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THE CORALS OF THE MIDDLE DEVONIAN TENMILE CREEK
DOLOMITE OF NORTHWESTERN OHIO

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VOLUME 22

1. New species of Porocrinidae and brief remarks upon these unusual crinoids, by Robert V. Kesling and Christopher R. C. Paul. Pages 1–32, with 8 plates and 14 text-figures.
2. Two unusually well-preserved Trilobites from the Middle Devonian of Michigan and Ohio, by Erwin C. Stumm. Pages 33–35, with 1 plate.

THE CORALS OF THE MIDDLE DEVONIAN TENMILE CREEK DOLOMITE OF NORTHWESTERN OHIO

ERWIN C. STUMM

ABSTRACT—The Tenmile Creek Dolomite is a very poorly exposed formation overlying the Silica Shale in Lucas County, Ohio. The rugose coral fauna includes one species of *Heterophrentis*, two of *Heliophyllum* (one new), one new species of *Zonophyllum*, one species of *Cystiphyllodes*, one new species of *Tabellaephyllum*, and one species each of *Bethanyphyllum*, *Eridophyllum*, *Billingsastrea*, *Disphyllum*, and *Depasophyllum*. The tabulate corals include four species of *Favosites* and one of *Aulocystis*.

INTRODUCTION AND ACKNOWLEDGMENTS

THE ONLY OUTCROP of the Tenmile Creek Dolomite occurs in the bottom and intermittently in the banks of Tenmile Creek, a very small stream about one mile south of the Quarries of the Medusa Portland Cement Company at Silica, 1½ miles west of Sylvania, Lucas County, Ohio, in which the underlying, well known Silica Shale is exposed. The formation name was proposed by J. E. Carman (*in Stewart*, 1938, p. 6, 7). The creek is scarcely more than a drainage ditch and has been deepened by dredging for runoff of surplus water. Dredged material has been thrown up on the banks on each side of the ditch. Under these conditions the exact stratigraphic position of many of the fossils is in doubt.

Stauffer (1909, p. 145–146) published a section of the Tenmile Creek Dolomite when the rocks were undoubtedly better exposed than they are now.

Stauffer's section is as follows:

	Ft.	In.
14. Massive bluish drab limestone containing iron pyrites, traces of petroleum and a few fossils.	10	0
13. Thin unevenly bedded blue limestone with several layers of white chert, both fossiliferous.	3	0
12. Blue shale and soft shaly blue limestone containing much iron pyrite and quite fossiliferous.	2	6
11. Bluish gray limestone alternating with layers of fossiliferous white chert.	3	6
10. A rather compact drab limestone with many fossils occurring as casts and much fossiliferous white chert.	2	0
9. Bluish gray shaly limestone with irregular layers of fossiliferous		

white chert. At places much of this zone becomes a mass of Corals.

8. Blue limestones interbedded with soft blue shaly layers.	2	0
7. Covered interval at least in part consisting of blue shale as shown by material dredged from the bottom of the creek.	4	0
	20	0

All the corals described herein are from units 9 and 10.

The contact with the underlying Silica Shale probably occurs approximately at the base of unit 9. Stauffer reports *Leiorhynchus kelloggi* from units 8 and 9. This is an excellent index fossil in the upper part of the Silica shale in the Medusa quarry.

The majority of the corals occur in the middle and upper parts of unit 9 and in unit 10. These units are very cherty and some of the corals have been partly or completely replaced by silica. The exteriors are so poorly preserved that identifications have been based largely on thin sections.

Lists of the fossils were made by Stauffer (1909, p. 145–146). I question the specific identification of several of the corals in his fossil list.

Stewart (1938) mentioned the occurrence of eighteen species of corals from the Tenmile Creek Dolomite and illustrated five of them. The remainder were mainly requotes from Stauffer's fossil list.

I have made thin sections of about one hundred specimens of rugose and tabulate corals from the Tenmile Creek Dolomite and have determined that there are 12 species of Rugosa, four of them new, and 5 species of Tabulata. These are illustrated solely by thin sections. All specimens are deposited in the

Museum of Paleontology, The University of Michigan.

I wish to thank Dr. Chester A. Arnold and Dr. Robert V. Kesling for critically reviewing the manuscript.

SYSTEMATIC DESCRIPTIONS

Order RUGOSA

Family STREPTELASMATIDAE

Genus HETEROPHRENTIS Billings

HETEROPHRENTIS SIMPLEX Hall

Pl. 1, figs. 6-7

For synonymy, see Stumm, 1965, p. 21.

Heterophrentis prolifica Stewart 1938, p. 22, partim (all specimens except those from the Columbus Limestone).

Remarks.—The species is common in beds of Hamilton age from New York and the Appalachian province throughout the Ohio Valley. Specimens are common in both the Silica Shale and the Tenmile Creek Dolomite. A typical specimen herein illustrated from the latter formation shows 88 septa in a transverse section with a maximum diameter of 33 mm. The major septa extend about two-thirds the distance to the axis and the minor are variable in length, some one-half the length of the major, and others quite short. The cardinal fossula is prominent. In longitudinal section the tabulae are complete or incomplete, depressed axially, domed periaxially, and depressed peripherally. Some of the specimens from the Ohio formations are larger than the average of the New York forms. This misled Stewart to refer them to *Heterophrentis prolifica*, an Onondaga species.

Hypotype.—No. 55040.

Family ZAPHRENTIDAE

Genus HELIOPHYLLUM Hall

HELIOPHYLLUM HALLI Edwards & Haime

Pl. 1, figs. 1-2; pl. 3, fig. 13

For synonymy see Stumm (1965, p. 36).

Remarks.—This widespread species is present in the Tenmile Creek Dolomite. The specimens range from 35 to 40 mm in transverse section. The number of septa ranges from 70 to 76, major extending to axis and minor about two-thirds as long. Prominent yard-arm carinae range from 3 to 7 to a septum. The cardinal fossula is very obscure. In longitudinal section the arrangement of tabulae and dissepiments is typical for the species.

The specimen described as *Heliophyllum proliferum* by Stewart (1938, p. 38-39, pl. 7, fig. 6) is probably a specimen of *H. halli forma praecoquus* described by Wells (1937, p. 11). *Heliophyllum proliferum* Nicholson is an Onondaga species.

Hypotypes.—Nos. 55038 and 55039.

HELIOPHYLLUM RHOPALISEPTATUM n. sp.

Pl. 1, figs. 3-5

Description.—Corallum simple, ceratoid, length unknown, maximum width of transverse sections of two specimens 41 mm and 25 mm respectively. Septa ranging from 68 in the smaller corallite to 82 in the larger. All septa short, major reaching one-half or three-fifths distance to axis, minor almost as long. Most major septa with rhopaloid swellings at or near their axial ends. Carinae of the yard-arm type range from 4 to 8 to a septum and are common in the peripheral parts of the corallites. Probably the rhopaloid ends are due to flanges of carinae cut on the bias. Fossulae apparently absent.

In longitudinal section tabularium wide, composed of thin, complete or incomplete, slightly concave tabulae. Dissepimentarium narrow, composed of a few rows of small, globose dissepiments, largely obscured by the prominent upward and inward arching carinae.

Remarks.—This is the only species of *Heliophyllum* in which the major and minor septa

EXPLANATION OF PLATE 1

All sections $\times 1\frac{1}{2}$

- FIGS. 1-2—*Heliophyllum halli* Edwards & Haime. 1, transverse section of hypotype no. 55038; 2, longitudinal section of another hypotype no. 55039.
 3-5—*Heliophyllum rhopaliseptatum* n. sp. 3, transverse section of paratype no. 50578; 4-5, transverse and longitudinal sections of holotype.
 6-7—*Heterophrentis simplex* (Hall), transverse and longitudinal sections of hypotype no. 55040.
 8-9—*Zonophyllum lucasense* n. sp.; transverse and longitudinal sections of holotype no. 55042.
 10-12—*Cystiphyllodes americanum* (Edwards & Haime); 10, transverse section of an average sized specimen, hypotype no. 55055; 11-12, transverse and longitudinal sections of a smaller specimen, hypotype no. 55057.
 13-14—*Tabellaephyllum* ? *phaceloidea* n. sp.; transverse and longitudinal sections of holotype no. 55052.

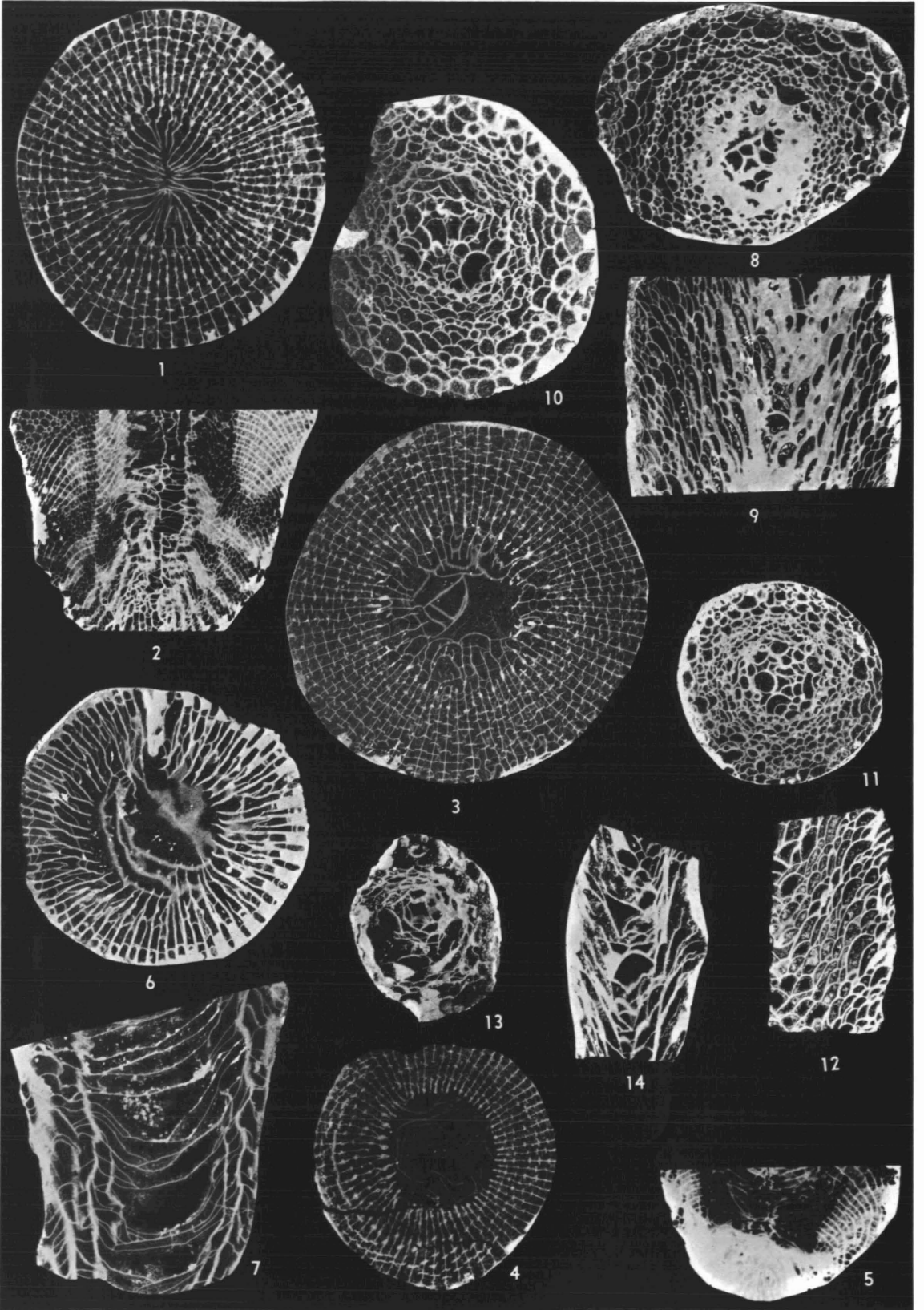


PLATE 1

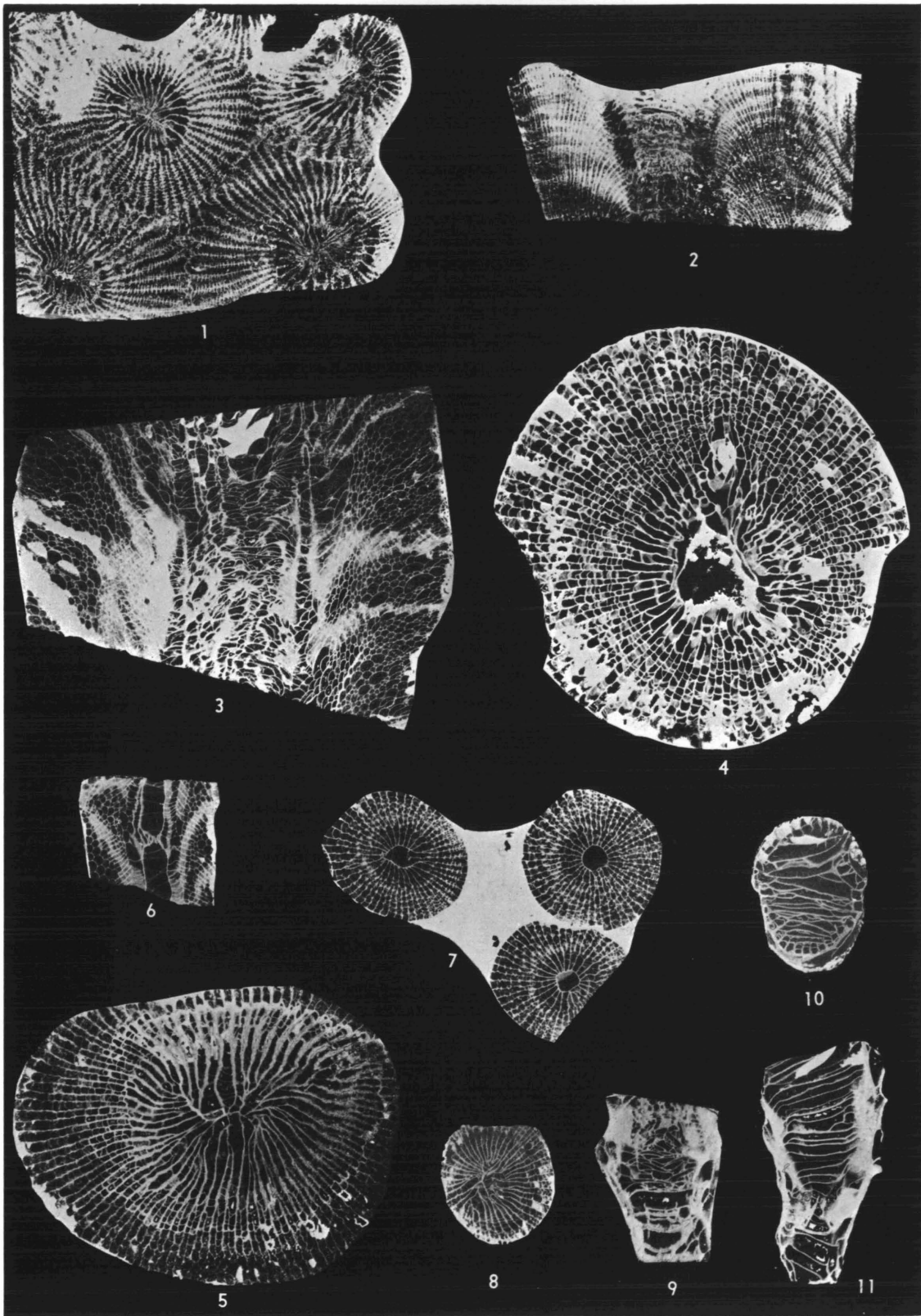


PLATE 2

are about the same length and do not extend far beyond the margin of the tabularium.

Types.—Holotype No. 55041; paratype No. 550578.

Genus BETHANYPHYLLUM Stumm
BETHANYPHYLLUM ROBUSTUM (Hall)

Pl. 2, figs. 3-5

For synonymy see Stumm (1965, p. 40).

Remarks.—Coralla from the Tenmile Creek Dolomite subcylindrical to ceratoid, typically geniculate. Total lengths unknown, typically ranging from 4 to 5 cm. Septa thin and smooth, ranging from 106 to 122 in the specimens studied. Major septa extending to axis; minor about one-half as long. Septa in cardinal quadrants dilated in neanic stage in some specimens. Cardinal fossula obscure. In longitudinal section dissepimentarium wide, composed of globose, axially convex dissepiments. Tabularium composed of incomplete, horizontal or slightly convex or concave tabulae and tabellae.

The forms from the Tenmile Creek Dolomite are similar to those from the underlying Silica Shale and from the basal Ludlowville of New York.

Hypotypes.—Nos. 55043, 55045, and 55050.

Family PHILLIPSASTRAEIDAE
Genus DISPHYLLUM de Fromentel
DISPHYLLUM sp. A
Pl. 2, figs. 8-9

Remarks.—A fragment of a cylindrical corallite of a phaceloid colony shows the characteristics of the genus, but there is not enough material to identify the species. The transverse section shows 84 smooth septa of which the major septa approach or reach the axis and the minor are about one-third as long. The longitudinal section shows a narrow dissepimentarium and a wide tabularium with complete and incomplete tabulae.

Figured specimens.—Nos. 55059 and 55188.

Genus BILLINGSASTRAEA Grabau
BILLINGSASTRAEA INGENS (Davis)

Pl. 2, figs. 1-2

Phillipsastrea ingens Davis 1887, pl. 118, figs. 1-3; pl. 119, fig. 1.

Billingsastrea ingens Ehlers & Stumm 1953, p. 9, pl. 5, figs. 1-5; pl. 6, figs. 1-3.

Remarks.—This species has been described from the Tenmile Creek Dolomite by Ehlers & Stumm (1953, p. 9; pl. 5, figs. 4-5; pl. 6). Only two specimens have been found in the formation, and both are completely silicified. Transverse and longitudinal sections of one of these are illustrated herein.

Hypotype.—No. 25598.

Genus ERIDOPHYLLUM Edwards & Haime
ERIDOPHYLLUM ARCHIACI (Billings)

Pl. 2, figs. 6-7

For synonymy see Stumm (1965, p. 45).

Remarks.—This well known species is represented by one colony in the Tenmile Creek Dolomite. The aulos, open in the direction of the cardinal septum, is well preserved. The heavily carinate septa average 50, the major forming the aulos at their axial ends and the minor are about one-half as long. The dissepimentarium and double tabularium are well shown in the longitudinal section. This species is common in the Four Mile Dam Formation of the Traverse Group of Michigan and the encrinal bed of the Hungry Hollow Formation of southwestern Ontario. It is also present in the Ludlowville Formation of the Hamilton Group of New York and in the Beechwood Limestone of southern Indiana and northern Kentucky.

Hypotype.—No. 55051.

Family SPONGOPHYLLIDAE
Genus TABELLAEPHYLLUM Stumm
TABELLAEPHYLLUM? PHACELOIDEA n. sp.
Pl. 1, figs. 13-14

Description.—Corallum phaceloid, with cylindrical corallites averaging about 2 cm in di-

EXPLANATION OF PLATE 2

All sections $\times 1\frac{1}{2}$

- FIGS. 1-2—*Billingsastrea ingens* (Davis), transverse and longitudinal sections of hypotype no. 25598.
3-5—*Bethanyphyllum robustum* (Hall), 3, longitudinal section of a typical specimen, hypotype no. 55043; 4, transverse section of an average sized specimen, hypotype no. 55045; 5, transverse section of a specimen with dilated septa in the cardinal quadrants, hypotype no. 55050.
6-7—*Eridophyllum archiaci* (Billings); longitudinal and transverse sections of a typical specimen, hypotype no. 55051.
8-9—*Disphyllum* sp.; 8, transverse section of figured specimen no. 55059; 9, longitudinal section of figured specimen no. 55188.
10-11—*Depasophyllum* sp.; transverse and longitudinal sections of figured specimen no. 55054.

ameter. Corallites irregularly spaced, some almost in contact, others spaced as much as 2 cm apart. In transverse section septa absent. Intercepted edges of tabulae and dissepiments prominent. In longitudinal section dissepiments large, very elongate, in two or three rows. Tabulae very irregularly arranged, complete or incomplete, convex or inclined.

Remarks.—This peculiar form has most of the characteristics of *Tabellaephyllum* except for the phaceloid growth form.

Type.—Holotype No. 55052.

Family STAURIDAE
Genus DEPASOPHYLLUM Grabau
DEPASOPHYLLUM sp. A
Pl. 2, figs. 10-11

Remarks.—One specimen from the Tenmile Creek Dolomite has characters typical of *Depasophyllum*. The transverse section (cut slightly on the bias) shows about 32 smooth septa of one order, all extending about one-fourth the distance to the axis or less. The longitudinal section shows tabulae, typically complete, with strongly depressed peripheral sections. In some places the peripheral ends of the tabulae rest on the tabula underneath instead of reaching the peripheral wall.

The species shows a marked similarity to *D. adnetum* Grabau from the Four Mile Dam Formation of Michigan and may be conspecific with it.

Figured specimen.—No. 55054.

Family DIGONOPHYLLIDAE
Genus CYSTIPHYLLOIDES Chapman
CYSTIPHYLLOIDES AMERICANUM
Edwards & Haime
Pl. 1, figs. 10-12

Remarks.—This widely distributed species of Hamilton age is represented by several specimens from Tenmile Creek. On pl. 10, fig. 10, is a transverse section of an average sized specimen showing the weakly developed septal crests. Figs. 11 and 12 show the transverse section, and the peripheral and axial parts of a longi-

tudinal section showing the dissepiments and tabellae.

Hypotypes.—Nos. 55055, 55056, and 55057.

Genus ZONOPHYLLUM Wedekind
ZONOPHYLLUM LUCASENSE n. sp.
Pl. 1, figs. 8-9

Description.—Corallum simple, subcylindrical, with a maximum diameter of 4 cm. Maximum length unknown. Calyx and epitheca not preserved. In transverse section the peripheral area is composed of dissepiments of various sizes; typically decreasing in size axially. Septal crests small, numerous, spinose. Axial area a stereozone composed of septal cones. In longitudinal section peripheral dissepiments elongate, axially convex. Axial area composed of nested septal cones in vertical series.

Remarks.—*Z. lucasense* differs from the middle Devonian species described by Wedekind from the Rhine Valley in having the cones confined to the axial area and in having the axis centrally located.

Type.—Holotype No. 55042.

Order TABULATA
Family FAVOSITIDAE
Genus FAVOSITES Lamarck
FAVOSITES HAMILTONIAE Hall
Pl. 3, figs. 1-2

For synonymy see Stumm (1965, p. 63).

Remarks.—Several specimens of this distinctive species have been found in the Tenmile Creek Dolomite. The sections shown herein exhibit the widely and irregularly spaced tabulae so characteristic of the species. Stewart (1938, p. 60, pl. 12, figs. 4-6) reported this species from this formation.

Hypotype.—No. 55046.

FAVOSITES PLACENTUS Rominger
Pl. 3, figs. 3-4
For synonymy see Stumm (1965, p. 64).

Remarks.—This small celled species so typical of the Hungry Hollow Formation of

EXPLANATION OF PLATE 3

All sections $\times 1\frac{1}{2}$

- FIGS. 1-2—*Favosites hamiltoniae* Hall. Transverse and longitudinal sections of a typical specimen, hypotype no. 55046.
3-4—*Favosites placentus* Rominger. Transverse and longitudinal sections of a well preserved specimen, hypotype no. 19688.
5-8—*Syringopora intermedia* Nicholson. Four sections from a single corallum, hypotype no. 55049.
9-10—*Favosites clausus* Rominger. Longitudinal and transverse sections of hypotype no. 55048.
11-12—*Favosites turbinatus* Billings. Transverse and longitudinal sections of a well preserved specimen, hypotype no. 55047.
13—*Helioephyllum halli* Edwards & Haime. Transverse section of an average sized specimen. Hypotype no. 55039.

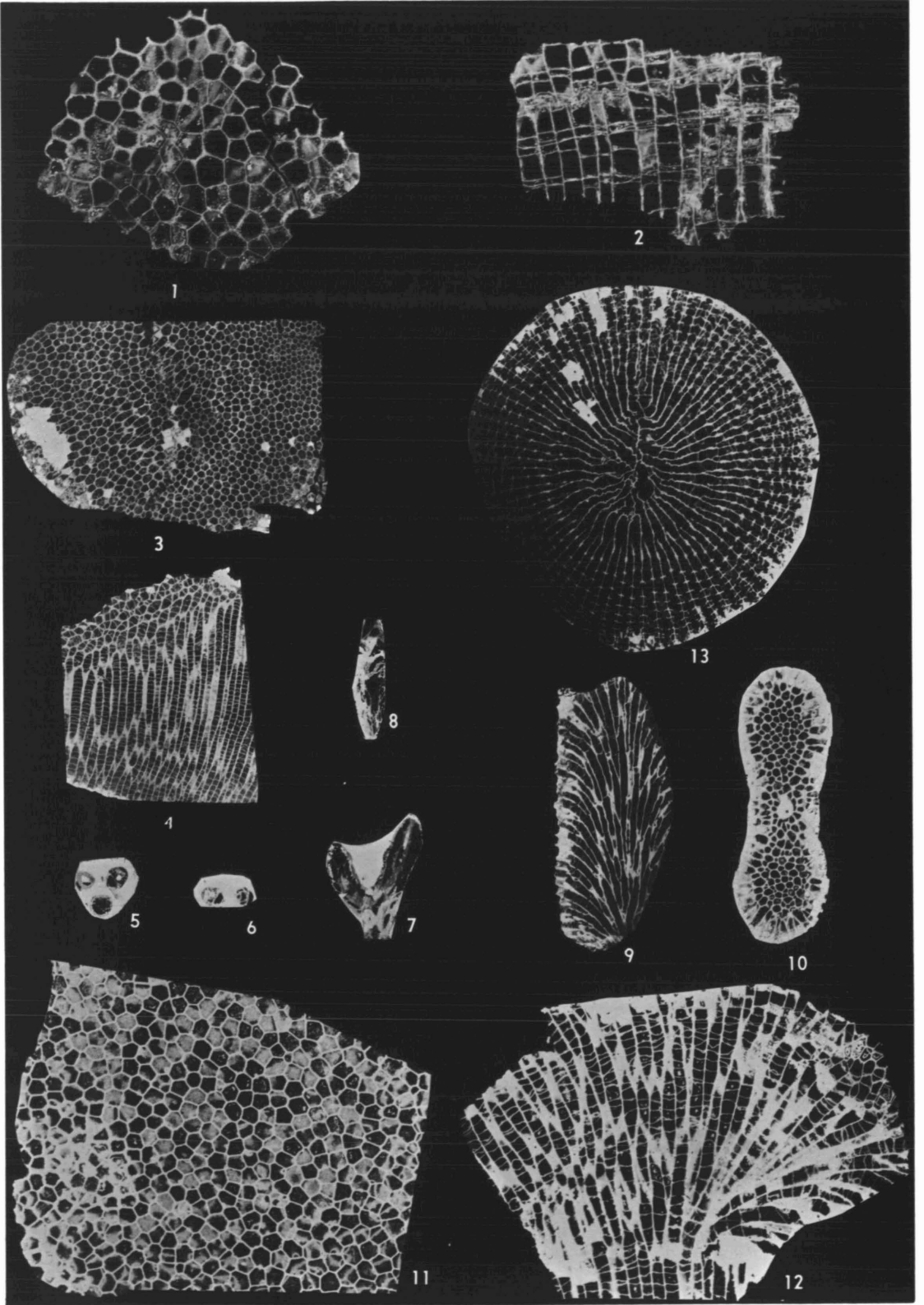


PLATE 3

southwestern Ontario is represented by several specimens in the Tenmile Creek Dolomite. The internal structures of these are identical with those of specimens from the type locality. Stewart (1938, pl. 14, figs. 3-4) illustrated exteriors of two specimens of this species from this formation.

Hypotype.—No. 19688.

FAVOSITES CLAUSUS Rominger

Pl. 3, figs. 9-10

For synonymy see Stumm (1965, p. 61).

Remarks.—This is an extremely widespread species, being found in the Ludlowville Formation of New York, the Hungry Hollow Formation of southwestern Ontario, and the Beechwood Limestone of southern Indiana and northern Kentucky. It is also represented by several specimens in the Tenmile Creek Dolomite.

This is probably the species referred to as *F. nitella* Winchell by Stewart (1938, p. 64-65, pl. 14, figs. 1-2) from the same formation.

The dendritic growth form and fine horizontal tabulae are clearly shown (figs. 9-10).

Hypotype.—No. 55048.

FAVOSITES TURBINATUS Billings

Pl. 3, figs. 11-12

For synonymy see Stumm (1965, p. 65).

Remarks.—Several typical specimens of this species have been found in the Tenmile Creek Dolomite. One shows the exterior turbinate form perfectly; others show the well preserved internal structures. The sheaf-like

growth form, evenly spaced tabulae, and the uniserial mural pores are well shown.

Hypotype.—No. 55047.

Family SYRINGOPORIDAE

Genus SYRINGOPORA Goldfuss

SYRINGOPORA INTERMEDIA Nicholson

Pl. 3, figs. 5-8

Remarks.—This well known species from the Hungry Hollow Formation of southwestern Ontario and the Prout Limestone of north-central Ohio is represented by fragmentary specimens in the Tenmile Creek Dolomite. Four sections of a fragmentary specimen are illustrated herein.

Hypotype.—No. 55049.

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ADDENDUM

The basal part of the Tenmile Creek Dolomite has recently been uncovered by quarrying operations in the north Medusa quarry about 1 mile north of Tenmile Creek.