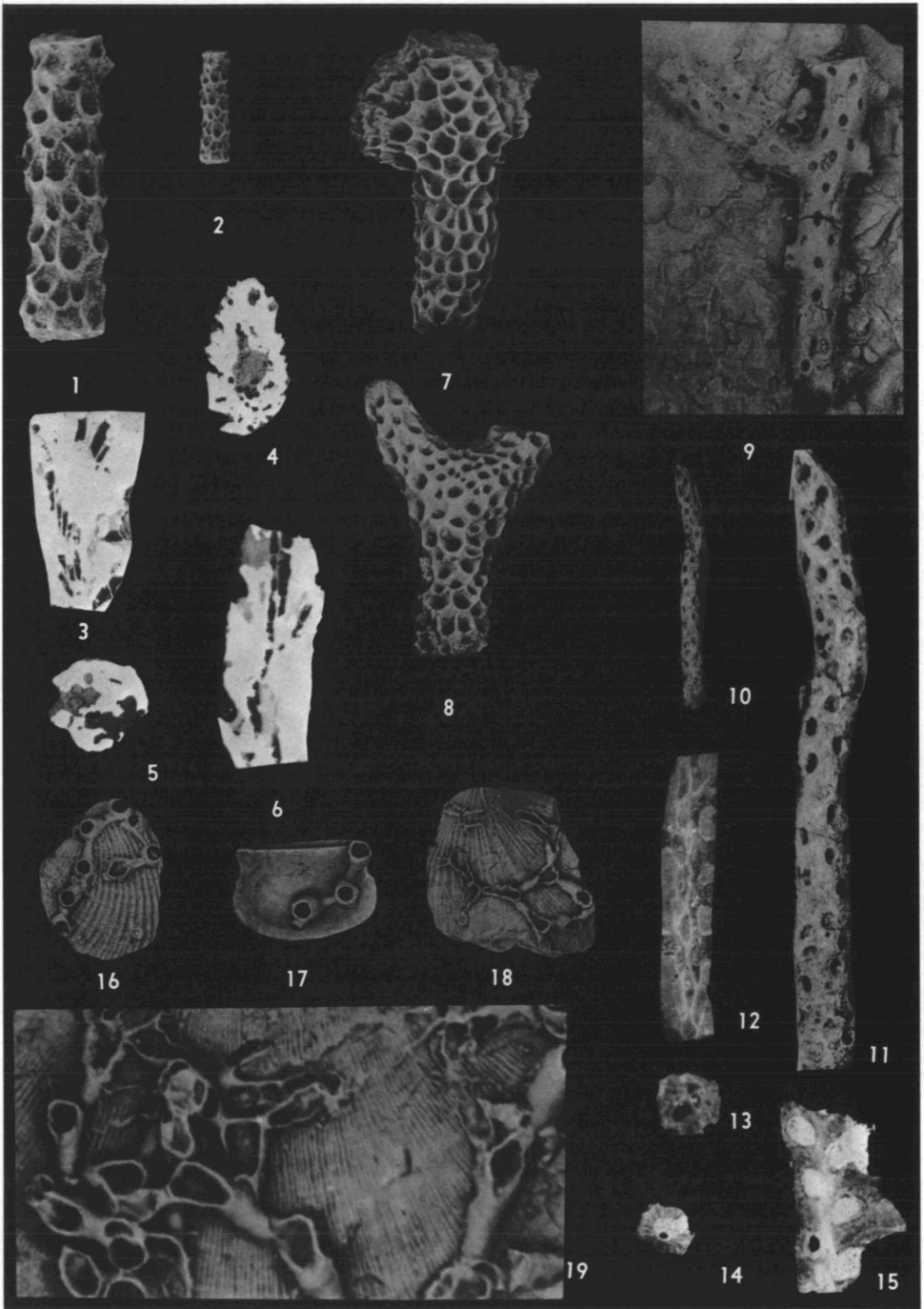
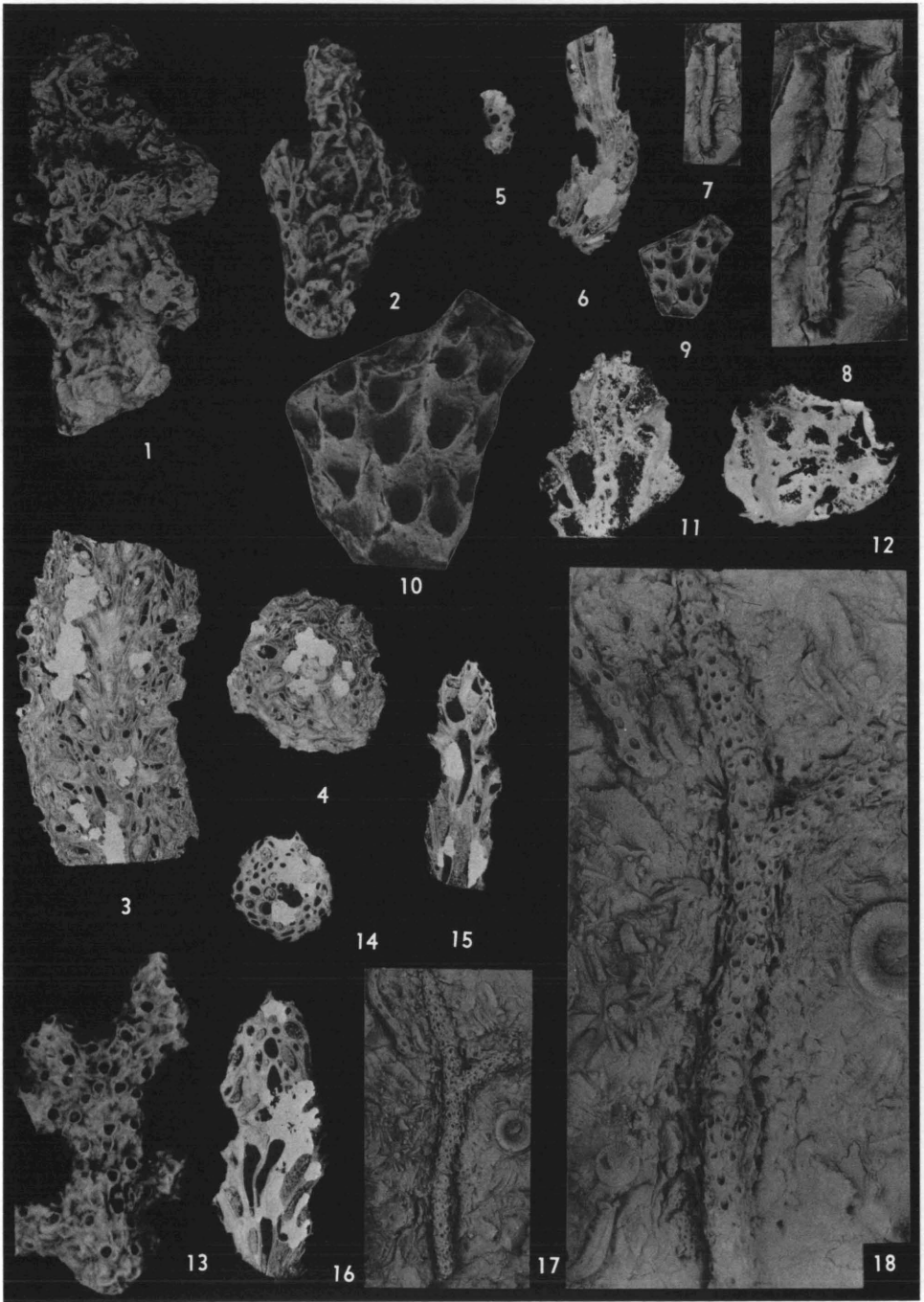


PLATE IV



EXPLANATION OF PLATE IV

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|---|------|
| <i>Trachypora labyrinthica</i> sp. nov. | 94 |
| FIG. 1. Side view of massive, laterally compressed corallum. Holotype UMMP 55024. Medusa quarry, Silica, Ohio. × 2. Gift of Mrs. Ruth Berner Chilman. | |
| FIG. 2. Side view of another corallum showing the adnate exterior parts of the corallites. Paratype UMMP 55025. Same occurrence as original of Fig. 1. | |
| FIG. 3. Longitudinal section of another specimen showing thin tabulae. Paratype UMMP 55026. Same occurrence as original of Fig. 1. × 4. | |
| FIG. 4. Transverse section of same specimen, × 4. | |
| <i>Cladopora minutissima</i> sp. nov. | 95 |
| FIG. 5. Transverse section from fragment of holotype UMMP 53790 showing rounded corallites. Unit 7, Medusa quarry, Silica, Ohio. × 4. | |
| FIG. 6. Longitudinal section of fragment from same specimen, showing steeply inclined corallites without tabulae. × 4. | |
| FIG. 7. Side view of holotype. × 1. | |
| FIG. 8. Side view of same specimen showing lunate apertures. × 2. | |
| <i>Cladopora crassa</i> sp. nov. | 96 |
| FIG. 9. Side view of holotype UMMP 53788. × 1. Medusa quarry, Silica, Ohio. | |
| FIG. 10. Same view. × 2, showing large lunate apertures. | |
| FIG. 11. Longitudinal section of specimen. Paratype UMMP 53787 showing corallites with mural pores and without tabulae. Same occurrence as original of Fig. 9. | |
| FIG. 12. Transverse section of same specimen showing round corallites with thick walls. | |
| <i>Trachypora? projectata</i> sp. nov. | 95 |
| FIG. 13. Side view of branching, dendritic corallum with well developed projecting apertures. Paratype UMMP 53054, Medusa quarry, Silica, Ohio. × 3. | |
| FIG. 14. Transverse section of a paratype UMMP 53071 showing relatively thin walled corallites. Same occurrence as original of Fig. 13. | |
| FIG. 15. Longitudinal section of another paratype UMMP 53069, showing open corallites without tabulae. Same occurrence as original of Fig. 13. | |
| FIG. 16. Longitudinal section of another paratype UMMP 53070. Same occurrence as original of Fig. 13. | |
| FIG. 17. Side view of elongate stem with one branch. Holotype UMMP 53785. Unit 7, Medusa quarry, Silica, Ohio. × 1. Specimen presented by Mrs. Ruth Berner Chilman. | |
| FIG. 18. Same specimen, showing disposition of apertures. × 2. | |

EXPLANATION OF PLATE V

	PAGE
<i>Favosites turbinatus lucasensis</i> subsp. nov.	91
FIG. 1. Side view of massive specimen showing unusual growth habit. Holotype UMMP 55028. Unit 7, Medusa quarry, Silica, Ohio. $\times 1$.	
FIG. 2. Proximal view of same specimen. $\times 1$.	
FIG. 3. Transverse section of same specimen showing very thin walled corallites. $\times 4$.	
FIG. 4. Longitudinal section of same specimen showing evenly spaced tabulae and uniserial mural pores.	

PLATE V

