

CONTRIBUTIONS FROM THE MUSEUM OF PALEONTOLOGY

UNIVERSITY OF MICHIGAN

Vol. XII, No. 1, pp. 1-11 (2 pls.)

JULY 23, 1954

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FOUR NEW SPECIES OF RUGOSE CORALS OF  
THE MIDDLE DEVONIAN GENUS *ERIDOPHYLLUM*,  
FROM NEW YORK, MICHIGAN, AND OHIO

BY  
ERWIN C. STUMM



UNIVERSITY OF MICHIGAN PRESS  
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INTRODUCTION AND PREVIOUS WORK

**T**HIS Middle Devonian genus, *Eridophyllum*, of rugose corals was erected by Edwards and Haime (1850, p. lxxi). They gave it the following diagnosis:

Corallum composite, and increasing by lateral gemmation. Corallites tall, cylindrical, and provided with a thick epitheca, which gives rise to a vertical series of short and thick subradicaliform productions that extend to the next individual and unite them together. Tabulae well developed, and occupying the central area circumscribed by the inner wall. Septal apparatus occupying the annular area situated between the outer and inner mural investment, but not extending into the inner or central area. Typ. sp., *Eridophyllum seriale* nob.

The next year Edwards and Haime (1851, pp. 423-425) rewrote the generic diagnosis and described three species, one of which was questionably assigned. The concern here is only with the first of the three species, *Eridophyllum verneuillanum* from the Middle Devonian Columbus limestone of Columbus, Ohio. In the synonymy the authors listed *Eridophyllum verneuillanum*, but referred to their 1850 generic diagnosis with its citation of *Eridophyllum seriale* as the type species. As already recognized by Smith and Lang (1927, p. 308), this change in trivial name was unwarranted; the correct name for the species is *Eridophyllum seriale*.

Since 1851 twenty-three more species have been described from Middle Devonian strata of North America. All came from three stratigraphic

positions: (1) the Lower Onondaga limestone of southwestern Ontario; (2) the Columbus limestone of Ohio and its stratigraphic equivalent the Jeffersonville limestone of southern Indiana and northern Kentucky; and (3) the Hungry Hollow formation of southwestern Ontario and its stratigraphic equivalent the Beechwood limestone of southern Indiana and northern Kentucky. Many of the species described (Hall, 1882, 1883; Davis, 1887; and Greene, 1898–1906) from the Jeffersonville and Beechwood limestones of the Falls of the Ohio, in southern Indiana and northern Kentucky, are conspecific. My revision of these species is in press and will appear in the forthcoming installment of the "Type Invertebrate Fossils of North America (Devonian)," published by the Wagner Free Institute of Science under the auspices of the Paleontological Society.

Edwards and Haime's original diagnosis of *Eridophyllum* does not cover all the skeletal structures of the species that have subsequently been assigned to it. The diagnostic feature most characteristic of the genus and common to all species is an inner wall, or aulos, produced by a lateral deflection of the axial ends of the major septa. In some forms the aulos is closed; in others it is open in the direction of the cardinal septum; and in still others it is open in the neanic stage, but closed in the ephebic. The type species, *Eridophyllum seriale*, is a phaceloid form with connecting processes or talons. Others are either phaceloid without talons, simple, or cerioid. All species have heavily carinate septa. If no aulos were present, the simple forms would be referable to *Heliophyllum*, the phaceloid forms to *Cylindrophyllum*, and the cerioid forms to *Hexagonaria*. Because of the existence of this very distinctive aulos, all these have been regarded as growth forms and retained in the same genus. This raises the question of whether we have three genera covered by the name *Eridophyllum* or whether we have created too many genera based entirely on growth form. I believe the latter to be closer to the truth.

Several other generic names have been suggested for species of *Eridophyllum*, but none has been based on external growth form. Of these, *Craspedophyllum* Dybowski (1873, pp. 153–160) and *Crepidophyllum* Nicholson and Thomson (1876, p. 149) were both proposed apparently without any precise knowledge on the part of the authors of the nature of *Eridophyllum*. Nicholson and Thomson did mention that forms with both open and closed aulos were included in their genus and their type species, *Diphyphyllum archiaci* Billings, is a phaceloid form in which the aulos is open in the ephebic stage. Stewart (1938, pp. 45–46) gave the generic name *Schistotoecholasma* to phaceloid forms of *Eridophyllum* with an open aulos. If the open aulos is to be considered a generic character, *Schistotoecholasma* would be congeneric with *Crepidophyllum*. No separate

generic terms have been proposed for the simple or the cerioid forms, which are known to occur with both open and closed aulos.

In the section on the family Disphyllidae of the order Tetracorallia that I prepared for the "Type Invertebrate Fossils of North America (Devonian)," all these forms are included in *Eridophyllum*. The same procedure is followed here.

Four new species from new stratigraphic positions or geographic localities are described in this paper. Unless otherwise designated all type material is catalogued and deposited in the Museum of Paleontology of the University of Michigan.

#### SYSTEMATIC DESCRIPTIONS

### Phylum COELENTERATA

#### Class ANTHOZOA

#### Order TETRACORALLIA

#### Family Disphyllidae

### Genus *Eridophyllum* Edwards and Haime

*Eridophyllum*, Edwards and Haime, 1850, p. lxxi.

*Type species*.—By original designation and monotypy, *Eridophyllum seriale* Edwards and Haime, 1850, p. lxxi; wrongly renamed *Eridophyllum verneuilanum* Edwards and Haime, 1851, p. 424.

*Revised diagnosis*.—Corallum simple, phaceloid, or cerioid. Simple corallum subcylindroid to trochoid, in some forms with one or more lateral buds. Phaceloid corallites cylindroid, some with talons, some with flange-like expansions giving subcerioid to cerioid appearance at different growth levels. Cerioid corallites polygonal throughout length. Calyxes funnel-shaped, with small or large peripheral platforms. Center of calyx occupied by well-developed aulos. Septa carinate, of two orders; the major septa extending from one-half to three-fourths the way to the axes, becoming deflected at axial ends to form the aulos; minor septa of variable length but never extending to the aulos. Aulos open in neanic stage apparently in all species; open in ephebic stage in some. Tabulae within aulos relatively horizontal, complete or incomplete. Periaxial tabellae outside aulos horizontal, convex, or inclined. Peripheral dissepiments in several rows, steeply inclined.

### *Eridophyllum seriale* Edwards and Haime

(Pl. I, Figs. 1-5)

*Eridophyllum seriale* Edwards and Haime, 1850, p. lxxi.

*Eridophyllum verneuilanum* Edwards and Haime, 1851, p. 424.

- Eridophyllum verneuianum* Nicholson, 1875, p. 239.  
*Diphyphyllum archiaci* Rominger, 1876 *partim*, pp. 126–27.  
*Diphyphyllum verneuianum* Davis, 1887, Pl. 113, Fig. 2.  
*Eridophyllum seriale* Smith and Lang, 1927, p. 307.  
*Eridophyllum seriale* Stewart, 1938, pp. 40–42.

*Description* (Stewart, 1938, p. 41).—

Coral masses forming an open colony, made up of cylindrical, irregularly flexuose corallites, increase by lateral budding and united by horizontal epithecal expansions at irregular intervals. The corallites are usually quite closely disposed, 5 mm. or less apart, sometimes even growing in contact for considerable distances. Diameter of average mature specimens, 10 to 15 mm.; exterior rugose, epitheca thin, marked by numerous fine encircling growth lines and longitudinal striae corresponding with the septa.

Calyx relatively deep, with steep and slightly concave walls; bottom marked by circular depressions.

About 54 septa in an average mature individual, carinate, and denticulate on the edges within the calyx; of two lengths; the longer or major are terminated near the center of the corallite by a closed inner wall, the minor group reach only about half-way to the center. The major septa are seldom carinate beyond the termination of the minor septa.

Each corallite divided longitudinally into three distinct zones; a central tabulate zone terminated by the inner wall; a second tabulate zone surrounding the central one; and an outer zone of dissepiments.

Central tabulate zone of variable width but usually equal to a little more than one-fourth the diameter of the corallite at any given place. Wall terminating this zone undulating and generally extremely uneven. Tabulae complete for the most part, either horizontal or bent slightly downward; irregular in their arrangement, being closely crowded in some places and in other places quite widely separated.

Second tabulate zone variable in width but usually narrower than the central zone. Tabulae more irregular in their arrangement than in the central zone; both incomplete and complete are present. The structure is coarsely vesicular in many places.

Outer zone of dissepiments about the same width as the central tabulate zone; dissepiments numerous, small; structure finely vesicular.

Carinae are numerous and are directed obliquely upward. They terminate on the sides of the septa just within the outer tabulate zone and average about 3 in 1 millimeter.

*Remarks.*—The following observations may be added to Stewart's description: (1) Serial sections indicate that the aulos is open in the position of the cardinal septum in the neanic stage and transitional stages between the open and closed aulos may be seen. (2) In ephebic corallites the aulos averages a little less than 3 mm. in diameter.

*Occurrence.*—Middle Devonian: Columbus limestone, central and north-central Ohio; Jeffersonville limestone, southern Indiana and northern Kentucky.

*Types.*—Holotype in de Verneuil collection, École des Mines, Paris; hypotypes Nos. 31271, 31272, and 31273.

**Eridophyllum subseriale** Stumm, sp. nov.

(Pl. I, Figs. 6-7)

*Description.*—Corallum phaceloid, with corallites ranging from 9 to 12 mm. in diameter, loosely aggregate, with interspaces averaging about the same as diameters of corallites. Corallites with very irregular exteriors, prolific lateral budding but few connecting talons. Calyxes not preserved.

In transverse section, septa ranging from 44 to 54 in mature corallites; major septa extending to and forming the aulos; minor septa about three-fourths as long as major. Carinae not prominent, crossbar or offset, from 1 to 6 to a septum; a few septa noncarinate. Aulos with very thin wall ranging in mature corallites from 3.5 to 4 mm. in diameter.

In longitudinal section, tabulae within aulos typically complete, relatively horizontal, from 1 to 1.5 mm. apart. Periaxial tabellae outside aulos short, relatively horizontal, or gently inclined axially, slightly more closely set than the axial tabulae. Dissepimentarium about as wide as aulos, composed of 5 or 6 rows of axially inclined dissepiments through which are scattered zones of upward and inward arching carinae.

*Remarks.*—This species is very similar to *E. seriale* but can be distinguished from it by the smaller size of the corallites, the smaller average number of septa, the larger aulos, and the more closely set, evenly spaced tabulae.

*Occurrence.*—Middle Devonian: Lower Onondaga limestone, western New York.

*Type.*—Holotype No. 5272.

**Eridophyllum magniventrum** Stumm, sp. nov.

(Pl. I, Figs. 8-9)

*Description.*—Corallum phaceloid, growth habit similar to that of *E. seriale*. Corallites in lateral contact or separated by as much as 10 mm. Exteriors with wrinkled epitheca and connecting talons. Mature corallites ranging from 15 to 20 mm. in diameter. Calyxes not preserved.

In transverse section, septa averaging 50 in mature corallites; major septa extending to aulos; minor septa about two-thirds as long as major. Septa heavily carinate across dissepimentarium, from 4 to 6 crossbar carinae to a septum. Aulos exceptionally large, 6 to 7 mm. in diameter.

In longitudinal section, tabulae within aulos horizontal, typically complete, relatively even-spaced, about 1.5 mm. apart. Periaxial tabellae outside aulos irregularly spaced, straight, proximally convex, or inclined either distally or proximally. Dissepimentarium about same size as aulos, with

dissepiments of various sizes ranging from very large to very small. Length of space enclosed by largest dissepiment 4.5 mm.; by smallest, less than .3 mm. Well-developed zones of upward and inward arching carinae present at different levels.

*Remarks.*—The large size of the corallites, the coarseness of the dissepiments, and the exceptionally large aulos distinguish this species from all other phaceloid forms of *Eridophyllum*.

*Occurrence.*—Middle Devonian: Delaware limestone—"Cystiphyllum" zone at top of formation, north-central Ohio.

*Type.*—Holotype No. 31276.

### ***Eridophyllum arachnoideum* Stumm, sp. nov.**

(Pl. II, Figs. 1-2)

*Description.*—Corallum cerioid, flattened subhemispherical, composed of polygonal corallites ranging from less than 10 to more than 20 mm. in diameter. Corallites separated by relatively thick, typically curved walls. Calyxes not preserved.

In transverse section, septa ranging from 36 to 40 in mature corallites. Major septa extending almost to axis, forming a very small aulos; minor septa about two-thirds as long as major. All septa heavily carinate, typically having long crossbar carinae with 6 to 15 carinae to a septum. Aulos closed, ranging from 1 to 2 mm. in least and greatest diameter.

In longitudinal section, tabulae within aulos typically complete and horizontal, a few incomplete and inclined. Tabulae relatively closely set, separated by an average distance of .8 mm. Zone of periaxial tabellae outside aulos as large as axial tabularium and composed of complete and incomplete tabellae, horizontal or proximally convex, spaced about the same distance apart as the axial tabulae. Dissepimentarium about as wide as entire tabularium, composed of many rows of very small, distally and axially directed, highly globose dissepiments. Zones of upward and inward arching carinae prominent at different growth levels.

*Remarks.*—I know of no other other species of *Eridophyllum* with which this species might be confused. The only other completely cerioid species known is *Eridophyllum conjunctum* (Davis) from the Jeffersonville limestone of northern Kentucky, but that has a relatively large, open aulos.

*Occurrence.*—Middle Devonian: Hamilton group—Ludlowville formation—Stone Mill limestone member, New York.

*Type.*—Holotype No. 123565, United States National Museum.



**Eridophyllum michiganense** Stumm, sp. nov.

(Pl. II, Figs. 3-10)

*Description.*—Corallum phaceloid, composed of cylindroid corallites ranging from 10 to 15 mm. in diameter, which may be in contact or may be separated by distances as great as 10 mm. No connecting talons present. Calyxes funnel-shaped with steeply sloping walls and an axial aulos.

In transverse section, septa from 46 to 54, moderately carinate, with an average of 6 offset or crossbar carinae to a septum. Major septa forming closed aulos at axial ends; minor septa typically less than one-half as long as major. Aulos relatively small, averaging 2 mm. in diameter in mature corallites.

In longitudinal section, axial tabularium within aulos composed of very widely spaced, horizontal, complete tabulae spaced at an average distance of 2 mm. apart. Rare zones of more closely spaced tabulae present in some corallites. Periaxial tabellae outside of aulos irregularly arranged, horizontal, inclined, or convex. Dissepimentarium about as wide as axial tabularium, composed of small, globose, axially convex dissepiments and occasional zones of carinae much more nearly horizontally directed than in other species of *Eridophyllum*.

*Remarks.*—This species is similar to *E. seriale* Edwards and Haime, but can be distinguished from it by the lack of connecting talons, the smaller aulos, and the much more widely spaced, complete tabulae in the axial tabularium.

*Occurrence.*—Middle Devonian: Dundee limestone, southeastern Michigan.

*Types.*—Holotype No. 31275; paratype No. 15264.

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*Submitted for publication January 8, 1954*

**PLATES**

## EXPLANATION OF PLATE I

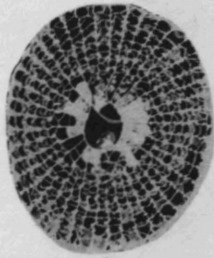
(All figures  $\times 2$ )

	PAGE
<i>Eridophyllum seriale</i> Edwards and Haime .....	3
FIG. 1. Longitudinal section of corallite of typical specimen showing complete and incomplete tabulae and wide dissepimentarium. Hypotype No. 31273. Columbus limestone; Lake Erie shore, just east of coast guard station at Marblehead, Ottawa County, Ohio.	
FIG. 2. Transverse section of corallite of same specimen (Fig. 1) showing heavily carinate septa.	
FIG. 3. Transverse section of specimen from same horizon and locality (Fig. 1) showing incipient opening in aulos in late neanic stage. Hypotype No. 31272.	
FIG. 4. Longitudinal section of specimen showing an unusual number of complete tabulae. Hypotype No. 31271. Columbus limestone; abandoned quarry on Kelley's Island, Lake Erie.	
FIG. 5. Transverse section of same specimen (Fig. 4) showing early epebic stage in which aulos had just closed in direction of cardinal septum.	
<i>Eridophyllum subseriale</i> Stumm, sp. nov. ....	5
FIG. 6. Transverse section showing small corallites with relatively large aulos. Holotype No. 5272. Lower Onondaga limestone; Caledonia, New York.	
FIG. 7. Longitudinal section of corallite of same specimen (Fig. 6) showing close-set horizontal tabulae and inclined periaxial tabellae.	
<i>Eridophyllum magniventrum</i> Stumm, sp. nov. ....	5
FIG. 8. Transverse section of corallite of specimen showing great size of both corallite and aulos. Holotype No. 32176. Delaware limestone; abandoned Wagner Quarry just west of Norfolk and Western Railroad Classification Yard, about 2 miles south of Sandusky, Erie County, Ohio.	
FIG. 9. Longitudinal section of same corallite (Fig. 8) showing wide tabularium with horizontal tabulae and coarse dissepiments in dissepimentarium.	

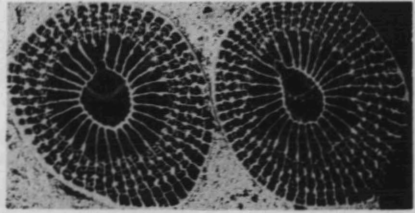
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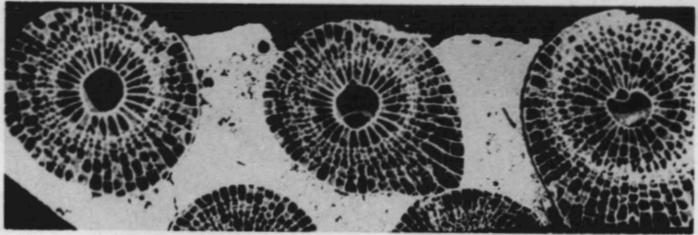
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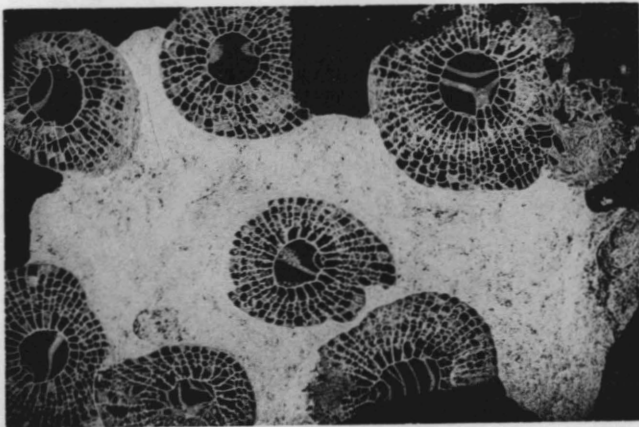
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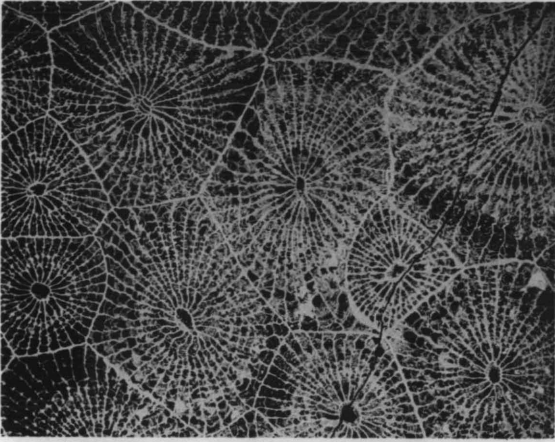


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PLATE II



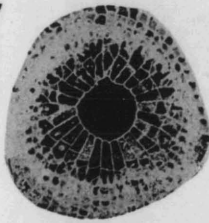
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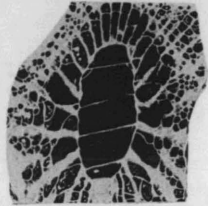
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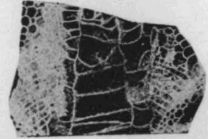
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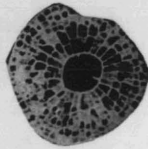
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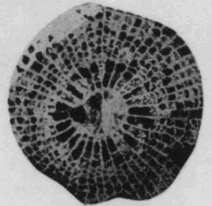
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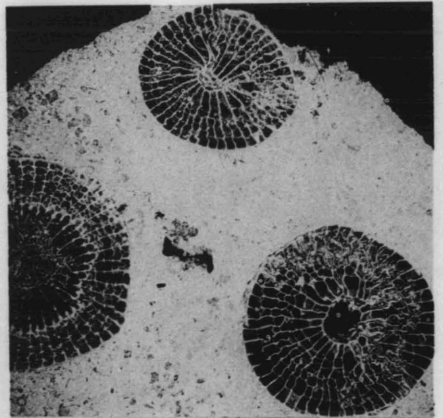
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## EXPLANATION OF PLATE II

(All figures  $\times 2$ )

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<i>Eridophyllum arachnoideum</i> Stumm, sp. nov. ....	6
FIG. 1. Transverse section showing polygonal corallites and small aulos. Holotype No. 123565, U.S. National Museum. Hamilton group, Ludlowville formation, Stone Mill limestone member; Glen on east side of road at southeast end of Bradley Brook Reservoir, Morrisville quadrangle, New York.	
FIG. 2. Longitudinal section of same specimen (Fig. 1) showing small tabularium and wide dissepimentarium with small, globose dissepiments.	
<i>Eridophyllum michiganense</i> Stumm, sp. nov. ....	7
FIG. 3. Longitudinal section of corallite showing complete tabulae and small dissepiments. Holotype No. 31275. Dundee limestone; abandoned quarry of the Solvay Process Company at Sibley, 2 miles north of Trenton, Wayne County, Michigan.	
FIG. 4. Transverse section of same specimen (Fig. 3) showing closed aulos.	
FIGS. 5-7. Additional longitudinal sections of same specimen (Fig. 3) showing horizontal, typically widely spaced tabulae.	
FIGS. 8-9. Additional transverse sections of same specimen (Fig. 3) showing small aulos and weakly carinate septa.	
FIG. 10. Transverse section of specimen from same horizon and locality as original of Figure 3. Paratype No. 15264.	





## VOLUME XII

1. Four New Species of Rugose Corals of the Genus *Eridophyllum*, from New York, Michigan, and Ohio, by Erwin C. Stumm. Pages 1-11, with 2 plates. Price \$.50.
2. Ornamentation as a Character in Specific Differentiation of Ostracods, by Robert V. Kesling. Pages 13-21, with 2 plates. Price \$.45.

