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DEVONIAN TRILOBITES FROM NORTHWESTERN
OHIO, NORTHERN MICHIGAN, AND
WESTERN NEW YORK

BY

ERWIN C. STUMM



MUSEUM OF PALEONTOLOGY
THE UNIVERSITY OF MICHIGAN
ANN ARBOR

CONTRIBUTIONS FROM THE MUSEUM OF PALEONTOLOGY

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2. *Planalveolitella*, a new genus of Devonian Tabulate Corals, with a redescription of *Planalveolites foughii* (Edwards and Haime), by Erwin C. Stumm, Pages 67-72, with 1 plate.
3. *Neopalaeaster enigmaticus*, New Starfish from Upper Mississippian Paint Creek Formation in Illinois, by Robert V. Kesling, Pages 73-85, with 2 plates and 3 figures.
4. Tabulate Corals of the Silica Shale (Middle Devonian) of Northwestern Ohio and Southeastern Michigan, by Erwin C. Stumm, pages 86-104, with 5 plates.
5. Growth Stages in the Middle Devonian Rugose Coral Species *Hexagonaria anna* (Whitfield) from the Traverse Group of Michigan, by Erwin C. Stumm, Pages 105-108, with 1 plate.
6. Devonian Trilobites from Northwestern Ohio, Northern Michigan, and Western New York, by Erwin C. Stumm, Pages 109-123, with 3 plates.

DEVONIAN TRILOBITES FROM NORTHWESTERN OHIO,
NORTHERN MICHIGAN, AND WESTERN NEW YORKBY
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ABSTRACT

Terataspis grandis (Hall) and *Calymene platys* Green are reported from the Bois Blanc Formation of Michigan. *Dechenella alpenensis* Stumm and *Echinolichas lucasensis* sp. nov. are described from the Silica Shale of northwestern Ohio. Additional material of *Basidechenella lucasensis* Stumm and *Greenops chilmanae* Stumm is described from the same formation. Additional material of *Dechenella alpenensis* Stumm, *Crassiproetus alpenensis* Stumm, *Mystrocephala rara* (Stumm), and *Greenops aequituberculatus* Stumm is described from the Traverse Group of Michigan. *Mystrocephala gemmaea* (Hall) is redescribed and *Otarion?* sp. is described from the Hamilton Group of New York.

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INTRODUCTION

IN RECENT YEARS new material on Devonian trilobites has accumulated in the Museum of Paleontology, The University of Michigan. Several new specimens have been collected from the Middle Devonian Traverse Group of Michigan since my publication (Stumm, 1953) on the trilobites from this group. This material is described and illustrated in this paper. Since my recent publication on the trilobites of the Middle Devonian Silica Shale of Ohio (Stumm, 1965) a new species of *Echinolichas*, a specimen of *Dechenella* previously unreported from this formation, and additional specimens of *Basidechenella* and *Greenops* have been collected. They are described and illustrated herein.

Two previously unreported species from the Bois Blanc Formation of northern Michigan—*Terataspis grandis* (Hall) and *Calymene platys Green*—are illustrated in this paper.

The material from New York was borrowed for comparative study and to unravel an involved synonymy in the case of *Mystrocephala gemmaea* (Hall).

Abbreviations of the repositories of the specimens illustrated herein are as follows: Museum of Paleontology, The University of Michigan, UMMP; The United States National Museum, USNM; The New York State Museum, NYSM; The American Museum of Natural History, AMNH; and The Buffalo Museum of Science, BMS.

Generic synonymy and citation of type species are omitted herein as this information is readily available in the Treatise on Invertebrate Paleontology, except in the case of the Genus *Mystrocephala* which was created after the material had been assembled for the Treatise.

The numbers of the stratigraphic units mentioned in the localities of the Silica Shale specimens are taken from Ehlers, Stumm, and Kesling, (1951, pp. 18–20).

PREVIOUS WORK

Previous work through 1952 on the Devonian trilobites of the Michigan Basin was summarized by Stumm (1953, p. 103). Since then, Whittington (1960, p. 415) placed *Cordania rara* Stumm in his new genus *Mystrocephala*. Fagerstrom, 1961, described *Crassiproetus crassimarginatus* (Hall), *C. crassimarginatus brevispinosus* Fagerstrom, *Basidechenella formosensis* Fagerstrom, *Mystrocephala stummi* Fagerstrom, and *Echinolichas parallelobatus* Fagerstrom from the Formosa Reef Limestone of southwestern Ontario. This fauna is considered to be of Detroit River age, intermediate between the Bois Blanc Formation and the Traverse Group.

Stumm, (1965, pp. 163–166, Pl. I) proposed the new species *Basidechenella lucasensis* and *Greenops chilmanae* from the Silica Shale of northwestern Ohio.

ACKNOWLEDGMENTS

The author is deeply indebted to Mrs. Ruth Berner Chilman of Detroit, Mich., for the gift of many specimens of trilobites from the Silica Shale. Thanks are also due to Mr. Lee Nieman of Lincoln Park, Mich., for the gift of the large specimen of *Dipleura dekayi* from Partridge Point; to Mrs. Jerome Duluk of Dearborn Heights, Mich., for the pygidium of *Greenops chilmanae*; and to Mr. Thomas Witherspoon of Dearborn, Mich., for the cephalon of *Greenops chilmanae* herein illustrated.

I am also indebted to Drs. L. B. Kellum, C. A. Arnold, and R. V. Kesling for critically reviewing the manuscript.

SYSTEMATIC DESCRIPTIONS

Family Otarionidae

Genus *Otarion* Zenker*Otarion craspedota* (Hall)

(Pl. II, Fig. 10; Pl. III, Figs. 3–4)

Cyphaspis craspedota Hall and Clarke, 1888, pp. 148–150, Pl. 24, Figs. 15–20.

Otarion craspedota Williams in Cooper, G. A., and Williams, J. S., 1935, p. 854.

For description see Hall and Clarke, 1888, pp. 148–150.

Remarks.—Hall's syntypes are refigured here to compare with the cephalon of an undescribed species tentatively assigned to the genus. The original of Hall's Figs. 18–19 (refigured on Pl. I, Figs. 3–4 of this paper) is here chosen as lectotype; the original of Figs. 15–17 (refigured on Pl. II, Fig. 10 of this paper) is chosen as lectoparatype.

Occurrence.—Middle Devonian (Hamilton Group), Canandaigua, Ontario County, New York.

Types.—Lectotype, NYSM 4236; lectoparatype, NYSM 4235.

Otarion? sp.

(Pl. II, Fig. 21)

Observations.—A tiny cephalon from the Hamilton Group of New York may belong to *Otarion* or may be an odontopleurid. The cranidium and one incomplete fixed cheek are preserved. The preserved part of the cephalon measures about 3 mm in maximum diameter and about 2.3 mm in maximum length. The glabella is relatively large, globose and pyriform. The occipital lobes are also relatively large. Deep and wide furrows are

present between the glabella and the occipital lobes; a prominent furrow separates these from the brim.

The brim is distinctly convex and without a visible border.

Three sets of paired spine bases and widely scattered tubercles are present on the glabella. Smaller spine bases and tubercles with random orientation are present on the brim. Widely spaced tubercles occur on the occipital lobes. The occipital ring is not preserved.

Occurrence.—Middle Devonian (Hamilton Group, Ludlowville Formation, Tichenor Limestone Member), cut along California Road, Windom, New York.

Figured Specimen.—BMS E-11035.

Family Brachymetopidae

Genus *Mystrocephala* Whittington

Mystrocephala Whittington, 1960, pp. 413–414.

Type species: (By original designation) *Cordania pulchra* Cooper and Cloud, 1938.

Mystrocephala gemmaea (Hall)

(Pl. II, Figs. 15–20)

Phillipsia? (*Brachymetopus?*) *ornata* Hall, 1876, Pl. 21, Fig. 1, *non Phillipsia ornata* Portlock, 1843.

Phillipsia coronata Miller 1877, p. 221, *non Cyphaspsis coronata* Barrande, 1872.

Phaethonides gemmaeus Hall and Clarke, 1888, p. 136, Pl. 24, Figs. 32–34, ? 36, *non* Fig. 35.

Cyphaspsis ornata Hall and Clarke, 1888, p. 145, Pl. 21, Fig. 1, Pl. 24, Figs. 21–21a.

Cyphaspsis ornata var. *baccata* Hall & Clarke 1888, pp. 146–148, Pl. 23, Figs. 22, 23.

Otarion halli Wheeler, 1935, pp. 104–106.

Description.—Glabella of maximum width just above occipital ring, narrowing slightly anteriorly. Basal glabellar lobes large, subrounded. Basal glabellar furrows relatively narrow and steeply inclined. Preglabellar field broad, concave, with a distinct border, *fixigenae* imperfectly preserved. Occipital ring narrow, relatively smooth. Librigena with a sloping ocular platform and a well-developed genal spine. Eye not preserved. Entire cephalon tuberculate. Tubercles larger in a parallel row at anterior end of preglabellar field, also larger next to anterior and lateral sides of glabella. Tubercles present also on ocular platform and on borders of genal spine. Length of cephalon 4–6 mm. Width 4–5 mm.

Thorax incomplete; only known specimen with 7 segments. Segments of axial lobe convex, almost twice as wide as those of pleural lobes. All segments tuberculate with tubercles in vertical rows. Tubercles of axis and of pleural lobes larger and more distinct.

Pygidium semicircular; axial lobe convex, narrower than pleural lobes, tapering posteriorly, with 10–12 segments. Pleural lobes weakly convex, composed of 7–9 segments which project beyond the border to form short, blunt spines. All segments strongly tuberculate.

Remarks.—Hall (1876), and Hall and Clarke (1888) named this species *Phaethonides gemmaeus* using as syntypes an incomplete thorax (Pl. 24, Fig. 34) and four pygidia (Pl. 24, Figs. 32, 33, 35, 36). Two of the pygidia (Figs. 35–36) are from the Onondaga Limestone. The other two pygidia and the thorax are from the Hamilton Group. Of the Onondaga Limestone specimens Fig. 35 is certainly not conspecific with the Hamilton forms and Fig. 36 is indeterminate. I choose as lectotype the pygidium illustrated by Hall and Clarke, 1888, Pl. 24, Fig. 32, which I have refigured herein (Pl. II, Fig. 20).

The cephalata which I have referred to this species were placed by Hall (1876) and Clarke (1888) in the genus *Cyphaspis* and were named *C. ornata*. This name had already been used by Portlock (1843), and Hall's form was renamed *Cyphaspis coronata* by Miller (1877). This name was also a homonym as explained by Wheeler (1935, pp. 104–106), and he renamed Hall's form *Otarion halli*. It had been established by this time that *Cyphaspis* was a junior synonym of *Otarion*. However, *Otarion halli*, based on the 2 cephalata described as *Cyphaspis ornata* by Hall and by Hall and Clark do not belong in *Otarion* but, in my opinion, are the cephalata of *Mystrocephala gemmaea*. Typical *Otarion* as illustrated by *O. craspedota* Hall (see Pl. II, Fig. 10; Pl. III, Figs. 3–4) has a very short, convex preglabellar field with a prominent border.

Occurrence.—Middle Devonian (Hamilton Group), western New York.

Types.—Lectotype (the original of Hall and Clarke, Pl. 24, Fig. 32), NYSM 4217; paratypes (the originals of Hall and Clarke, Pl. 24, Figs. 33 and 34), NYSM 4218; hypotypes (cephalata of *Cyphaspis ornata* Hall and Clarke, Pl. 21, Fig. 1; Pl. 24, Fig. 21), AMNH 5509/1; NYSM 4250. Hypotypes (cephalata of *Cyphaspis ornata baccata* Hall and Clarke, Pl. 24, Figs. 22–23), NYSM 4251 and 4252.

Mystrocephala rara (Stumm)

(Pl. II, Figs. 13–14)

Cordania rara Stumm, 1953, pp. 124–125, Pl. 6, Fig. 3.

Mystrocephala rara Whittington, 1960, p. 415, Pl. 52, Figs. 10, 12, 15.

For description of cranium see Stumm (1953) and Whittington (1960).

Description of pygidium.—Axial lobe highly convex, relatively narrow, tapering posteriorly, composed of 9 to 11 segments. Pleural lobes wide, moderately convex axially, flattening slightly peripherally, composed of

about 8 segments, each separated by a narrow ridge extending to the periphery and each bisected by a narrow ridge extending from the axial lobe half-way to the periphery. Maximum width of pygidium 1 cm; maximum length 7 mm. Maximum width of axial lobe 4 mm. All segments covered with weakly developed tubercles.

Remarks.—Both pygidia are internal molds. Some anatomical features, especially the tuberculation, would probably be better defined if the test were present. The pygidia are strikingly similar to those of *M. pulchra* illustrated by Cooper and Cloud (1938) and Whittington (1960) but differ in having weaker tuberculation and less prominent pleural ridges.

Occurrence.—Middle Devonian (Traverse Group, Four Mile Dam Formation), bioherm at Four Mile Dam on the Thunder Bay River, 3 miles west of Alpena, Mich.

Types.—Holotype, USNM 117869; hypotypes herein illustrated, UMMP 47296 a-b.

Family Phacopidae
Genus *Greenops* Delo
Greenops chilmanae Stumm
(Pl. II, Figs. 4-5)

Greenops chilmanae Stumm, 1965, p. 165, Pl. I, Fig. 9.

The species was originally described from an incomplete cephalon. Since then an additional incomplete cephalon and a complete pygidium have been collected.

Amended description.—Pygidium with narrow, convex axial lobe, tapering posteriorly, extending about $\frac{3}{4}$ the distance to the posterior margin, composed of 10 segments with anterior articulating ridge and furrow on anterior segment. Anterior diameter of axial lobe 4 mm, posterior diameter about 2.8 mm. Posterior end of axial lobe terminating in a broad flat lappet. Pleural lobes between 6 and 7 mm in maximum width; anterior segments with anterior articulating ridge and furrow; all other segments with a median groove and terminating in a relatively narrow, spinose lappet. Entire pygidium tuberculate with tubercles larger and more prominent on the lappets.

Remarks.—The cephalon herein illustrated differs from that of the holotype in having a better developed anterior margin and a more irregularly tuberculate pattern on the posterior part of the glabella. The elevated tuberculate node at the axis of the occipital ring is well shown on both specimens. The lappets on the pygidium are more rapidly tapering and more spinose than in the most nearly related species of *Greenops*.

Occurrence.—Middle Devonian (Silica Shale), quarry of the Medusa Portland Cement Company at Silica, 1½ miles southwest of Sylvania, Lucas County, Ohio.

Types.—Holotype, UMMP 49758; hypotypes herein illustrated UMMP 54765, 54766.

Greenops aequituberculatus Stumm

(Pl. II, Figs. 6–7)

Greenops aequituberculatus Stumm, 1953, pp. 131–132, Pl. VII, Figs. 4–6; Pl. VIII, Figs. 5–9.

Remarks.—Two additional well-preserved pygidia have been collected from the Traverse Group. One of them (Pl. II, Fig. 6) is exposed on the ventral side and shows the narrow, relatively smooth doublure. The lappets are flat, relatively wide, and tuberculate as on the dorsal side. The other (Pl. II, Fig. 7) is exposed dorsally and shows the bluntly terminated lappets. This specimen may be slightly water worn.

Occurrence.—Hypotype (Pl. II, Fig. 5), Middle Devonian (Traverse Group, Four Mile Dam Formation, Dock Street Clay Member), abandoned quarry of the Thunder Bay Quarries Company, Alpena, Mich.; hypotype (Pl. II, Fig. 6), Middle Devonian (Traverse Group, Gravel Point Formation), abandoned Bell quarry, on shore of Lake Michigan, about 2 miles east of Bay Shore, Emmet County, Mich.

Types.—Hypotype (Pl. II, Fig. 5) UMMP 51984; hypotype (Pl. II, Fig. 6) UMMP 51985.

Family Proetidae

Genus *Proetus* Steininger

Subgenus *Crassiproetus* Stumm

Crassiproetus Stumm, 1953, pp. 110–111.

Proetus (Crassiproetus) alpenensis Stumm

Proetus (Crassiproetus) alpenensis Stumm, 1953, pp. 113–114, Pl. I, Figs. 4–5, 20.

For original description see Stumm 1953, pp. 113–114.

Remarks.—This is the first complete specimen of this species to be found. The pleural lobes of the thorax, missing in the holotype, are shown to be smooth, axially convex midway between axial and peripheral ends, and almost vertically inclined peripherally.

Occurrence.—Middle Devonian, Traverse Group, Thunder Bay Limestone; northeast shore of Partridge Point, 4 miles south of Alpena, Alpena County, Mich.

Genus *Dechenella* Kayser*Dechenella (Dechenella) alpenensis* Stumm

(Pl. II, Figs. 1-2)

Dechenella (Dechenella) alpenensis Stumm, 1953, pp. 116-117, Pl. II, Figs. 1-15.

For description see Stumm (1953).

Remarks.—A well-preserved cranidium (Pl. II, Fig. 1) was picked up in the Silica Shale of Lucas County, Ohio. This is the first reported occurrence of this species in this formation. A relatively complete specimen with broken anterior brim (Pl. II, Fig. 2) has been found in the Ferron Point Formation of the Traverse Group.

Occurrence.—UMMP 54155, Middle Devonian (Silica Shale), quarry of the Medusa Portland Cement Co. at Silica, 1½ miles southwest of Sylvania, Lucas County, Ohio. USNM 123569, Middle Devonian (Traverse Group, Ferron Point Formation), Ocqueoc Falls, Presque Isle County, Mich.

Types.—Hypotype from Silica Shale, UMMP 54155; hypotype from Ferron Point Formation, Ocqueoc River, USNM 123569; plastotype, UMMP 51982.

Subgenus *Basidechenella* Richter*Dechenella (Basidechenella) lucasensis* Stumm

(Pl. I, Fig. 3)

Dechenella (Basidechenella) lucasensis Stumm, 1965, pp. 164-165, Pl. I, Figs. 1-6.

For description see Stumm (1965).

Remarks.—A well-preserved pygidium of this species was found in the Silica Shale. The nodes on the segments of the axial lobe and the characters of the right pleural lobe show plainly.

Occurrence.—Middle Devonian (Silica Shale/Unit 9), quarry of the Medusa Portland Cement Co., at Silica, 1½ miles southwest of Sylvania, Lucas County, Ohio.

Type.—Hypotype, UMMP 54158.

Family Lichidae Hawle and Corda

Genus *Terataspis* Hall*Terataspis grandis* (Hall)

(Pl. III, Figs. 1-2)

Lichas grandis Hall, 1861, p. 82.*Lichas superbus* Billings, 1875, p. 239.*Acidaspis (Terataspis) grandis* Hall, 1876, Pls. XVII, XVIII.*Terataspis grandis* Hall and Clarke, 1888, pp. 73-77, Pl. XVII, Figs. 1-6; Pl. XVIII, Figs. 1-2; Pl. XIX, Figs. 1-7.

Terataspis Reimann, 1941, pp. 39-46, Figs. 1-2, and frontispiece; 1945, pp. 70-71, Figs. 1-2.

Remarks.—This trilobite, although rare, has been studied in detail and restorations have been used in many dioramas because of its great size and spectacular ornamentation.

The species had been previously known from the Schoharie of central New York, and the basal Onondaga of western New York and neighboring Ontario. The specimen herein illustrated (Pl. III, Figs. 1-2) is the first known occurrence in the Michigan Basin.

Terataspis grandis occurs in association with *Calymene platys* (Green) and *Anchiopella anchiops* (Green) in the Bois Blanc Formation of Michigan. Specimens of *Echinolichas eriopsis* (Hall) and *Odontopleura callicera* (Hall) have been found in the drift of southern Michigan. They are probably from the Bois Blanc Formation, but have not yet been found in the outcrop area.

Occurrence.—Middle Devonian (Bois Blanc Formation), northern Michigan.

Type.—Hypotype, UMMP 51987.

Genus *Echinolichas* Gürich

***Echinolichas lucasensis* sp. nov.**

(Pl. II, Figs. 11-12)

Description.—Cephalon hemispherical in outline, holotype measuring 7 mm in length and 11 mm in maximum width. Glabella convex, without lobes, tapering anteriorly from a maximum of 4 mm to a minimum of about 2 mm. Anterior end of glabella rounded. Brim obscured. Fixigenae with highly arched fields, each with an almost horizontal furrow about midway between posterior and anterior margins. Occipital furrow shallow, relatively wide. Occipital ring sharply defined. Librigenae, thorax, and pygidium unknown. Entire cephalon covered with blunt, tubercular spines.

Remarks.—To the author's knowledge, this is the first known occurrence of a lichadean trilobite in strata younger than those of Onondaga age.

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

Types.—Holotype, UMMP 54159; paratype, UMMP 54160.

Family Calymenidae Burmeister

Genus *Calymene* Brongniart

Calymene platys Green

(Pl. III, Fig. 5)

Remarks.—This species is characteristic of the Schoharie Grit and the basal part of the Onondaga Limestone of New York and adjacent Ontario. A well-preserved specimen has been found in the Bois Blanc Formation of northern Michigan. The size and structural features are identical with specimens from the New York area. The species occurs in association with *Terataspis grandis* (Hall) and *Anchiopella anchiops* (Green). The latter species was described from the Bois Blanc Formation by G. M. Ehlers in Landes, Ehlers, and Stanley, (1945, p. 87, Pl. 11, Figs. 8–9).

Occurrence.—Middle Devonian (Bois Blanc Formation), northern Michigan.

Type.—Hypotype, UMMP 55060.

Family Homatonotidae Chapman

Genus *Dipleura* Green

Dipleura dekayi Green

(Pl. I, Fig. 1; Pl. III, Fig. 6)

Remarks.—Two additional specimens have been collected from the Traverse Group since the discussion of the species (Stumm, 1953). A small specimen showing the pygidium and the posterior 6 thorax segments was found in the Norway Point Formation. The punctate test is well-preserved in this specimen (Pl. III, Fig. 6).

The other specimen (Pl. I), from the Thunder Bay limestone, is one of the largest trilobites ever found in the Michigan Basin. It measures 17.6 cm in maximum length and 7.5 cm in maximum width.

Occurrence.—Middle Devonian (Traverse Group, Norway Point Formation and Thunder Bay Limestone), northern Michigan.

Types.—Hypotypes, UMMP 51986 and 54161.

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Manuscript received June 14, 1966

EXPLANATION OF PLATE I

	PAGE
<i>Dipleura dekayi</i> Green	118

FIG. 1. Dorsal view of unusually large specimen. Hyptotype UMMP 54161.
Middle Devonian (Traverse Group, Thunder Bay Limestone), bluffs on north
shore of Partridge Point, 4 miles south of Alpena, Mich. $\times 1$.

PLATE I

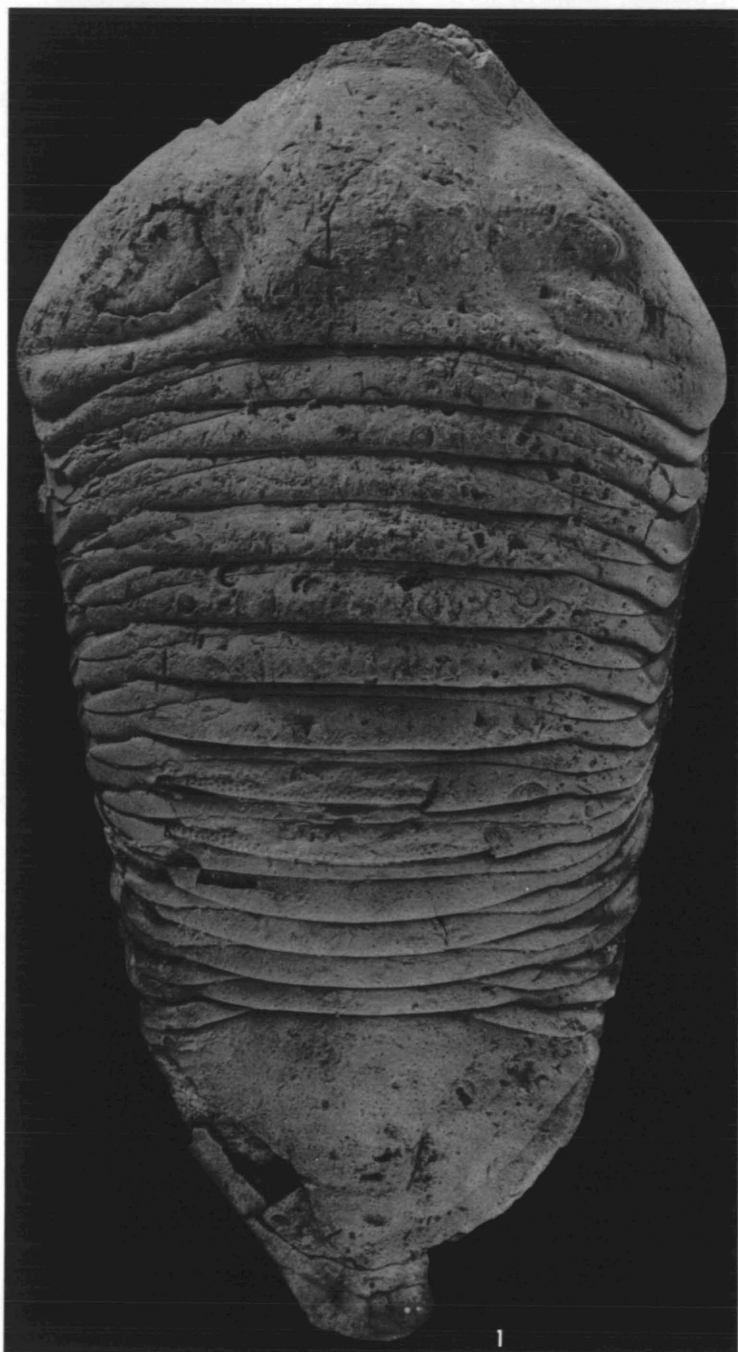
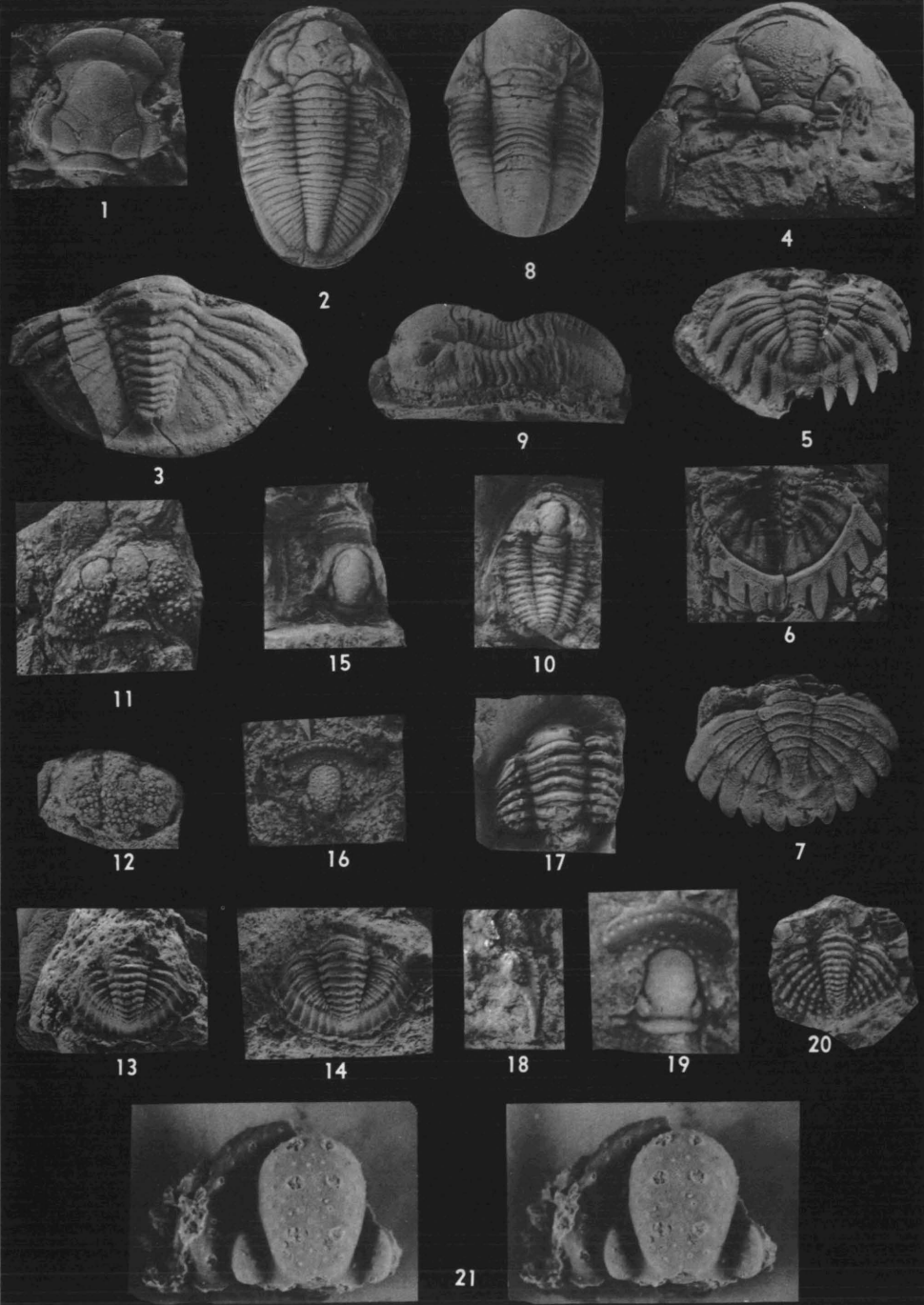


PLATE II



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EXPLANATION OF PLATE II

- PAGE
- Dechenella (Dechenella) alpenensis* Stumm 116
 FIG. 1. Cranidium with well-preserved brim and distinct facial sutures. Hypotype UMMP 54155. Middle Devonian (Silica Shale), quarry of the Medusa Portland Cement Company at Silica, 1½ miles southeast of Sylvania, Lucas County, Ohio. × 2.
 FIG. 2. Relatively complete specimen with imperfect anterior brim. Hypotype USNM 123569. (Plastotype UMMP 51982) Middle Devonian (Traverse Group, Ferron Point Formation) bank on Ocqueoc River, ¼ mile below waterfalls formed by Genshaw Limestone and about ½ mile above Ocqueoc Falls, Presque Isle County, Mich. × 1.
- Dechenella (Basidechenella) lucasensis* Stumm 116
 FIG. 3. Pygidium showing tuberculation and axial nodes. Hypotype UMMP 54158. Unit 9, same occurrence as original of Fig. 1. × 2.
- Greenops chilmanae* Stumm 114
 FIG. 4. Cephalon with left librigena. Hypotype UMMP 54766. Probably from Unit 9. Same occurrence as original of Fig. 1. × 2.
 FIG. 5. Pygidium showing spinose lappets. Hypotype UMMP 54765. Unit 13 or 14. Same occurrence as original of Fig. 1. × 2.
- Greenops aequituberculatus* Stumm 115
 FIG. 6. Ventral view of pygidium showing doublure. Hypotype UMMP 51984. Middle Devonian (Traverse Group, Four Mile Dam Formation, Dock Street Clay Member), abandoned quarry of the Thunder Bay Quarries Co., Alpena, Mich. × 2.
 FIG. 7. Dorsal view of another pygidium. Hypotype UMMP 51985. Middle Devonian (Traverse Group, Gravel Point Formation, upper part), quarry of the Penn-Dixie Cement Company, Petoskey, Mich. × 2.
- Proetus (Crassiproetus) alpenensis* Stumm 115
 FIGS. 8-9. Dorsal and lateral views of a complete specimen. Hypotype USNM 123568 (Plaster cast UMMP 51983). Middle Devonian (Traverse Group, Thunder Bay Limestone), north shore of Partridge Point on Lake Huron, 4 miles south of Alpena, Mich. × 2.
- Otarion craspedota* (Hall) 111
 FIG. 10. Unrolled specimen with well-preserved genal spine. Lectoparatype NYSM 435. Middle Devonian (Hamilton Group), Canandaigua, Ontario County, N.Y. × 2.
- Echinolichas lucasensis*, sp. nov. 117
 FIG. 11. Cranidium with well-preserved glabella, fixigenae and occipital ring. Holotype UMMP 54159. Unit 10. Same occurrence as original of Fig. 1. × 2.
 FIG. 12. Small incomplete cranidium. Paratype UMMP 54160. Same occurrence as original of Fig. 1. × 4.
- Mystrocephala rara* (Stumm) 113
 FIG. 13. Pygidium showing ornamentation. Hypotype UMMP 47296b. Middle Devonian (upper part of Four Mile Dam Formation), Four Mile Dam on Thunder Bay River, 3 miles northwest of Alpena, Mich. × 2.
 FIG. 14. Exfoliated pygidium. Hypotype 47296a. Same occurrence as original of Fig. 13. × 2.
- Mystrocephala gemmaea* (Hall) 112
 FIG. 15. Cranidium (Hall's Pl. XXIV, Fig. 22). Hypotype NYSM 4251. Middle Devonian (Hamilton Group), Canandaigua, Ontario County, N. Y. × 2.
 FIG. 16. Glabella and anterior brim. (Original of Hall's Pl. 21, Fig. 1). Hypotype AMNH 5509/1. Middle Devonian (Hamilton Group, Tichenor Limestone), Eighteen Mile Creek, Erie County, N. Y. × 2.
 FIG. 17. Series of 7 thoracic segments. Lectoparatype NYSM 4218. Same occurrence as original of Fig. 15. × 2.
 FIG. 18. Right librigena with genal spine. (Original of Hall's Pl. XXIV, Fig. 23). Hypotype NYSM 4252. Same occurrence as original of Fig. 15. × 2.
 FIG. 19. Relatively complete cranidium with well-preserved brim. (Original of Hall's Pl. XXIV, Fig. 21). Hypotype NYSM 4250. Same occurrence as original of Fig. 15. × 4.
 FIG. 20. Complete pygidium (original of Hall's Pl. XXIV, Fig. 32). Lectotype NYSM 4217. Same occurrence as original of Fig. 15. × 2.
- Otarion* ? sp. 111
 FIG. 21. Stereophotograph of tiny cephalon. Figured Specimen BMS E-11035 Middle Devonian (Hamilton Group), Eighteen Mile Creek, Erie Co., N. Y. × 10.

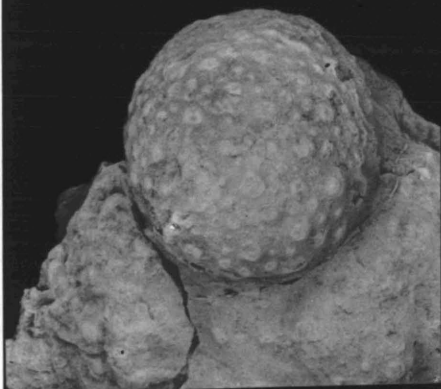
EXPLANATION OF PLATE III

	PAGE
<i>Terataspis grandis</i> (Hall)	116
FIG. 1. View of specimen with well preserved glabella and parts of fixigenae. Hypotype UMMP 51987. Middle Devonian (Bois Blanc Formation), from large block along southeast shore of Brevoort Lake, NE $\frac{1}{4}$, sec. 2, T.41N., R.5W., Mackinaw County, Mich. \times 1.	
FIG. 2. Stereophotograph of glabella of same specimen. \times 1.	
<i>Otarion craspedota</i> (Hall)	111
FIGS. 3-4. Anterior end posterior views of enrolled specimen. Lectotype NYSM 4236. Middle Devonian (Hamilton Group), Canandaigua, Ontario County, N.Y. \times 4.	
<i>Calymene platys</i> Green	117
FIG. 5. Dorsal view of a relatively complete specimen. Hypotype UMMP 55060. Middle Devonian (Bois Blanc Formation, middle part), west side of McGulpin Point, on Mackinac Strait, 2 $\frac{1}{2}$ miles west of center of Mackinaw City, Mich. \times 1.	
<i>Depleura dekayi</i> (Green)	118
FIG. 6. View of pygidium and posterior part of thorax. Hypotype UMMP 51986. Middle Devonian (Traverse Group, Norway Point Formation), Seven Mile (Norway Point) Dam on Thunder Bay River, 5 miles northwest of Alpena, Mich. \times 2.	

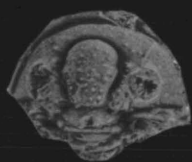
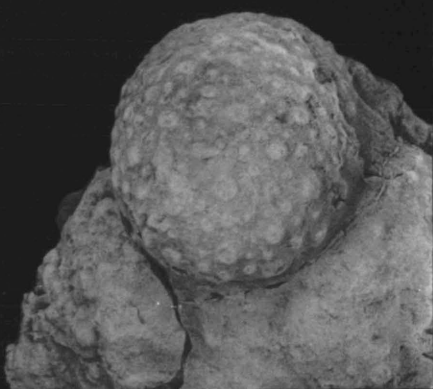
PLATE III



1



2



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