CONTRIBUTIONS FROM THE MUSEUM OF PALEONTOLOGY

UNIVERSITY OF MICHIGAN

VOL. XIV, No. 11, pp. 167–189 (4 pls.) JULY 25, 1958

CORALS OF THE DEVONIAN TRAVERSE GROUP OF MICHIGAN
PART V, *TRACHYPORA*

BY

ERWIN C. STUMM and ALLEN S. HUNT

MUSEUM OF PALEONTOLOGY
UNIVERSITY OF MICHIGAN
ANN ARBOR

CONTRIBUTIONS FROM THE MUSEUM OF PALEONTOLOGY

Director: LEWIS B. KELLUM

The series of contributions from the Museum of Paleontology is a medium for the publication of papers based chiefly upon the collections in the Museum. When the number of pages issued is sufficient to make a volume, a title page and a table of contents will be sent to libraries on the mailing list, and to individuals upon request. A list of the separate papers may also be obtained. Correspondence should be directed to the Museum of Paleontology, University of Michigan, Ann Arbor, Michigan.

VOLS. II–XIII. Parts of volumes may be obtained if available.

VOLUME XIV

1. An Upper Cretaceous Crab, *Avitelmessus grapsoideus* Rathbun, by Robert V. Kesling and Irving G. Reimann. Pages 1–15, with 4 plates.
2. A Chart Useful for Study of Ostracod Carapaces, by Robert V. Kesling. Pages 17–20, with 2 figures.
3. A New Genus and Species of Ostracod from the Middle Devonian Ludlowville Formation in Western New York, by Robert V. Kesling. Pages 21–26, with 1 plate.
4. A Peel Technique for Ostracod Carapaces, and Structures Revealed therewith in *Hibbardia lacrimosa* (Swartz and Oriel), by Robert V. Kesling. Pages 27–40, with 5 plates.
5. The Ontogeny and Ecology of *Welleria aftonensis* Warthin, a Middle Devonian Ostracod from the Gravel Point Formation of Michigan, by Robert V. Kesling and George C. Soronen. Pages 41–55, with 4 plates.
6. Origin of Beyrichiid Ostracods, by Robert V. Kesling. Pages 57–80, with 7 plates and 5 figures.
7. Check List of Fossil Invertebrates Described from the Middle Devonian Rocks of the Thedford-Arkona Region of Southwestern Ontario, by Erwin C. Stumm and Jean D. Wright. Pages 81–132.
8. A New *Tempskya,* by Chester A. Arnold. Pages 133–142, with 3 plates and 1 figure.
9. A New and Unusual Species of the Ostracod Genus *Herrmannina* from the Middle Silurian Hendricks Dolomite of Michigan. Pages 143–148, with 1 plate.
10. Petrified Cones of the Genus *Calamostachys* from the Carboniferous of Illinois, by Chester A. Arnold. Pages 149–165, with 12 plates.
11. Corals of the Devonian Traverse Group of Michigan. Part V, *Trachypora,* by Erwin C. Stumm and Allen S. Hunt. Pages 167–189, with 4 plates.

VOL. XIV, No. 11, pp. 167–189 (4 pls.) JULY 25, 1958

CORALS OF THE DEVONIAN TRAVERSE GROUP OF MICHIGAN. PART V, *TRACHYPORA*

BY

ERWIN C. STUMM and ALLEN S. HUNT

CONTENTS

Introduction 167
Previous work 168
Acknowledgments 169
Register of localities 169
Systematic descriptions 170
Genus *Trachypora* Edwards and Haime 170
Trachypora alpenensis, sp. nov. 174
Trachypora alternans (Rominger) 174
Trachypora dendroidea, sp. nov. 176
Trachypora elegantula Billings 177
Trachypora lineata, sp. nov. 178
Trachypora ornata (Rominger) 179
Trachypora perreticulata, sp. nov. 180
Trachypora proboscidialis (Rominger) 180
Trachypora (?) reticulata Rominger 181
Trachypora rockportensis, sp. nov. 182
Trachypora sp. A 183
Trachypora sp. B 183
Literature cited 184
Plates ..... (*after*) 185

INTRODUCTION

THIS is the fifth part[1] of a study of the corals of the Traverse group of Michigan and concerns the species of the tabulate coral genus *Trachypora*. Species of this genus are known almost exclusively from Middle Devonian strata in North America. Only two others, *T. halli* Girty and *T. oriskania* Weller, both from the Lower Devonian of Eastern North America, have been tentatively referred to the genus, and a third, *T. austini* Worthen, from the Pennsylvanian of Kansas, is known from strata younger than Middle Devonian.

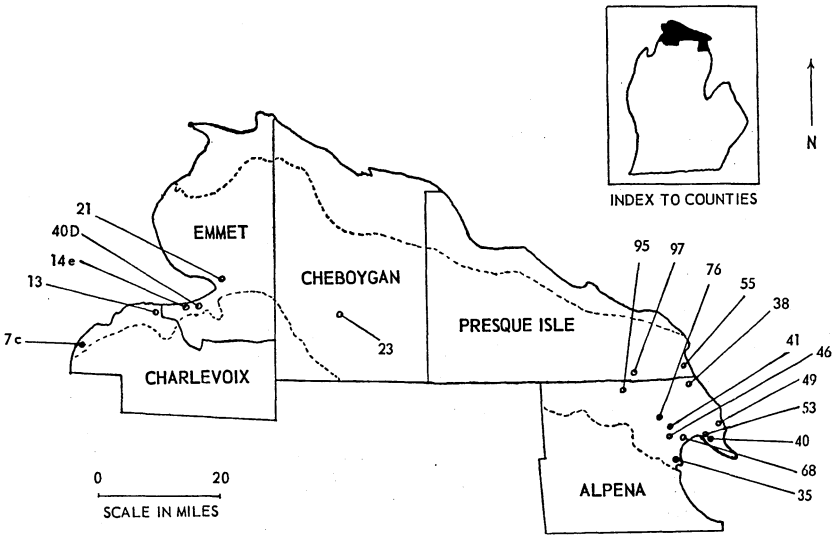
[1]Part I is published in Vol. VII, No. 8; Part II in Vol. VIII, No. 3; Part III in Vol. VIII, No. 8; and Part IV in Vol. IX, No. 3, of the *Contributions from the Museum of Paleontology, University of Michigan.*

Prior to this paper, eight species had been described from Middle Devonian strata of North America, all of them from Onondagan and Hamiltonian strata of western New York, southwestern Ontario, Michigan, and the Ohio Valley. In the present paper five of the eight species are redescribed because of their occurrence in Michigan strata. One of them is placed in synonymy. Five new species are proposed.

All numbered specimens referred to are located in the Museum of Paleontology, University of Michigan.

PREVIOUS WORK

Although some work has been done on tabulate corals of the Traverse group by Fenton (1937), Swann (1947), and Stumm (1950*b*), none since the classic work of Carl Rominger (1876) has been concerned with the



MAP 1. Index map of Traverse group localities. Broken lines indicate limits of the Traverse group.

genus *Trachypora*. Of the six species described or discussed by him, five, *T. alternans* (Rominger), *T. elegantula* Billings, *T. ornata* (Rominger), *T. proboscidialis* (Rominger), and *T. (?) reticulata* (Rominger) were listed as occurring in the Thunder Bay region. However, *T. dendroidea,* sp. nov., and *T. perreticulata,* sp. nov., described in this paper, had been recognized by Rominger as new species. He mentioned and illustrated the former (1876, p. 65, Pl. 24. Fig. 1) but never described or named it. A specimen of the latter, collected by him, was affixed with the label "sp. nov."

Acknowledgments

The authors are indebted to Dr. W. A. Kelly of the Department of Geology, Michigan State University, for having made available all specimens of the genus *Trachypora* at his disposal, and to Drs. C. A. Arnold, L. B. Kellum, and R. V. Kesling for critically reading this paper.

REGISTER OF LOCALITIES

With the exception of that for locality 40D, the numbers listed below were established for Devonian outcrops of Northern Michigan by the Michigan Geological Survey in the summer of 1926. They are currently used by the staff of the Museum of Paleontology, University of Michigan. Locality 40D was established by A. W. Grabau and no corresponding Michigan Geological Survey number exists for it. See Map 1 for index to localities and Table I for occurrence in Michigan.

MICHIGAN GEOLOGICAL SURVEY

LOCALITY

7*c*. Ledges and bluffs along Lake Michigan extending from point 1 mile N. of pier at Norwood to a point ½ mile north, Charlevoix county, NE. ¼ sec. 22, T. 33 N., R. 9 W. Petoskey formation—upper part.

13. Abandoned Northern Lime Company quarry ("Main Curtiss and two smaller quarries" of E. R. Pohl, 1930), and shore bluffs to west, Emmet and Charlevoix counties, near village of Bay Shore, SW. ¼ sec. 6, T.34 N., R. 6 W. Charlevoix and Petoskey formations.

14*e*. Abandoned "Bell" quarry and ledges on shore about 2 miles east of Bay Shore, Emmet County, near NE. corner sec. 8, T. 34 N., R. 6 W. Basal Charlevoix limestone and Gravel Point formation—upper part.

21. Kegomic quarry on south shore of Mud Lake just east of Harbor Springs Road (Michigan Highway 131), about ¼ mile north of its termination on U.S. Highway 31 one mile east of Bay View, Emmet County, SE. ¼ SW. ¼ sec. 27, T. 35 N., R. 5 W., Petoskey formation—*Gypidula petoskeyensis* zone.

23. Beebe schoolyard and exposures along highway, from 2½ to 2¾ miles south of road corner ½ mile west of Afton, Cheboygan County, extreme SE. corner NE. ¼ and E. line, SE. ¼ sec. 14, T. 34 N., R. 2 W. Beebe School formation.

35. Bluffs on northeast shore of Partridge Point, 4 miles south of Alpena, Alpena County, extends from center into SE. ¼ sec. 11, T. 30 N., R. 8 E. Thunder Bay limestone, type locality.

38. Abandoned quarry of Kelley's Island Lime and Transport Company (Great Lakes Stone and Lime Company), Rockport, Alpena County, sec. 6, T. 32 N., R. 9 E. Upper Bell shale, Rockport Quarry limestone, lower Ferron Point shale.

40. Quarry of Michigan Alkali Company, eastern edge of Alpena, Alpena County, sec. 13, T. 31 N., R. 8 E. Grenshaw formation—upper part, Newton Creek limestone, Alpena limestone, type locality.

41. Exposures on banks and in bed of Thunder Bay River below Four Mile Dam, Alpena County, ¼ mile south of center, sec. 7, T. 31 N., R. 8 E. (Other names

currently applied to this dam site are Fletcher Dam, Three Mile Dam, Broadwell's Saw Mill). Four Mile Dam bioherms, type locality, and Norway Point formation.

46. Shale bank on south side of Thunder Bay River on Potter Farm about 1 mile below Four Mile Dam, Alpena County, center of E. line sec. 18, T. 31 N., R. 8 E. Norway Point formation.

49. Abandoned quarry of El Cajon Cement Company at El Cajon Beach, Alpena County, center of W. ½ NE. ¼ sec. 10, T. 31 N., R. 9 E. Grenshaw formation—lower beds.

53. Abandoned quarry of Thunder Bay Quarries Company, eastern edge of Alpena, Alpena County, SE. ¼ sec. 14, T. 31 N., R. 8 E. Four Mile Dam limestone—Dock Street clay lens, type section.

55. Cut on private railway of Kelley's Island Lime and Transport Company, about 1 miles south of Bell, Presque Isle County, SW. ¼ SW. ¼ sec. 24, T. 33 N., R. 8 E. Bell shale.

68. Small shale pit at the northwest corner of the Alpena Cemetery (Evergreen Cemetery), west city limits of Alpena, Alpena County, SW. ¼ sec. 21, T. 31 N., R. 8 E. Potter Farm formation.

76. Low cuts and ditches on Alpena—Long Rapids Road about ½ mile northwest of Norway Point Dam (locality 47), Alpena County, short distance north of center south line sec. 1, T. 31 N., R. 7 E. Four Mile Dam limestone and possibly Norway Point formation.

95. Abandoned "Griffin" or "Bolton" limestone quarry and adjacent field outcrops, on southwest side of Detroit and Mackinac Railroad tracks about 1¼ miles northwest of Bolton, Alpena County, SE. ¼ SW. ¼ sec. 5, T. 32 N., R. 7 E. Alpena limestone.

97. Sink hole and ledges at Sunken Lake, F. W. Fletcher State Park, on south edge of Presque Isle County, near center sec. 32, T. 33 N., R. 6 E. Alpena limestone.

A. W. GRABAU

LOCALITY

40D. ½ mile west of mouth of Bear Creek, NW. ¼ sec. 6, T. 34 N., R. 5 W., Emmet County, Michigan.

SYSTEMATIC DESCRIPTIONS

Phylum COELENTERATA
Class ANTHOZOA
Order TABULATA
Family Favositidae Dana
Subfamily Pachyporinae Gerth

Genus *Trachypora* Edwards and Haime

Trachypora Edwards and Haime, 1851, p. 305.
Dendropora Rominger, 1876, p. 61.
Trachypora Nicholson, 1879, p. 102.

Trachypora Stewart, 1938, p. 70.
Trachypora Le Compte, 1939, p. 146.
Trachypora Stumm, 1949, Card 115.
Trachypora Ross, 1953, p. 83.

Type species.—By monotypy, *Trachypora davidsoni* Edwards and Haime, 1851, p. 305, Pl. 17, Figs. 7, 7*a*. [Upper] Devonian: Ferques, France.

Original description (Edwards and Haime, 1851, p. 305, from the English translation by Billings, 1860, p. 254).—

> Corallum dendroid, the branches presenting calyces which are only slightly salient and in which there are no radiating septa; coenenchyme very abundant, solid, and with the surface marked by strong, irregular, vermicular, and sub-echinulated striae.

Remarks.—The genus *Trachypora* was founded by Edwards and Haime on the single species *Trachypora davidsoni* and was placed, along with the genera *Dendropora* Michelin and *Rhabdopora* Edwards and Haime, within the family Seriatoporidae. Rominger (1876, p. 61) concluded that these genera should be referred to the subfamily Favositinae in view of the fact that they lack a central columella. In addition, he maintained that differences in surface ornamentation was not a significant characteristic upon which to separate existing species into three genera. Consequently, he adopted the genus *Dendropora* as all inclusive and incorporated the genera *Trachypora* and *Rhabdopora* within it.

Nicholson (1879, p. 102), after studying *T. ornata* (Rominger) and *T. elegantula* Billings, regarded them as being congeneric with the type species, *T. davidsoni*. From a study of thin sections, he concluded that coenenchyma is absent and wall thickening a result of deposition of sclerenchyma within the epitheca.

Le Compte (1939, p. 147), unable to locate type material of either *Trachypora* or *Dendropora,* hesitated to take a positive stand on the validity of the genus *Trachypora*. From the examination of figured specimens, however, he suggested that the coenenchyma "marked by strong, irregular, vermicular, and sub-echinulated striae" attributed to the type species by Edwards and Haime, as was established in the case of *T. circulipora* Kayser, may have been produced by an encrusting stromatoporoid. With regard to the genus *Dendropora,* Le Compte remarked that the "very finely granulose striae," which characterize the type species *D. explicata,* do not intimate a very sharp distinction between the two genera.

Until the type specimens of *T. davidsoni* are found and re-examined, some characteristics concerning the genus *Trachypora* must remain imperfectly known. Although there is some disagreement as to certain features, the genus is interpreted to include favositid corals with branching coralla.

TABLE I

OCCURRENCE OF SPECIES OF THE GENUS *Trachypora* IN THE TRAVERSE GROUP OF MICHIGAN

Species / Lithic Unit	Thunder Bay Region											Afton-Onaway Region						Traverse Bay Region				
	Bell shale	Rockport Quarry ls.	Ferron Point fm.	Genshaw fm.	Newton Creek ls.	Alpena ls.	Dock Street clay	Four Mile Dam ls.	Norway Point fm.	Potter Farm fm.	Thunder Bay ls.	Rockport Quarry ls.	Ferron Point fm.	Genshaw fm.	Koehler ls.	Gravel Point fm.	Beebe School fm.	Gravel Point fm.	Charlevoix ls.	Lower Petoskey fm.	Middle Petoskey fm.	Upper Petoskey fm.
Trachypora alpenensis	..	..	..	..	..	x	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Trachypora alternans	..	..	..	..	..	x	x	x	x	x	x	..	..	..	..	..	x	x	..	x	..	..
Trachypora dendroidea	..	..	..	..	..	..	x	x	..	..	x	..	..	..	..	..	..	..	..	..	..	..
Trachypora elegantula	..	..	..	..	..	..	..	x	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Trachypora lineata	..	..	..	..	..	..	x	..	..	x	..	..	..	..	..	..	..	x	..	..	..	..
Trachypora ornata	..	..	..	..	..	?	..	?	?	?	..	..	..	..	..	..	..	..	..	..	..	..
Trachypora perreticulata	..	..	..	..	..	..	..	..	..	..	x	..	..	..	..	..	..	..	..	..	..	..
Trachypora proboscidialis	..	..	..	..	..	x	x	x	..	x	x	..	..	..	..	..	..	..	..	x	..	x
Trachypora (?) reticulata	..	..	..	x	..	x	x	..	..	..	x	..	..	..	..	..	..	..	..	..	..	..
Trachypora rockportensis	..	x	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Trachypora sp. A	x	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Trachypora sp. B	..	..	..	x	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Corallites typically diverge from a central axis and thicken distally through deposition of sclerenchyma, and thus produce seemingly widely separated individuals. Tabulae and mural pores, if present, are scattered. Opinion differs concerning the importance which should be attributed to surface ornamentation in defining the genus.

Observations.—Corals possessing characteristics attributed to the genus *Trachypora* are easily recognized. Specific distinction, however, is complicated, because marked variations may occur among characteristics which some workers have assumed to be constant. It must be realized that although a useful concept enters into the definition of this genus, it is probably not a natural genetic grouping.

Some external features show little uniformity and many which are constant for one group are not for another. *Trachypora rockportensis* (Rominger), for example, possesses a single growth pattern, but *T. alternans* (Rominger), having encrusting basal expanse and branching forms, shows no such tendency. Similarly, corallite arrangement often proves to be of little significance. The arrangement of apertures in vertical rows, so characteristic of *T. elegantula* Billings, seems far too consistent to have resulted from chance. Other species, however, as *T. lineata,* exhibit both linear and alternating aperture arrangements. In such instances growth pattern may develop not from genetic inheritance but from spatial necessity.

Ornamentation consists of two kinds: that which is developed between corallites (intercorallite) and that which occurs surrounding corallite apertures (intracorallite). The former is oriented parallel to growth direction and is the more constant; the latter occurs as radiating ridges which are present in various stages of development on the same corallum. Swann (1947, p. 249, Pl. VI, Fig. 6) observed strong septal ridges on a specimen of *Favosites alpenensis killiansensis* Swann, which he attributed either to a planula of some other genus having settled on a growing *Favosites* colony or to a mutation. Such peculiar growth is not uncommon within the genus *Trachypora*. Possibly, it is an ontogenetic expression of phylogenetic development.

The frequent occurrence of relatively larger and oval-shaped corallite apertures on smaller stems suggests two principles. First, as the angle of repose of the corallite increases, the sphericity of the aperture increases. In the end result, circular apertures are formed when corallites emerge perpendicular to the corallum surface. Secondly, when deposition of sclerenchyma within the epitheca occurs faster than corallite diameter increases (which is often) the diameter of the lumen is decreased. With respect to corallum growth habit, it was noted that some species developed porous sclerenchyma consisting of a network of partitions. Perhaps, this

tissue was developed under certain environmental conditions. Externally, such areas on *Trachypora alternans* have the appearance of encrusted zones that could be mistaken for a parasitic growth. Microscopic examination, however, reveals this tissue to be continuous with the dense underlying sclerenchyma.

Trachypora alpenensis, sp. nov.

(Pl. II, Figs. 1–4)

Description.—Coralla composed of straight,cylindrical branches 3 mm. or less in diameter diverging approximately perpendicular to the main stem. Surface ornamentation, if present, consisting of very faint radial ridges evidenced in the gently raised margins surrounding the apertures and longitudinally disposed ridges occurring on the interstitial surface. Apertures of nearly equal size, oval, with maximum and minimum diameters of 1 by .5 mm., relatively distantly spaced, characteristically .75 mm. apart, typically arranged in alternating rows. Calyces deep, oblate-cone-shaped.

In transverse section, epithecal limits subpolygonal, lumen round, resulting from thickening of sclerenchyma within epitheca.

In longitudinal section, corallites frequently appearing as biserially arranged tubes .5 mm. or less in diameter, developed longitudinally in the axial region. Corallites diverging from central portion of the stem to meet the surface at angles greater than 45 degrees. Mature corallites 2 to 3 mm. in length. Walls thickening peripherally, with a maximum width of .5 mm. Tabulae rare, extremely thick, up to .15 mm. in width. One or more basal pores leading from mature region of parent corallite to daughter corallites.

Remarks.—Trachypora alpenensis most closely resembles *T. dendroidea,* but it differs from it in being smaller and less disposed to branch. The nature of the complete corallum is not known. *T. alpenensis* is known only from the 1-foot shale bed of the Alpena limestone, which is considered to possess a somewhat distinctive fauna.

Occurrence.—Middle Devonian (Traverse group, Alpena limestone—1-foot shale bed 21 feet above base of formation), locality 40, Alpena County, Michigan.

Types.—Holotype No. 34362; paratypes Nos. 34358, 34359, 34363.

Trachypora alternans (Rominger)

(Pl. III, Figs. 7–10; Pl. IV, Figs. 1–8)

Dendropora alternans Rominger, 1876, p. 64, Pl. 24, Fig. 1.
Dendropora alternans Davis, 1887, Pl. 65, Fig. 2.

Dendropora osculata Davis, 1887, Pl. 65, Figs. 7–11, Pl. 66.
? Trachypora alternans Stewart, 1938, p. 70, Pl. 17, Fig. 1.
Trachypora alternans Stumm, 1950*a*, Card 394.
Trachypora osculata Stumm, 1950*a*, Cards 402–403.

Original description (Rominger, 1876, p. 64)—

Stems of about four millimeters in diameter, with remote oval orifices in quincuncial position, forming about five loose, alternating, longitudinal rows in the circumference of a stem. Diameter of orifices lengthwise from one and a half to two millimeters, and one millimeter in transverse direction. Margins raised into an obtuse circumvallation. Surface minutely punctate by acutely pointed granules, but not ornamented with longitudinal rugae.

Revised description.—Coralla variable, exhibiting massive basal expanses, cylindrical anastomosing stems and encrusting growth habit. All three growth forms visible on same corallum. Surface rarely ornamented with pustules and faint radial ridges surrounding elevated aperture margins, but typically smooth. Apertures oval with maximum and minimum diameters of 1.75 by 1 mm., but considerable variation may exist. Apertures irregularly spaced, alternating, or in vertical rows. Distance between openings ranging from 3 mm. to less than .25 mm.

In transverse section, corallites small in axial region, subcircular in outline. Sclerenchyma typically banded, extremely thick and very dense; but with encrusting habit, sclerenchyma becoming porous, consisting of disordered partitions.

In longitudinal section, corallites diverging from axial region to meet the surface at angles of 90 degrees or less. Sclerenchyma thickening rapidly toward distal end of corallites. Epitheca distinct only in axial region. Budding very apparent. Mural pores scattered, variable in size but typically .15 mm. or greater in diameter. Tabulae complete, incomplete, horizontal, arched or depressed, generally .12 mm. or less in thickness; irregularly spaced, .25 mm. or more apart.

Remarks.—*Trachypora alternans* is characterized by large coralla, large corallites, and extremely thick, dense deposits of sclerenchyma. It is thus easily distinguished from all other forms of the Traverse group. Rominger (1876, p. 64) described *T. alternans* from the branches of an incomplete corallum and regarded the alternation of corallites as a specific characteristic. Subsequently, Davis (1887, Pl. 65, Fig. 2) recorded the occurrence of *T. alternans* and figured specimens of it, along with *T. osculata* Davis (1887, Pl. 65, Figs. 7–11; Pl. 66). He considered the latter to be a new species exhibiting basal expanse and branching growth habit. Material presently available indicates the two are conspecific. *T. alternans* demonstrates the variations in growth pattern possible in a single corallum.

Trachypora alternans has a wide stratigraphic range. Specimens from the Potter Farm and Petoskey formations typically possess smaller apertures than those from older formations. Since all intermediate stages exist and other differences were not observed, it seems advisable to consider all forms as variants of a single species. Whether variations in aperture size have resulted through genetic inheritance or were environmentally controlled remains a question.

Occurrence.—Middle Devonian (Traverse group, Alpena limestone), localities 40 to 95 (of those given); (Four Mile Dam limestone—Dock Street clay lens), locality 53; (Four Mile Dam limestone), localities 41 and 76; (Norway Point formation), locality 46; (Potter Farm formation), locality 68; (Thunder Bay limestone), locality 35, Alpena County; (Beebe School formation), locality 23, Cheboygan County; (Gravel Point formation), locality 14*e,* Emmet County; (Petoskey formation), locality 13, Emmet and Charlevoix Counties; (Petoskey formation), locality 21, Emmet County, Michigan.

Types.—Lectotype (here chosen) No. 8518; unfigured paratype No. 34364; hypotypes Nos. 34365, 34366, 34370–34372, 34376, 34429; unfigured hypotypes Nos. 34367, 34368, 34373, 34375, 34377, 34430, 34431.

Trachypora dendroidea, sp. nov.

(Pl. I, Figs. 2–5)

Description.—Coralla ramose, encrusting, composed of branches which bifurcate from the base member at angles between 45 and 90 degrees. Branches cylindrical or oval, less than 4 mm. in diameter. Surface ornamentation, if present, consisting of pits and flexous ridges developed parallel to direction of growth. Apertures round or oval, longitudinally disposed, irregularly arranged, 1 mm. or less in diameter, relatively distantly spaced with approximately one aperture width between openings.

In transverse section, corallite walls polygonal to subrounded. Sclerenchyma extremely thick, banded, with maximum development on exterior wall of corallite where a thickness of 1 mm. is reached.

In longitudinal section, corallites appearing as one or more thick tubes, .5 mm. or less in diameter, expanding and curving moderately before opening perpendicularly to the exterior. Epitheca distinct in central region, becoming obscure peripherally. Tabulae not observed. Basal pores large.

Remarks.—*Trachypora dendroidea* resembles *T. alpenensis,* but the latter possesses smaller corallites and coralla. The stems of *T. dendroidea* are characteristically curved, whereas those of *T. alpenensis* are typically straight. *T. dendroidea* differs externally from *T. rockportensis,* sp. nov.,

in size and nature of ornamentation. Internally, *T. dendroidea* lacks irregularly disposed mural pores. This species may be most easily distinguished by the shape of the corallum and the size, shape, and distribution of the corallites.

Trachypora dendroidea was first illustrated but not described by Rominger (1876, Pl. 24, Fig. 1) beside the figured holotype of *T. alternans*. Included within the description of *T. alternans* was the following remark (Rominger, 1876, p. 65):

> In the upper right-hand corner of the same piece a small, flat, basal expansion and a stem of another smaller species of *Dendropora* are represented. The tubes of these are arranged in distant, irregularly quincuncial order; the interstitial surface exhibits the same ornamentations by rugae as *Dendropora elegantula,* but the species is, on the whole, smaller, and the arrangement of the tubes is different.
>
> The material at my command is not sufficient to enable me to give full characteristics of the latter kind, but I think it is specifically a distinct form.

T. dendroidea, as do several other species of this genus, exhibits an encrusting growth habit. Surface ornamentation is very delicate and on most specimens examined was not preserved. One of the specimens collected and illustrated by Rominger has been chosen as the holotype.

Occurrence.—Middle Devonian (Traverse group, Four Mile Dam limestone—Dock Street clay lens), locality 53; (Four Mile Dam limestone), locality 41; (Thunder Bay limestone), locality 35, Alpena County, Mich.

Types.—Holotype No. 34383; paratypes Nos. 34382, 34388, 34398; unfigured hypotype No. 34384.

Trachypora elegantula Billings

(Pl. I, Figs. 6–8)

Trachypora elegantula Billings, 1860, p. 254, Figs. 2, 3, 4.
Dendropora elegantula Rominger, 1876, p. 64, Pl. 23, Fig. 2.
Trachypora elegantula Hall, 1876, Pl. 33, Figs. 1–8.
Trachypora elegantula Nicholson, 1879, p. 108, Pl. 5, Figs. 4–4*c*.
Trachypora elegantula Lambe, 1899, p. 41.
Trachypora elegantula Stewart, 1938, p. 70.
Trachypora elegantula Shimer and Shrock, 1944, p. 109, Pl. 38, Figs. 16–17.
Trachypora elegantula Stumm, 1950*a*, Card 395.
Trachypora elegantula Ross, 1953, pp. 84–85, Pl. 27, Figs. 1, 2, 11.

Original description (Billings, 1860, p. 254).—

> Stems (in the specimens examined) from two to two and a half lines in diameter, branching at an angle of about 75 degrees. Cells arranged in four or five rows, parallel with the axis of the stem; they are oval, about one line in length and two-thirds of a line wide, with an elevated margin at the sides, in general effuse above, rarely effuse below. The space between the cells is marked with irregular, flexuous, broken striae,

four or five in the width of one line; the elevated margin at the sides of the cells exhibits from seven to nine short, oblique ridges or tubercles. In the longitudinal rows, the cells are sometimes in contact with each other, and often separated by distances equal to half their own length or a little more. In *T. davidsoni,* the cells are not arranged in linear series, and the striae are of a different form.

Remarks.—In discussing *Trachypora elegantula,* Rominger (1876, p. 64) states that it "Occurs rarely in the Hamilton group of Thunder Bay, near Broadwell's mills, where it is associated with several other species of *Dendropora.*" His figured specimens are from the Hamilton group of Widder, Ontario. The few specimens examined from the Four Mile Dam limestone were not from locality 41 (Broadwell's mills) but from locality 76. Although poorly preserved, external features conform with Billing's original description.

Occurrence.—*Middle Devonian* (Hamilton group, Hungry Hollow formation) southwestern Ontario; (Ludlowville formation) central and western New York (Ross, 1953, p. 85); (Ten Mile Creek dolomite), Paulding County, Ohio, (Stewart, 1938, p. 70); (Traverse group, Four Mile Dam limestone), locality 76, Alpena County, Michigan.

Types.—Hypotypes Nos. 34402–34404.

Trachypora lineata, sp. nov.

(Pl. II, Figs. 6–10)

Description.—Coralla composed of cylindrical, anastomosing, reticulated stems 4 mm. or less in diameter typically branching from the main stem at angles of less than 45 degrees. Exterior ornamented with small pits and well-developed, irregular, discontinuous longitudinal ridges. Corallites distantly spaced, either in quincuncial arrangement or in longitudinal rows, nearly equal in size, oval; maximum and minimum diameters 1 by .75 mm. Calyces oblate-cone-shaped, very deep and perpendicular to the surface on thick stems, shallower and more gently inclined on thin stems.

In transverse section, corallites radiating from axial region. Epitheca distinct, corallite boundaries lacrimal-shaped.

In longitudinal section, mature corallites 2 to 3 mm. in length, composed of vertical tubes about .5 mm. in diameter, which expand and diverge abruptly to meet the surface at angles of 90 degrees or less. Sclerenchyma with maximum thickness of 1 mm. in distal region. Basal pores conspicuous. Tabulae complete, scattered, variable in thickness.

Remarks.—In external appearance *Trachypora lineata* most closely resembles *T. elegantula,* but differs from the latter in possessing irregularly arranged corallites, deep calyces, and coarser, more prominent, longitudinal

ridges. In size *T. lineata* resembles *T. rockportensis,* sp. nov., but lacks scattered mural pores. *T. dendroidea* has smaller and more widely spaced corallites than *T. lineata.*

Occurrence.—Middle Devonian (Traverse group, Four Mile Dam formation—Dock Street clay lens), locality 53; (Potter Farm formation), locality 68, Alpena County, Michigan; (Gravel Point formation), locality 40D (Grabau), Emmet County, Michigan.

Types.—Holotype No. 34393; paratypes Nos. 34395–34397, 34399.

Trachypora ornata (Rominger)

(Pl. II, Figs. 14–15)

Dendropora ornata Rominger, 1876, partim., p. 62, Pl. 24, Fig. 2, right hand figure only (*non* Pl. 23, Fig. 1).
Trachypora ornata Stumm, 1950*a,* Card 401.

Remarks.—Rominger's syntypes of *Trachypora ornata* included one specimen from the Traverse group of Alpena, Michigan, and four specimens from the Hamilton group of western New York. The Michigan specimen is not conspecific with those from New York. Stumm (1950*a,* Card 401) chose the Michigan specimen as lectotype. The New York specimens have been commonly referred to as *Trachypora limbata* (Eaton). As Eaton (1832, p. 39) had merely identified his specimens to an established recent species, the New York form was considered to be without a valid specific name until Ross (1953, p. 85) named it *Trachypora romingeri.* More recently, Wells (1958, p. 242) discovered that the species had been described and named *Milleporites vermiculosa* by Lesueur (1821, p. 293). The correct name for the New York species thereby becomes *Trachypora vermiculosa* (Lesueur).

The Michigan specimen, lectotype of *Trachypora ornata* (Rominger), is a badly silicified fragment with all internal structures obliterated, and was obtained from an unknown stratigraphic position in the Traverse group. The exterior is smooth except for the irregularities produced by silicification. The apertures are circular, slightly oblique, and range from 1 to 2 mm. in diameter. It is doubtful if this species can ever be properly established.

Occurrence.—Middle Devonian (Traverse group—Alpena limestone, Four Mile Dam limestone, Norway Point formation, or Potter Farm formation); vicinity of Alpena, Michigan.

Type.—Lectotype No. 8522.

Trachypora perreticulata, sp. nov.

(Pl. II, Figs. 11–13)

Description.—Coralla ramose, composed of slender anastomosing branches 3 mm. or less in diameter which infrequently exhibit encrusting habit. Surface ornamentation, if present, comprised of pits and very thick irregular longitudinal ridges up to .12 mm. in width. Typically, corallites circumscribed by narrow uniformly elevated margins. Calyces of moderate depth. Apertures very small, typically .35 mm. and rarely over .5 mm. in width, round to oval, irregularly arranged, widely spaced; average distance between corrallites .75 mm.

In transverse section, corallites radiating from axial region. Epitheca distinct in central portion, becoming obscure peripherally. Corallites subpolygonal, lumen oval, produced by thickening within epitheca.

In longitudinal section, corallites about 1.5 mm. in length, vertical in central region but diverging and expanding rapidly to meet the surface at an angle somewhat less than 90 degrees. Budding prominent in axial region. Maximum wall thickness, about 1 mm., on exterior side of corallite. Sclerenchyma banded. Basal pores conspicuous. Tabulae scattered, variable in thickness, complete, horizontal.

Remarks.—In growth form *Trachypora perreticulata* resembles *T. (?) reticulata* (Rominger) but differs externally from it in possessing surface ornamentation. Internally, *T. perreticulata* lacks the scattered mural pores and abundant tabulae of *T. (?) reticulata.* The small, widely spaced apertures readily distinguish this species from other forms. Rominger recognized this coral as a new species but never described it.

Occurrence.—Middle Devonian (Traverse group, Thunder Bay limestone), locality 35, Alpena County, Michigan.

Types.—Holotype No. 34432; paratypes Nos. 34406, 34408; unfigured paratype No. 34433.

Trachypora proboscidialis (Rominger)

(Pl. III, Figs. 1–6)

Dendropora proboscidialis Rominger, 1876, p. 65, Pl. 24, Fig. 4.
non *Dendropora proboscidalis* [sic] Davis, 1887, Pl. 63, Fig. 8.
Trachypora proboscidialis Stumm, 1950*a*, Card 404.

Original description (Rominger, 1876, p. 65).—

Small reticulated branchlets, not much over one millimeter in diameter. Orifices forming proboscidal, spoon-like projections, disposed in five or six longitudinal alternating rows on the circumference of the stems, or of more irregularly dispersed position. Interstitial surface longitudinally rugose, and dotted by punctiform and fissure-like porosites. Diameter of orifices about one-third of a millimeter.

Revised description.—Coralla ramose, infrequently encrusting, composed of slender, cylindrical, anastomosing branches 1.5 mm. or less in diameter. Surface as well as aperture margins ornamented with pits and discontinuous irregular ridges. Apertures round or, if oval, oriented parallel to direction of growth, irregularly arranged or in longitudinal rows, between .25 and .5 mm. in diameter, typically of equal size. Aperture margins unequally raised producing prominent spoon-shaped lower lips.

In transverse section, corallites round to subround, intercorallite walls generally less than .1 mm. in width, maximum wall thickness of .5 mm. on exterior side of corallite.

In longitudinal section, corallites composed of slender vertical tubes, typically two or more, about .25 mm. in diameter, diverging abruptly to meet the surface at an angle of 45 degrees or greater.

Epitheca distinct in proximal portion of corallite, becoming poorly defined distally particularly about the upper margin. Tabulae thin, complete, horizontal, very unevenly spaced. Basal pores prominent.

Remarks.—Rominger (1876, p. 65) recorded *Trachypora proboscidialis* from the Thunder Bay and Four Mile Dam limestones. Specimens, more recently found from outcrops of the Potter Farm formation and Four Mile Dam limestone—Dock Street clay lens, at localities unknown to Rominger, have produced an abundance of well-preserved material. His original description, however, is accurate. *T. proboscidialis* differs from other members of the genus in possessing unequally raised aperture margins which produce a prominent extended lower lip.

Occurrence.—Middle Devonian (Traverse group, Alpena limestone), locality 40; (Four Mile Dam limestone—Dock Street clay lens), locality 53; (Four Mile Dam limestone), locality 76; (Potter Farm formation), locality 68; (Thunder Bay limestone), locality 35, Alpena County; (Alpena limestone), locality 97, Presque Isle County; (Petoskey formation), locality 13, Emmet and Charlevoix counties; (Petoskey formation), locality 7*c*, Charlevoix County, Michigan.

Types.—Hypotypes Nos. 34409, 34411, 34417, 34418, 34420, 34421; unfigured hypotypes Nos. 34410, 34412–34414, 34419, 34422.

Trachypora (?) reticulata Rominger

(Pl. I, Figs. 11–14)

Dendropora (?) reticulata Rominger, 1876, p. 65, Pl. 24, Figs. 1, 4.
Trachypora reticulata Stumm, 1950*a*, Card 405.

Original description (Rominger, 1876, p. 65).—

Reticulated horizontal expansions of small cylindrical stems about two millimeters in diameter, composed of moderately thick-walled conical tubules, the outlines of which

in their longitudinal extension can be distinctly seen. Orifices erect, circular, with free margins. Stems similar to *Aulopora spicata* of Goldfuss, in external structure, but more minute, the diameter of the tubes being only one-third to one-half millimeter. Interstitial surface smooth, neither rugose nor granulose. Found in the upper strata of the Hamilton group at Partridge Point, and in the lower beds of Thunder Bay River, at Broadwell's mills.

Revised description.—Coralla ramose, reticulate, composed of encrusting, anastomosing stems 5 mm. or less in diameter. Surface ornamentation lacking. Apertures circular or oval, average diameter .5 mm., surrounded by raised margins except toward terminus of stem. Apertures typically closely spaced with maximum separation of 1 mm.

In transverse section, corallites round, axial budding region poorly defined. Epitheca distinct.

In longitudinal section, corallites slender, 2 to 5 mm. in length, curving gently outward from a poorly defined central region to meet the surface at an angle of about 45 degrees. Average diameter in central region .5 mm. Maximum thickness of sclerenchyma, .5 mm., reached in distal region on upper surface of corallite. Mural pores common, scattered. Tabulae complete, typically horizontal, up to .12 mm. thick.

Remarks.—Rominger (1876, p. 65) prefaced his original description with the following statement: "With doubt I arranged, under the genus *Dendropora,* the coral of which a description follows:" *Trachypora (?) reticulata* differs in several respects from other members of the genus. Typical corallites have an auloporoid appearance. Thin sections reveal horizontal tabulae, and mural pores. The epitheca of individual corallites is clearly defined distally. The species is also atypical in lacking surface ornamentation. Eventually, *T. (?) reticulata* may be placed in a new genus, but at present it seems most logically retained within the genus *Trachypora.*

Occurrence.—Middle Devonian (Traverse group, Alpena limestone and Genshaw formation—upper part), locality 40; (Four Mile Dam limestone —Dock Street clay lens), locality 53; (Four Mile Dam limestone), locality 41 (Rominger, 1876, p. 65); (Thunder Bay limestone), locality 35, Alpena County.

Types.—Lectotype No. 8519 (here chosen); figured hypotypes Nos. 34425–34427; unfigured hypotype No. 34555.

Trachypora rockportensis, sp. nov.

(Pl. I, Figs. 9–10)

Description.—Coralla ramose, composed of slender, cylindrical stems, 3 mm. or less in diameter, that bifurcate at angles of less than 90 degrees. Ornamentation composed of faint ridges which radiate from moderately

raised aperture margins. Apertures of equal size, oval, parallel to growth direction, with maximum and minimum diameters 1 by .75 mm., unevenly and relatively distantly spaced, .5 mm. or more between orifices.

In transverse section, corallite boundaries circular, irregularly shaped.

In longitudinal section, corallites diverging gradually from a poorly defined central region. Calyces bowl-shaped. Epitheca distinct, boundaries very irregular. Walls thickening distally; sclerenchyma with maximum thickness of .5 mm. Thickness of axial intercorallite wall about .15 mm. Mural pores irregularly arranged, .12 mm. or less in diameter. Basal pores prominent. Tabulae not observed.

Remarks.—In longitudinal sections of *Trachypora rockportensis* scattered mural pores are apparent. This characteristic has not been observed in *T. dendroidea* or in *T. alpenensis,* the two species which *T. rockportensis* most clearly resembles. Bowl-shaped calyces are produced by a peculiar re-entrant development of sclerenchyma surrounding the epitheca. Poor preservation may account for the weakly developed ornamentation.

Occurrence.—Middle Devonian (Traverse group, Rockport Quarry limestone), locality 38, Alpena County, Michigan.

Types.—Holotype No. 34391; paratype No. 34392.

Trachypora sp. A
(Pl. I, Fig. 1)

Description.—Complete corallum not known. Segment studied, a cylindrical, branched stem, 3 mm. in diameter. Surface ornamentation of corallum indistinct, composed of radial ridges on uniformly, very gently raised aperture margins. Corallites expanding rapidly from the axial region and emerging perpendicular to the surface. Apertures round to ovoid, average diameter 1 mm., closely spaced, frequently with less than .5 mm. between openings.

Remarks.—In general appearance this specimen does not closely resemble any other species studied. It is stratigraphically the oldest *Trachypora* observed to occur in the Traverse group.

Occurrence.—Middle Devonian (Traverse group, Bell shale), locality 38, Alpena, Michigan.

Figured specimen.—No. 34400.

Trachypora sp. B.
(Pl. II, Fig. 5)

Description.—Complete corallum unknown. Stem examined, about 7 mm. in diameter. Surface ornamentation absent or destroyed. Apertures closely spaced in quinuncial arrangement, frequently 1 mm. or less between

opening. Apertures oval with maximum and minimum diameters of 3 by 2 mm. Corallites inclined to the surface at an angle of somewhat less than 45 degrees. Mural pores common.

Remarks.—*Trachypora* sp. B most closely resembles *T. alternans* and may be a progenitor of that species. It differs from *T. alternans,* however, in possessing larger, more closely spaced corallites.

Occurrence.—Middle Devonian (Traverse group, Genshaw formation—lower beds), locality 49, Alpena County, Michigan.

Figured specimen.—No. 34401.

LITERATURE CITED

BILLINGS, E. 1860. On the Devonian Fossils of Canada West. Can. Journ., n.s., Vol. 5, pp. 249–60.

DAVIS, W. J. 1887. Kentucky Fossil Corals. Frankfort, Ky.: Kentucky Geol. Surv., Pt. 2, 139 pls.

EATON, A. 1832. Geological Textbook. 2d. ed., p. 39, Pl. 5, Fig. 52.

EDWARDS, H. M., and HAIME, J. 1851. Monographie des Polypiers Fossils des Terrains Palaeozoiques. Mus. Hist. Nat., Arch., Vol. 5, 502 pp.

FENTON, M. A. 1937. Species of *Aulopora* from the Traverse and Hamilton Groups. Amer. Midl. Nat., Vol. 18, No. 1, pp. 115–19.

HALL, J. 1876. Illustrations of Devonian Fossils: Corals of the Upper Helderberg and Hamilton Groups. Albany: Geol. Surv. New York, Paleontol. Pls. 1–39.

LAMBE, L. M. 1899. A Revision of the Genera and Species of Canadian Palaeozoic Corals. Can. Geol. Surv., Contrib., Paleontol., Vol. 4, Pt. 1, pp. 1–96.

LE COMPTE, M. 1939. Les Tabulés de Dévonien Moyen et Supérieur du Bord Sud du Bassin de Dinant. Mus. Roy. Hist. Nat. Belgique, Mem. No. 90, 229 pp.

LESUEUR, C. A. 1821. Description de plusiers animaux appartenant aux Polypiers Lamelliferes de M. le Ch. de Lamarck. Mem. Mus. Hist. Nat. Paris, Vol. 5, pp. 241–488.

NICHOLSON, H. A. 1879. On the Structure and Affinities of the "Tabulate Corals" of the Palaeozoic Period . . . Edinburgh and London: Blackwood. Pp. xii + 342.

POHL, E. R. 1930. The Middle Devonian Traverse Group of Rocks in Michigan, a Summary of Existing Knowledge. Proc. U.S. Nat. Mus., Vol. 76, Art. 14, No. 2811, 34 pp.

ROMINGER, C. L. 1876. Paleontology, Fossil Corals. Mich. Geol. Surv., Vol. 3, Pt. 2, 161 pp.

ROSS, M. H. 1953. The Favositidae of the Hamilton Group (Middle Devonian of New York). Buffalo Soc. Nat. Sci., Bull. Vol. 21, No. 2, pp. 37–89.

SHIMER, H. W., and SHROCK, R. R. 1944. Index Fossils of North America. New York: Wiley. 837 pp.

STEWART, G. A. 1938. Middle Devonian Corals of Ohio. Geol. Soc. Amer., Special Paper, No. 8, 120 pp.

STUMM, E. C. 1949. Type Invertebrate Fossils of North America (Devonian). Tabulata, Family Favositidae, Pt. 1. Philadelphia: Wagner Free Instit. Sci., Card 115.

——— 1950*a*. *Ibid.*, Pt. 2, Cards 393–405.

——— 1950*b*. Corals of the Devonian Traverse Group of Michigan. Pt. 3, *Antholites, Pleurodictyum,* and *Procteria.* Contrib. Mus. Paleontol. Univ. Mich., Vol. 8, No. 8, pp. 205–20.

SWANN, D. H. 1947. The *Favosites alpenensis* Lineage in the Middle Devonian Traverse Group of Michigan. Contrib. Mus. Paleontol. Univ. Mich., Vol. 6, No. 9, pp. 235–318.

WELLS, J. W. 1958. Note on Two Forgotten Species of Paleozoic Tabulate Corals from New York. Journ. Paleontol., Vol. 32, No. 1, pp. 242–43.

Submitted for publication July 22, 1957

PLATES

EXPLANATION OF PLATE I

PAGE

Trachypora sp. A 183

FIG. 1. Exterior view showing round, closely spaced apertures. Figured specimen No. 34400. Belle shale; locality 38. × 2.

Trachypora dendroidea, sp. nov. 176

FIG. 2. Exterior view showing branching habit and ornamentation consisting of flexuous ridges. Holotype No. 34383. Thunder Bay limestone; locality 35. × 2.

FIG. 3. Exterior view showing encrusting habit and distally spaced apertures. Paratype No. 34382. Thunder Bay limestone; locality 35. × 2.

FIG. 4. Longitudinal section. Paratype No. 34398. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 4.

FIG. 5. Transverse section showing thick-banded sclerenchyma and subrounded walls. Paratype No. 34388. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 10.

Trachypora elegantula Billings 177

FIG. 6. Transverse section. Hypotype No. 34403. Four Mile Dam limestone; locality 76. × 10.

FIG. 7. Exterior view showing irregular flexuous ridges, linear cell arrangement, and raised aperture margins. Hypotype No. 34402. Four Mile Dam limestone; locality 76. × 4.

FIG. 8. Longitudinal section. Hypotype No. 34404. Four Mile Dam limestone; locality 76. × 4.

Trachypora rockportensis, sp. nov. 182

FIG. 9. Longitudinal section, showing irregularly arranged mural pores, bowl-shaped calyces, and distinct but irregular epithecal boundaries. Paratype No. 34392. Rockport Quarry limestone; locality 38. × 6.

FIG. 10. Exterior view showing large, distantly-spaced corallites on a slender branching stem. Holotype No. 34391. Rockport Quarry limestone; locality 38. × 2.

Trachypora (?) reticulata (Rominger) 181

FIG. 11. Transverse section showing rounded corallites and poorly defined axial region. Hypotype No. 34426. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 10.

FIG. 12. Exterior view showing encrusting growth pattern and free, raised aperture margins. Hypotype No. 34427. Alpena limestone; locality 40. × 1.

FIG. 13. Exterior view showing reticulate growth pattern. Lectotype No. 8519. Thunder Bay limestone; locality 35. ×1.

FIG. 14. Longitudinal section showing slender corallites curving gently outward from a poorly defined central region. Hypotype No. 34425. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 8.

PLATE I

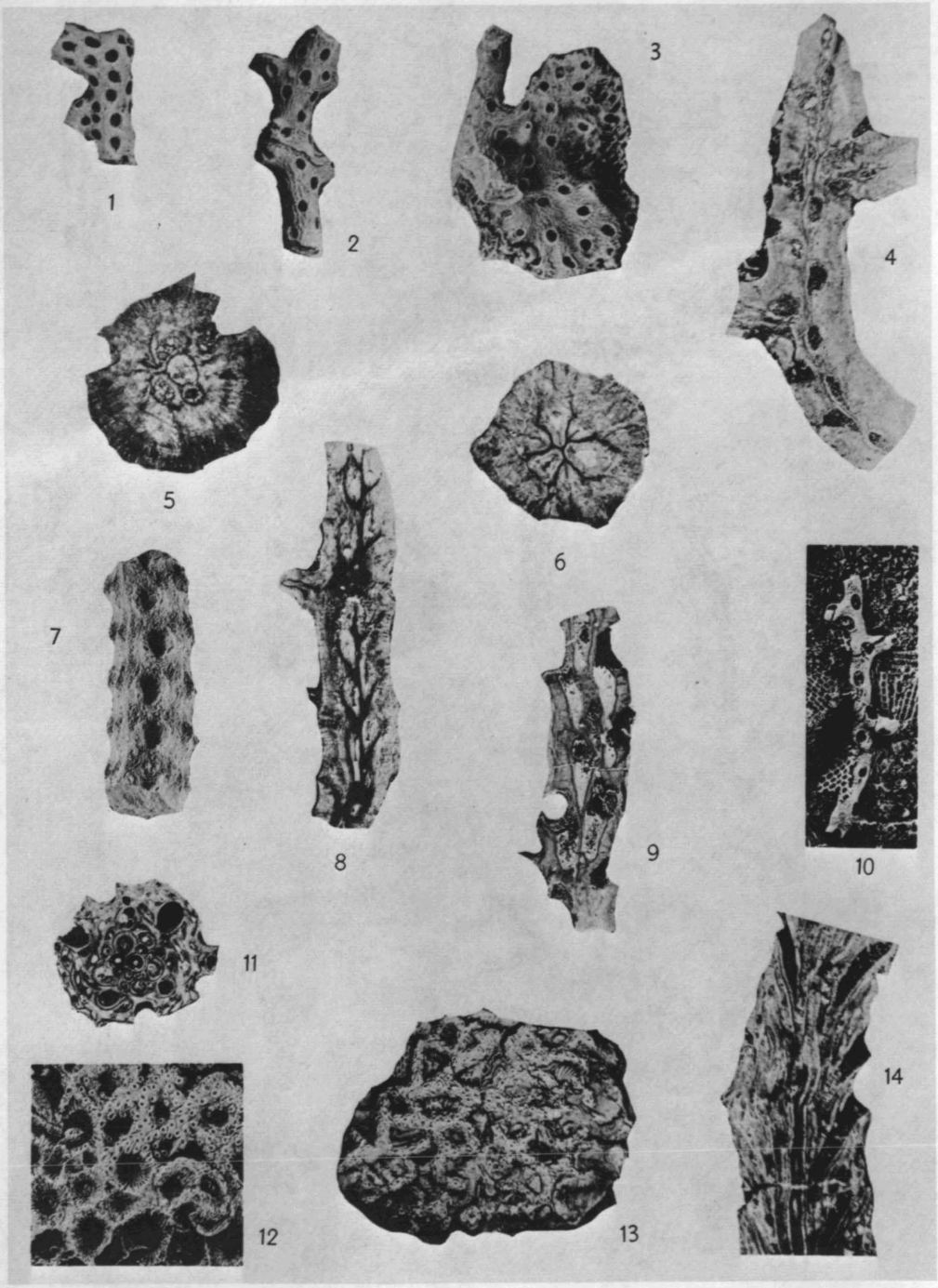
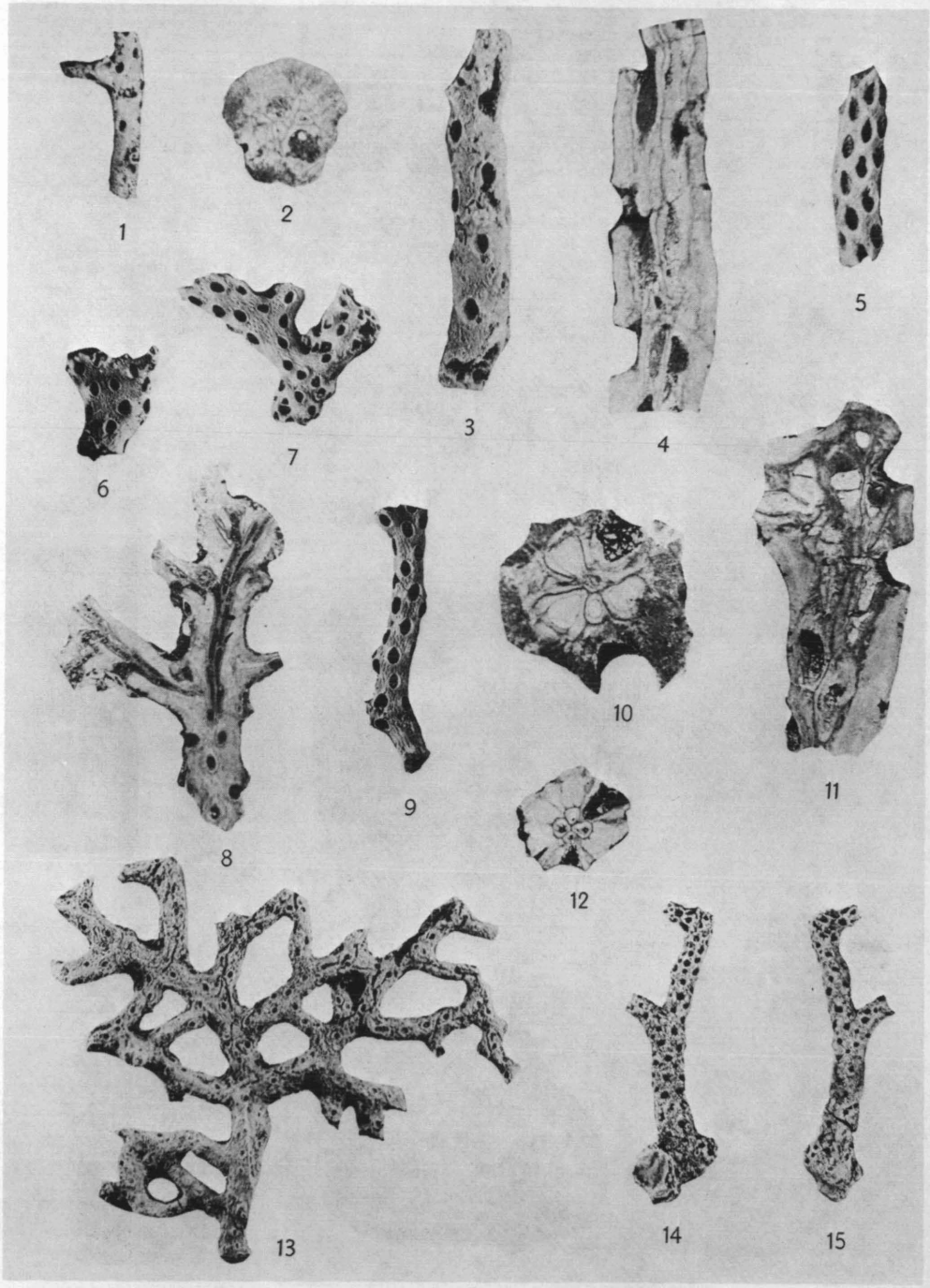


PLATE II



EXPLANATION OF PLATE II

PAGE

Trachypora alpenensis, sp. nov. 174

FIG. 1. Exterior view showing branching perpendicular to stem. Paratype No. 34363. Alpena limestone; locality 40. × 2.

FIG. 2. Transverse section. Paratype No. 34359. Alpena limestone; locality 40. × 10.

FIG. 3. Exterior view showing distantly spaced apertures. Holotype No. 34362. Alpena limestone; locality 40. × 4.

FIG. 4. Longitudinal section showing biserial arrangement of corallites and wall thickening outside the epitheca. Paratype No. 34358. Alpena limestone; locality 40. × 8.

Trachypora sp. B 183

FIG. 5. Exterior view showing corallites in closely spaced quincuncial arrangement. Figured specimen No. 34401. Genshaw formation; locality 49. × 1.

Trachypora lineata, sp. nov. 178

FIG. 6. Exterior view. Paratype No. 34397. Gravel Point formation; locality 40D. × 2.

FIG. 7. Exterior view of slender branch. Paratype No. 34399. Potter Farm formation; locality 68. × 2.

FIG. 8. Exterior view. Holotype No. 34393. Potter Farm formation; locality 68. × 2.

FIG. 9. Transverse section showing lacrimal-shaped corallite boundaries. Paratype No. 34396. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 10.

FIG. 10. Longitudinal section showing complete tabulae. Paratype No. 34395. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 6.

Trachypora perreticulata, sp. nov. 180

FIG. 11. Longitudinal section showing horizontal tabulae. Paratype No. 34406. Thunder Bay limestone; locality 35. × 4.

FIG. 12. Transverse section showing distinct epitheca in central region of stem, subpolygonal corallite boundaries, and banded sclerenchyma. Paratype No. 34408. Thunder Bay limestone; locality 35. × 10.

FIG. 13. Exterior view showing reticulate pattern of corallum, and small, irregularly arranged distantly spaced apertures. Holotype No. 34432. Thunder Bay limestone; locality 35. ×2.

Trachypora ornata (Rominger) 179

FIGS. 14–15. Two views of the lectotype, No. 8522. × 1.

EXPLANATION OF PLATE III

PAGE

Trachypora proboscidialis (Rominger) 180

FIG. 1 Exterior view showing dendritic growth form. Hypotype No. 34420. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 1.

FIG. 2. Transverse section showing rounded to subrounded corallites. Hypotype No. 34417. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 10.

FIG. 3. Exterior view showing branch with encrusting growth form at extremity (right margin). Hypotype No. 34421. Potter Farm formation; locality 68. × 1.

FIG. 4. Exterior view showing longitudinal ridges developed on intercellular area and raised aperture margins. Hypotype No. 34411. Potter Farm formation; locality 68. × 4.

FIG. 5. Exterior view showing anastomosing branch (middle right). Hypotype No. 34409. Potter Farm formation; locality 68. × 2.

FIG. 6. Longitudinal section showing slender vertical tubes diverging abruptly to meet the surface at angles of 45 degrees or greater. Hypotype No. 34418. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 6.

Trachypora alternans (Rominger) 174

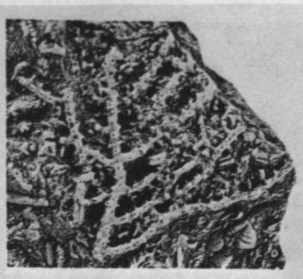
FIG. 7. Transverse section showing dense sclerenchyma and complete and incomplete tabulae. Hypotype No. 34376. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 2.

FIG. 8. Transverse section showing dense sclerenchyma overlain by porous wall tissue. Hypotype No. 34372. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 4.

FIG. 9. Longitudinal section showing a complete stem composed of porous wall tissue. Hypotype No. 34366. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 1.

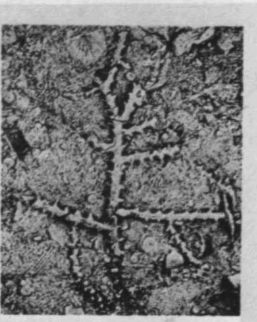
FIG. 10. Longitudinal section showing porous wall tissue underlain by dense sclerenchyma. Hypotype No. 34372. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 4.

PLATE III

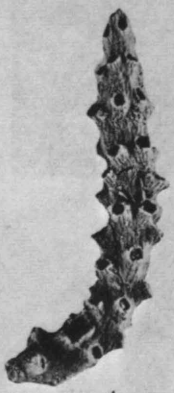


1

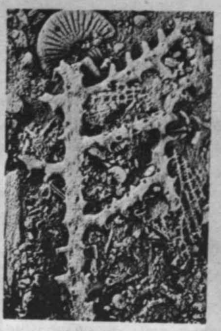
2



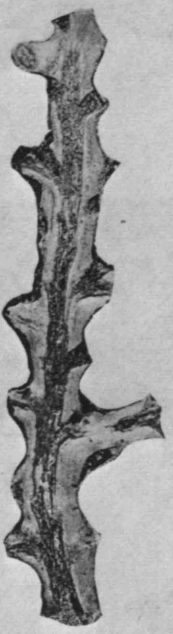
3



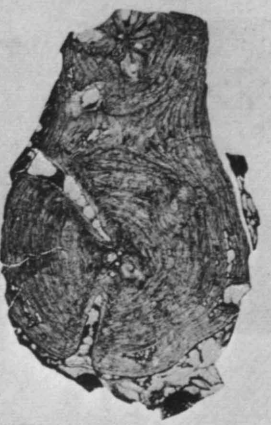
4



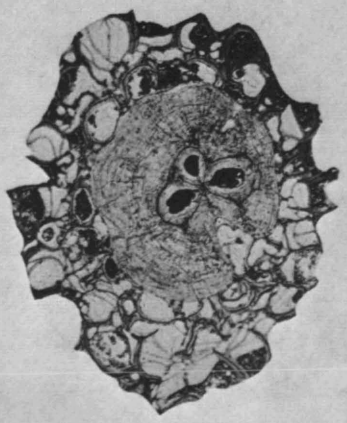
5



6



7

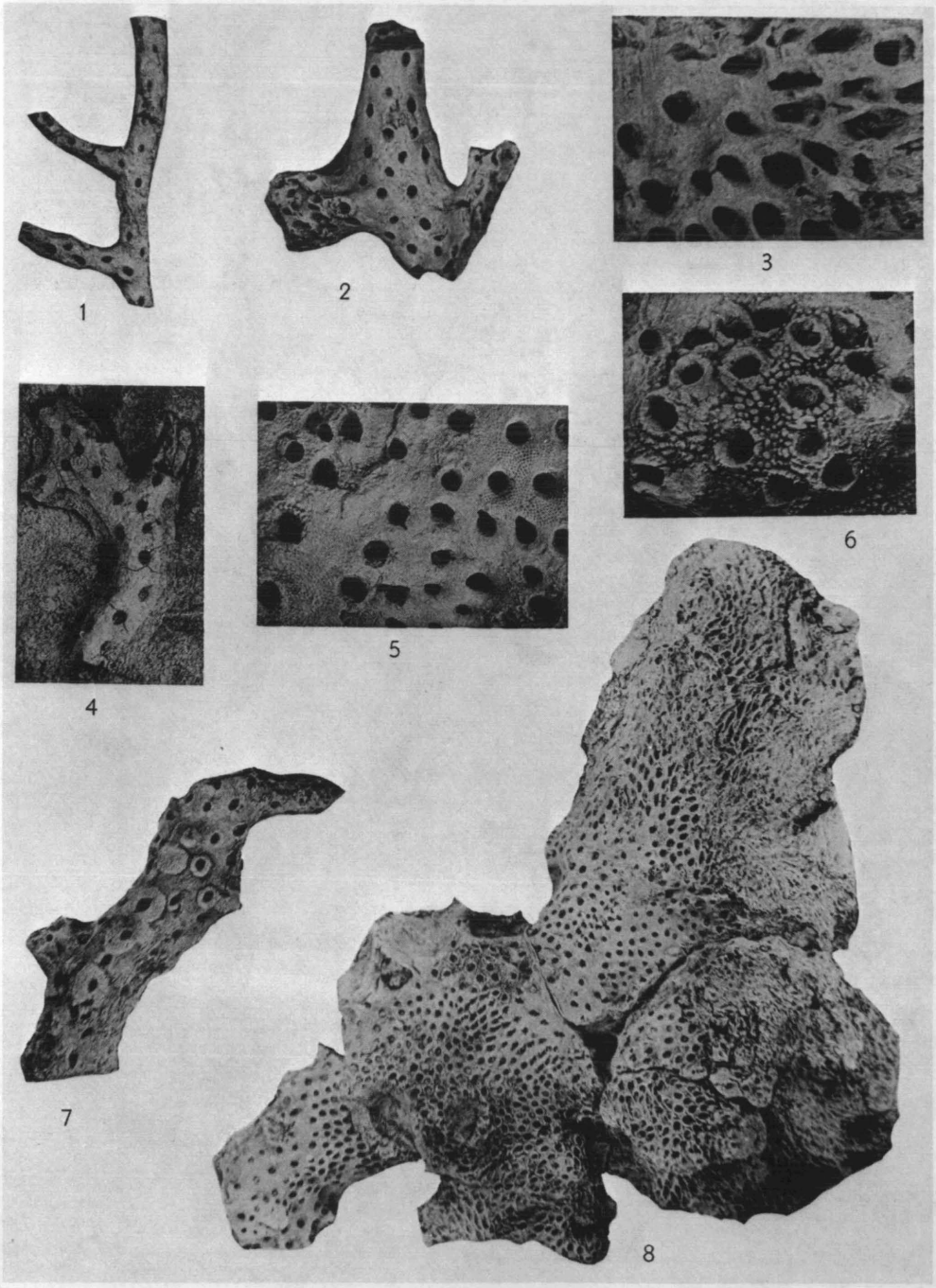


8

9

10

PLATE IV



EXPLANATION OF PLATE IV

PAGE

Trachypora alternans (Rominger) 174

FIG. 1. Exterior view showing branching stem and alternating corallite apertures. Lectotype No. 8518. Thunder Bay limestone; locality 35. × 1.

FIG. 2. Exterior view of specimen with somewhat smaller apertures than shown by lectotype. Hypotype No. 34365. Potter Farm formation; locality 68. × 1.

FIG. 3. Exterior view showing corallites with encrusting growth form. Hypotype No. 34429. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 2.

FIG. 4. Exterior view. Hypotype No. 34370. Alpena limestone; locality 95. × 1.

FIG. 5. Exterior view showing typical developmnet of corallite apertures. Hypotype No. 34429. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 2.

FIG. 6. Exterior view showing elevated area having pronounced pustulose development. Hypotype No. 34429. Four Mile Dam limestone—Dock Street clay lens; locality 53. × 2.

FIG. 7. Exterior view showing a peculiar, thick development of raised aperture rims. Hypotype No. 34371. Four Mile limestone—Dock Street clay lens; locality 53. × 2.

FIG. 8. Exterior view showing variation in growth form occurring on a single corallum. Note small branch growing from basal expanse (top). Hypotype No. 34429. Four Mile Dam limestone—Dock Street clay lens; locality 53. × ½.