

CONTRIBUTIONS FROM THE MUSEUM OF PALEONTOLOGY
THE UNIVERSITY OF MICHIGAN

Vol. XIX, No. 1, pp. 1-14 (3 pls.)

FEBRUARY 14, 1964

SILICIFIED TRILOBITES FROM THE DEVONIAN
JEFFERSONVILLE LIMESTONE AT THE
FALLS OF THE OHIO

BY
ERWIN C. STUMM



MUSEUM OF PALEONTOLOGY
THE UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

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 collection 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, The University of Michigan, Ann Arbor, Michigan.

VOLS. II-XVIII. Parts of volumes may be obtained if available.

VOLUME XIX

1. Silicified Trilobites from the Devonian Jeffersonville Limestone at the Falls of the Ohio, by Erwin C. Stumm. Pages 1-14, with 3 plates.

SILICIFIED TRILOBITES FROM THE DEVONIAN JEFFERSONVILLE LIMESTONE AT THE FALLS OF THE OHIO

BY
ERWIN C. STUMM

ABSTRACT

Thirteen species of trilobites belonging to twelve genera and subgenera are illustrated from the red clay zone of the Middle Devonian Jeffersonville Limestone of the Falls of the Ohio. The specimens are silicified and show internal and external features not previously known. Amended descriptions are furnished for most of the species with regard to previously unknown structures. All species have been previously described.

CONTENTS

Introduction	2
Stratigraphy	2
Acknowledgments	3
Systematic descriptions	3
Genus <i>Proetus</i> Steininger	3
Subgenus <i>Crassiproetus</i> Stumm	3
<i>Proetus</i> (<i>Crassiproetus</i>) <i>crassimarginatus</i> (Hall)	3
Genus <i>Dechenella</i> Kayser	4
Subgenus <i>Basidechenella</i> Richter	4
<i>Dechenella</i> (<i>Basidechenella</i>) <i>canaliculata</i> (Hall)	4
<i>Dechenella</i> (<i>Basidechenella</i>) <i>clara</i> (Hall)	4
<i>Dechenella</i> (? <i>Basidechenella</i>) sp. A.	5
Genus <i>Cyrtodechenella</i> Richter and Richter	5
<i>Cyrtodechenella</i> <i>welleri</i> (Stauffer)	5
Genus <i>Mystrocephala</i> Whittington	6
<i>Mystrocephala</i> <i>varicella</i> (Hall)	6
Genus <i>Phacops</i> Emmerich	6
<i>Phacops</i> <i>pipa</i> Hall and Clarke	6
Genus <i>Coronura</i> Hall and Clarke	7
<i>Coronura</i> <i>aspectans</i> (Conrad)	7
Genus <i>Odontocephalus</i> Conrad	8
<i>Odontocephalus</i> <i>bifidus</i> (Hall)	8
Genus <i>Trypaulites</i> Delo	8
<i>Trypaulites</i> <i>calypso</i> (Hall)	8
Genus <i>Acanthopyge</i> Hawle and Corda	8
<i>Acanthopyge</i> <i>contusus</i> (Hall)	8
Genus <i>Ceratolichas</i> Hall and Clarke	9
<i>Ceratolichas</i> <i>gryps</i> Hall and Clarke	9
Genus <i>Echinolichas</i> Gürich	9
? <i>Echinolichas</i> <i>eriopis</i> (Hall)	9
Literature cited	11
Plates	(after) 11

INTRODUCTION

IN DECEMBER, 1958, The University of Michigan, through the Baird Endowment Fund, purchased the Guy Campbell collection of fossil invertebrates from the outcrops along the Ohio River in the region of the "Falls of the Ohio," in the vicinity of Jeffersonville, Indiana, and Louisville, Kentucky.

This collection contains a well-preserved set of silicified cranidia, librigenae, thorax segments, and pygidia of trilobites. All were collected from the same locality and the same stratigraphic position. The specimens (Pls. I-III) are illustrated by stereophotographs to emphasize the distinct ornamentation and the details of the internal structures.

STRATIGRAPHY

The lowest of the Devonian formations exposed in this region, the Jeffersonville limestone of lower Middle Devonian age, rests disconformably on the Louisville limestone of Middle Silurian age. The formation averages 30 feet thick in this vicinity and is composed of three major zones, each averaging about 10 feet thick.

The lowest zone, referred to as the coral zone, is widely known because of the remarkable coral biostrome which makes up most of the unit. This zone is capped by the "blue clay" of Davis (1887) which apparently represents an erosional interval between the coral zone and the overlying unit.

Above the coral zone is another zone averaging 10 feet thick and characterized by large numbers of the brachiopod *Brevispirifer gregarius* (Clapp) associated with fewer scattered corals and larger numbers of bryozoans, brachiopods, and molluscs. At the top of these beds is the "red clay" of Davis (1887), a pockety layer ranging from 1 to 6 inches thick and intermittently developed along the bedding plane between the *Brevispirifer gregarius* beds and the overlying beds. This red clay apparently represents either an erosional interval at the top of the *B. gregarius* beds or a plane of solution and concentration of insoluble residues after lithification of the entire formation. In the clay is a remarkably well-preserved fauna of silicified bryozoans, ostracods, and trilobites which can be washed out relatively free of matrix. This red clay is the interval from which all the silicified trilobites illustrated herein were collected. Above the red clay the upper 10 feet of the Jeffersonville limestone is characterized by the index brachiopod *Paraspirifer acuminatus* (Conrad) in association with a typical coral, bryozoan, and brachiopod fauna.

None of the trilobites illustrated herein are new species; their value

lies in the fact that they show internal features some of which have not been previously known, and they form an assemblage from a definitely placed, vertically limited stratigraphic interval. Knowing the position of these specimens will make it easier to determine the stratigraphic position of many of James Hall's types, some of which were described from float boulders from the Onondaga limestone of New York and indefinitely located outcrop areas there and elsewhere.

The trilobite fauna of the "red clay" is apparently distinct from that found in the lower part of the coral zone. In the latter beds occur forms such as *Anchiopsis anchiops* (Green), *A. tuberculatus* Stumm, and *Calymene platys* Green, which are characteristic fossils of the Bois Blanc formation of Michigan and southwestern Ontario. The trilobite assemblage of the "red clay" herein illustrated is more closely related to that of the Columbus limestone of Ohio.

ACKNOWLEDGMENTS

I am indebted to Dr. C. A. Arnold and Dr. L. B. Kellum for critically reviewing the manuscript. My thanks are also due to Mr. Karoly Kutasi for making the stereophotographs of the specimens.

SYSTEMATIC DESCRIPTIONS

Order PTYCHOPARIIDA

Family Proetidae

Genus *Proetus* SteiningerSubgenus *Crassiproetus* Stumm

Calymene crassimarginata Hall, 1843, p. 172, Fig. 5.

Proetus crassimarginatus Hall, 1859, p. 88; 1861, p. 72; 1862, p. 100; 1876, Pl. 20, Figs. 21-23, 26-31; *non* Figs. 20, 23-24; Hall and Clarke, 1888; pp. 99-101 *partim*, Pl. 20, Figs. 21-22, 26-31; Pl. 22, Figs. 20-23, 26, ?24-25; *non* Pl. 20, Figs. 6-8, 20, 23-24.

Phillipsia crassimarginata Billings, 1861, p. 362.

Proetus (Crassiproetus) crassimarginatus Stumm, 1953, pp. 15-17.

Proetus (Crassiproetus) crassimarginatus glabrus Stumm, 1953, p. 17.

Proetus (Crassiproetus) crassimarginatus (Hall)

(Pl. I, Figs. 7-12)

Five specimens are known from the silicified fauna. These consist of one incomplete glabella, one left librigena, and three pygidia. On the dorsal side the glabella is evenly convex with no lobes or furrows except for very faintly convex occipital lobes. The frontal border slopes anteriorly and is separated from the glabella by a deep furrow. Terrace lines are well developed on the border. The right fixigena with palpebral lobe are

present. The occipital ring is flat and separated from the posterior part of the glabella by a moderately developed furrow.

On the ventral side, the frontal border terminates without a distinct doublure, is broad and flat axially, becoming thinner peripherally. Terrace lines are well known on the structure. A well-developed node is shown on the under side of the occipital ring at the juncture of the glabella and the fixigena. The left librigena shows the rounded genal angle, border, ocular platform, and a part of the eye. On the under side a broadly convex doublure is present. The pygidia show the characteristic convexity with the large number of axial and pleural segments. The pygidial border is weakly to moderately defined. On the under side the doublure is continuous and relatively highly convex.

Hypotypes.—Nos. 4897, 47190, 47191, and 47192.

Genus *Dechenella* Kayser

Subgenus *Basidechenella* Richter

Dechenella (*Basidechenella*) *canaliculata* (Hall)

(Pl. II, Figs. 4, 17–18)

Proetus canaliculatus Hall, 1861, p. 73; 1862, p. 101; 1876, Pl. 20, Figs. 10–11; Hall and Clarke, 1888, pp. 107–8, Pl. 20, Figs. 10–11.

Dechenella (*Basidechenella*) *canaliculata* Stumm, 1953, p. 24, Pl. 23, Figs. 10–11.

One cranidium and one pygidium from the silicified fauna are assigned to this species. The dorsal side of the cranidium shows the glabella with posterior pair of glabellar furrows weakly developed. The frontal border is incomplete, but shows the medial ridge between the anterior and posterior parts. The palpebral lobes, occipital ring and right occipital lobe are shown. All cranidial structures covered with fine tubercles. The ventral side of the cranidium is not well preserved but shows anterior and posterior doublures which are relatively flat and which possess terrace lines. The pygidium is perfectly preserved. On the dorsal surface are about 10 axial ribs, each with a low axial node. There are seven pleural ribs. The border is separated from the ribs by a distinct furrow. All ribs and border are distinctly tuberculate. On the ventral side of the pygidium the doublure is moderately wide and flat. No terrace lines are visible.

Hypotypes.—Nos. 47198 and 47232.

Dechenella (*Basidechenella*) *clara* (Hall)

(Pl. II, Figs. 7–9, 11–16)

Proetus clarus Hall, 1861, p. 71; 1862, p. 99; 1876, Pl. XX; Hall and Clarke, 1888, pp. 104–106.

Dechenella (*Basidechenella*) *clara* Stumm, 1953, p. 23.

This species is represented by one complete glabella, 10 librigenae, and 14 pygidia. The glabella is well preserved and includes the border, fixigenae, occipital lobes, and occipital ring. The glabella proper is evenly convex and smooth without a trace of glabellar furrows. The border is flat and smooth. The fixigenae are composed mainly of the palpebral lobes. The occipital lobes are relatively large and horizontally elongate. The occipital ring is smooth and flat. On the under side the posterior doublure is wide axially thinning toward the lateral margins. It is well provided with terrace lines. The apparent axial notch is a missing fragment. The anterior doublure is thin and flat. The librigenae, on the upper side, show the well developed ocular platform and genal spine. On the under side the well developed doublure shows terrace lines. The pygidia are well preserved and show the characteristic lobation, and the axial and pleural ribs. On the under side is a narrow, slightly convex doublure with terrace lines.

Hypotypes.—Nos. 47200, 47201, 47202, 47203, and 47204.

Dechenella (? *Basidechenella*) sp. A

(Pl. III, Fig. 10)

One glabella from the silicified fauna shows some unusual characteristics. Two distinct pairs of glabella furrows are represented by perforations in the test. The posterior pair are slightly sigmoid, becoming thinner posteriorly. The anterior pair are narrow, elongate, and roughly parallel to the posterior pair. The anterior border is missing on the specimen. The palpebral lobes, occipital lobes and occipital ring are similar to those of typical *D. (B.) clara*.

Figured specimen.—No. 47212.

Genus *Cyrtodechenella* Richter and Richter

Cyrtodechenella welleri (Stauffer)

(Pl. I, Figs. 13–14; Pl. II, Fig. 10)

Proetus welleri Stauffer, 1909, pp. 195–196.

Dechenella (Dechenella) welleri Stumm, 1953, p. 21.

This species is represented by an incomplete glabella and 2 pygidia. The glabella shows the broad concave preglabellar field and the narrow, convex brim about 7 mm wide. The anterior part of glabella is gently rounded. The posterior part with the glabellar lobes is missing. The right posterior part of the cephalon is present and shows a well-developed palpebral lobe and the right part of the occipital ring. The larger of the two pygidia (Pl. II, Fig. 10) shows the axial lobe with about 13 smooth rings of which the posterior ones are indistinct. The pleural lobes show

about 7 low, relatively indistinct ribs. The border is distinct and smooth but not separated from the pleural ribs by a furrow. The smaller of the two pygidia (Pl. I, Figs. 14–15) can be viewed from both sides. The upper side is very similar to that of the larger pygidium. The under side shows the flat, distinct doublure provided with faint terrace lines. The species may be conspecific with *C. planimarginata* (Meek).

Hypotypes.—Nos. 47193, 47194, and 47205.

Family Brachymetopidae
Genus *Mystrocephala* Whittington
Mystrocephala varicella (Hall)
(Pl. I, Fig. 16)

Phaethonides varicella Hall and Clarke, 1888, pp. 135–136.

Cordania varicella Clarke, 1892, p. 443.

Mystrocephala varicella Whittington, 1960, p. 415.

One perfectly preserved pygidium of this rare species is illustrated. It measures 5 mm long and 9 mm wide. The maximum convexity is about 2.5 mm. The axial lobe has 10 rings, each of which is provided with a relatively long axial node and 2 or 3 shorter, subordinate lateral nodes on each side. A small cluster of nodes is present just posterior to the last axial ring. The pleural have 8 ribs and an anterior, smooth articulating ring. The ribs are provided with 5 to 7 nodes, some of which are elongate, others short and rounded. The ribs are separated by furrows about 0.5 mm in diameter. Both ribs and furrows extend to the margin. The doublure is flat, smooth, and a little over 1 mm wide.

Hypotype.—No. 47195.

Order PHACOPINA
Family Phacopidae
Genus *Phacops* Emmrich
Phacops pipa Hall and Clarke
(Pl. III, Figs. 1–9, 11–15)

Phacops cristata var. *pipa* Hall and Clarke, 1888, pp. 18–19; Delo, 1940, p. 17.

Phacops pipa Stumm, 1954, p. 213.

Approximately 40 parts of specimens of this species are present in the silicified fauna. Three cephalia (Pl. III, Figs. 1–2, 11; Figs. 5–6; and Figs. 12–15) show both external and internal features. On the original of Figs. 1–2, the rudimentary genal spine is well preserved. On the original of Figs. 5–6 the internal features are exceptionally well preserved. The part of the doublure under the fixigena shows a well-developed notched

flange. The lateral furrow between the glabella and the fixigena is shown as a pronounced ridge. The two pits in the nuchal furrow at the juncture of the posterior part of glabella with the fixigena appear as two pronounced tubercles. The original of Figs. 12-15 is a complete cephalon. The vincular furrow is well developed. Fig. 7 shows a thoracic segment with a rounded node on the axial ring. Figs. 3-4 and 8-9 show external and internal features of 2 pygidia with the characteristic tuberculate ornamentation and the well developed, flat doublure.

Hypotypes.—Nos. 47206, 47207, 47208, 47209, and 47210.

Family Dalmanitidae
Genus *Coronura* Hall and Clarke
Coronura aspectans (Conrad)
(Pl. II, Figs. 1-3)

? *Asaphus diurus* Green, 1839, p. 40.

Asaphus aspectans Conrad, 1841, p. 49.

Dalmania adspectans Hall, 1861, p. 60; 1862, p. 88.

Dalmanites ohioensis Meek, 1873, pp. 234-236.

Dalmanites aspectans Hall 1876, Pl. 13, Figs. 6-8.

Dalmanites helena Hall, 1876, Pl. 13, Figs. 11, 14.

Dalmanites (Coronura) aspectans Hall and Clarke, 1888 *partim*, pp. 33-34, Pl. 13, Figs. 1-6, 10-11, ? 13.

Dalmanites (Coronura) myrmecophorus Hall and Clarke, 1888 *partim*, Pl. 13, Fig. 12.

Coronura diurus Clarke, 1892, pp. 105-9, Pl. 4, Fig. 1.

Coronura aspectans Delo, 1940, pp. 70-71; Stumm, 1954, pp. 204-205.

Two fragments of the test of this species are illustrated. The first of these (Pl. II, Fig. 1), is a view of the underside of part of the cephalon between the lateral border and the eye. The lateral border is 5 mm wide and the field between it and the eye is 9 mm wide. Both border and field show closely set pits ranging from 0.5 to 2 mm in diameter. These pits correspond to pustules as seen on the upper side of the test. The pustules are subconical to rounded and each one bears a medial perforation. The eye facets as seen from the under side are perfectly round, with a round rim surrounding each. They appear to be arranged in an almost perfect quincuncial pattern.

The other fragment (Pl. II, Fig. 2) shows the doublure which is very thin and about 2 mm wide. The upper surface of the same fragment (Pl. II, Fig. 3) shows the border and a fragment of the free cheek, both heavily pustulose. Eight other fragments of thoracic segments and pygidia are present in the collection. They show the typical pustules with medial perforations.

Hypotypes.—Nos. 47196 and 47197.

Genus *Odontocephalus* Conrad*Odontocephalus bifidus* (Hall)

(Pl. I, Fig. 2)

Dalmania bifida Hall, 1861, p. 63; 1862, p. 9.*Dalmanites (Odontocephalus) aegeria* Meek and Worthen, 1868 (*non* Hall, 1861), p. 417.*Dalmanites (Odontocephalus) bifidus* Hall and Clarke, 1888, p. 53.*Odontocephalus bifidus* Delo, 1940, pp. 75-76; Stumm, 1954, pp. 207-208.

One well-preserved pygidium of this species is illustrated. The thick, parallel, posterior spines are well developed. The ribs on the axial and pleural lobes are clearly defined. The entire test with the exception of the posterior parts of the pygidial spines is coarsely punctate.

Hypotype.—No. 47186.Genus *Trypaulites* Delo*Trypaulites calypso* (Hall)

(Pl. I, Figs. 3-4)

Dalmania calypso Hall, 1861, pp. 61-62; 1862, p. 89.*Dalmanites calypso* Hall, 1876, Pl. 13, Figs. 1-2.*Dalmanites (Chasmops) calypso* Hall and Clarke, 1888, pp. 64-66.*Trypaulites calypso* Delo, 1940, p. 85; Stumm, 1954, p. 209.

Two incomplete pygidia of this species were found in the silicified fauna. The larger one shows most of the right pleural lobe and most of the axial lobe, which has been crushed downward so that the axial nodes appear along the left margin. The fine tuberculation on both lobes can be clearly seen. The medial furrows on the ribs of the pleural lobe are distinct. In the smaller specimen the axial lobe is seen in normal position with the rounded axial nodes distinctly shown.

Hypotypes.—Nos. 47187 and 47188.

Order LICHIDA

Family Lichidae

Genus *Acanthopyge* Hawle and Corda*Acanthopyge contusus* (Hall)

(Pl. I, Figs. 5-6)

Lichas (Arges) contusus Hall and Clarke, 1888, pp. 83-84.*Euarges contusus* Phleger, 1937, p. 1089.*Acanthopyge contusus* Harrington et al, 1959, p. 0503.

A beautifully preserved glabella of this very rare species shows both external and internal features. The exterior shows three subequal lobes, a narrow frontal and lateral border, and the occipital ring. The lobes are

separated by two shallow parallel weakly developed furrows that extend from the frontal border to the occipital lobe. Lobes, border, and ring are covered with low, rounded pustules.

The interior is remarkably well preserved and the two glabellar furrows appear as parallel ridges. Two ridges, at approximately right angles to these, extend from the region of the palpebral lobes to the glabellar ridges. Another ridge extends laterally, parallel to, and just above the doublure opposite the occipital ring. The intersection of these ridges makes triangular structures with medial pits on either side of the posterior end of the glabella. The doublure is fairly wide in the posterior of the glabella but very thin in the position corresponding to the frontal and lateral borders. Between the ridges the surface is covered with pits corresponding to the pustules on the opposite surface.

Hypotype.—No. 47189.

Genus *Ceratolichas* Hall and Clarke

Ceratolichas gryps Hall and Clarke

(Pl. I, Fig. 1)

Acidaspis, n. sp. ? Hall, 1876, Pl. 19, Fig. 1.

Lichas (*Ceratolichas*) *gryps*, Hall and Clarke, 1888, pp. 84–85, Pl. 19b, Figs. 7–13.

Ceratolichas gryps Phleger, 1936, p. 604; 1937, p. 1087.

The anterior part of a glabella of this rare species is illustrated. A trace of the frontal border is preserved. The anterior part of the glabella is uniformly convex, 12 mm long, 10 mm wide, and 5 mm high at the center. Near the posterior end of the anterior part of the glabella are two posteriorly recurved spines 12 mm long and 3 mm thick. Border, glabella, and spines covered with broad, low pustules ranging from 1 to 2 mm in diameter and from 0.5 to 2 mm high. Most pustules show a median depression with a small perforation which apparently extended through the test.

Hypotype.—No. 47185.

Genus *Echinolichas* Gürich

? *Echinolichas eriopsis* (Hall)

(Pl. II, Figs. 5–6)

Lichas eriopsis Hall, 1863, p. 226.

Acidaspis (*Terataspis*) *eriopsis* Hall, 1876, Pl. xix, Figs. 4–7, 10, 11.

Lichas (*Conolichas*) *eriopsis* Hall and Clarke, 1888, pp. 78–80.

Echinolichas eriopsis Phleger, 1936, p. 604; 1937, p. 1086.

The silicified collection includes several incomplete librigenae showing the genal spines. These are tentatively assigned to this species. The best

preserved of these is illustrated both dorsally and ventrally. In dorsal view a series of 6 stout spines decreasing in length from 2 mm long at the anterior end to 1 mm at the posterior. Another major series of spines occurs dorsally with the same pattern and measurements. The remainder of the surface is covered with short spines or rounded pustules. On the ventral side the pustules are quite small except in the vicinity of the outer margin.

Hypotype.—No. 47199.

LITERATURE CITED

- BILLINGS, ELKANAH. 1861. On the Devonian Fossils of Canada West: Canadian Journ., New Ser., Vol. 6.
- CLARKE, J. M. 1892. Note on *Coronura aspectans*, Conrad (sp.): N. Y. State Geologist, Tenth Ann. Rept. for 1890.
- CONRAD, T. A. 1841. Description of New Genera and Species of Organic Remains, Crustacea: Fifth Ann. Rept. N. Y. Geol. Surv.
- DAVIS, W. J. 1887. Kentucky Fossil Corals, Vol. 2; Kentucky Geol. Surv.
- DELO, D. M. 1935. A Revision of the Phacopid Trilobites. Journ. Paleontol., Vol. 9, No. 5.
- GREEN, J. 1839. Description of a New Trilobite. Amer. Journ. Sci., First Ser., Vol. 37.
- HALL, JAMES. 1843. Geology of New York, Pt. IV, Comprising the Survey of the Fourth Geological District, Albany.
- 1859. Twelfth Ann. Rept. N. Y. State Cabinet Nat. Hist.
- 1861. Descriptions of New Species of Fossils from the Upper Helderberg, Hamilton, and Chemung Groups. Albany.
- 1862. Fifteenth Ann. Rept. N. Y. State Cabinet Nat. Hist.
- 1876. Illustrations of Devonian Fossils. Gasteropoda, Pteropoda, Cephalopoda, Crustacea, and Corals of the Upper Helderberg, Hamilton, and Chemung Groups. Albany.
- and CLARKE, J.M. 1888. Descriptions of the Trilobites and other Crustacea of the Oriskany, Upper Helderberg, Hamilton, Chemung, and Catskill Groups. Natural History of New York. N. Y. Geol. Surv., Paleontol., Vol. 7.
- HARRINGTON, H. J., and others. 1959. Treatise on Invertebrate Paleontology, Pt. O, Arthropoda 1. University of Kansas Press.
- MEEK, F. B. 1873. Descriptions of Invertebrate Fossils of the Devonian and Silurian Systems. Geol. Surv. Ohio, Vol. 1, Pt. 2.
- PHLEGER, F. G., JR. 1936. Lichadian Trilobites. Journ. Paleontol., Vol. 10, No. 7.
- 1937. Species and Distribution of Lichadacea. Amer. Midland Naturalist, Vol. 18, No. 6.
- STUMM, E. C. 1953. Lower Middle Devonian Proetid Trilobites from Michigan, Southwestern Ontario, and Northern Ohio. Contrib. Mus. Paleontol., Univ. Mich., Vol. XI, No. 2.
- 1954. Lower Middle Devonian Phacopid Trilobites from Michigan, Southwestern Ontario, and the Ohio Valley. *Ibid.*, Vol. XI, No. 11.
- WHITTINGTON, H. B. 1960. Cordania and other Trilobites from the Lower and Middle Devonian. Journ. Paleontol., Vol. 34, No. 3.

Manuscript received, July 29, 1963

PLATES

EXPLANATION OF PLATE I

	PAGE
<i>Ceratolichas gryps</i> Hall and Clarke	9
FIG. 1. Anterior part of glabella showing border, frontal part of glabella, and recurved glabellar spines. Hypotype No. 47185. $\times 1$.	
<i>Odontocephalus bifidus</i> (Hall)	8
FIG. 2. Complete pygidium with spines and showing coarse punctae on test. Hypotype No. 47186. $\times 2$.	
<i>Trypaulites calypso</i> (Hall)	8
FIGS. 3-4. Incomplete pygidia showing the characteristic ornamentation. Hypotypes Nos. 47187 (larger), and 47188.	
<i>Acanthopyge contusus</i> (Hall)	8
FIGS. 5-6. External and internal views of a complete cranidium. Hypotype No. 47189. $\times 2$.	
<i>Proetus</i> (<i>Crassiproetus</i>) <i>crassimarginatus</i> (Hall)	3
FIGS. 7-8. External and internal views of a cranidium incomplete on the left side. Hypotype No. 47190. $\times 1$.	
FIGS. 9-10. External and internal views of a typical free cheek. Hypotype No. 47191. $\times 1$.	
FIGS. 11-12. Views of two pygidia. 11, external view, Hypotype No. 4897. 12, interior view showing doublure, Hypotype No. 47192. Both $\times 1$.	
<i>Cyrtodechenella welleri</i> (Stauffer)	5
FIG. 13. Incomplete granidium showing wide border. Hypotype No. 47193. $\times 2$.	
FIGS. 14-15. External and internal views of a well-preserved pygidium. Hypotype No. 47194. $\times 2$.	
<i>Mystrocephala varicella</i> (Hall)	6
FIG. 16. External view of a perfectly preserved pygidium showing the characteristic tuberculation. Hypotype No. 47195. $\times 2$.	

PLATE I

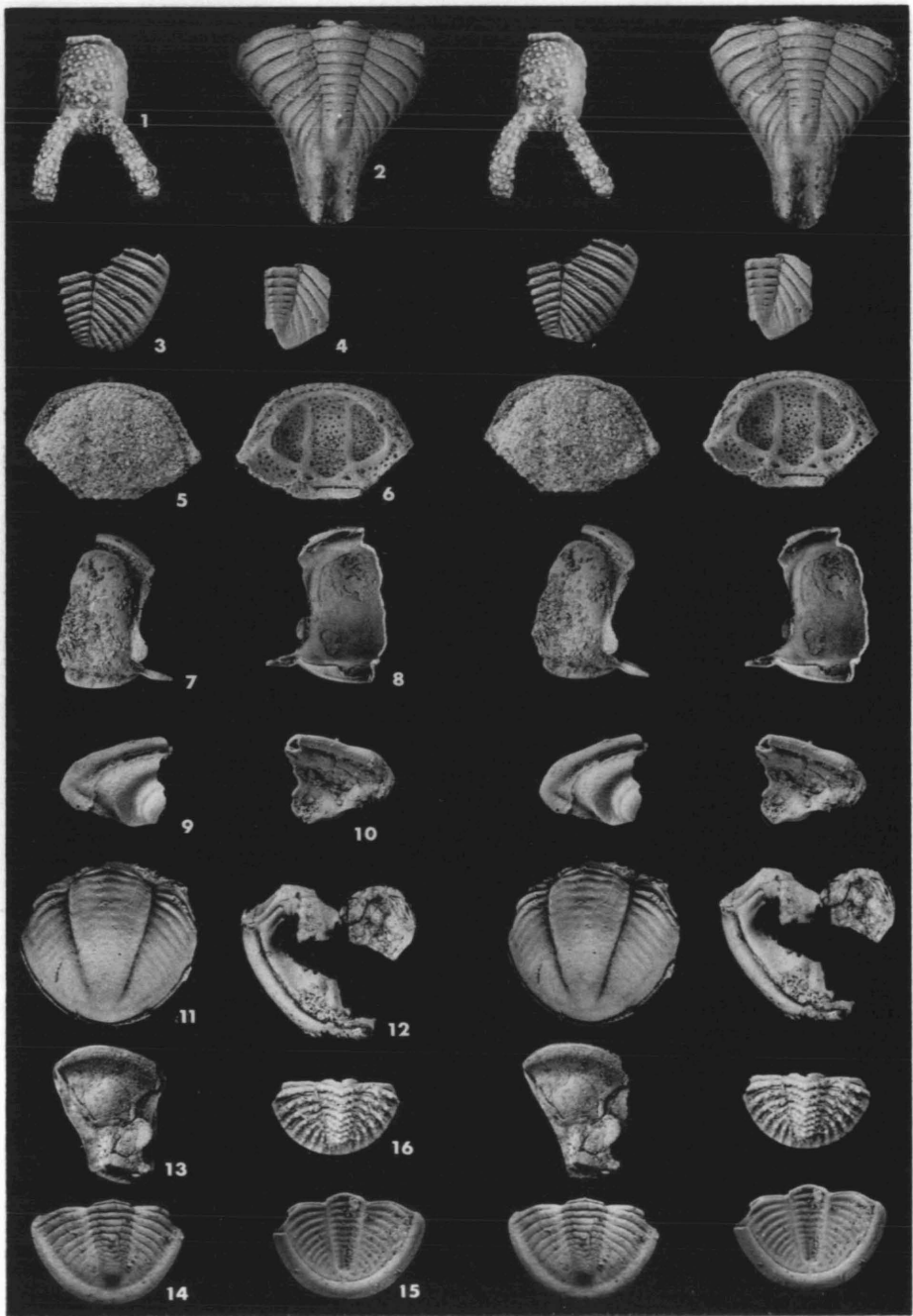


PLATE II



EXPLANATION OF PLATE II

	PAGE
<i>Coronura aspectans</i> (Conrad)	7
FIG. 1. Internal view of part of cranidium showing part of eye, ocular platform, and lateral border. Hypotype No. 47196. × 1.	
FIGS. 2-3. Internal and external views of lateral fragment of cranidium showing tuberculation, border, and doublure. Hypotype No. 47197. × 1.	
<i>Dechenella</i> (<i>Basidechenella</i>) <i>canaliculata</i> (Hall)	4
FIG. 4. View of cranidium showing faint glabellar furrows and fine tuberculation. Hypotype No. 47232. × 2.	
FIGS. 17-18. Exterior and interior views of a well-preserved pygidium. Fine tuberculation and doublure are well shown. Hypotype No. 47198. × 1.	
? <i>Echinolichas eriopis</i> (Hall)	9
FIGS. 5-6. Dorsal and ventral views of a genal spine tentatively assigned to this species. Figured specimen No. 47199. × 2.	
<i>Dechenella</i> (<i>Basidechenella</i>) <i>clara</i> (Hall)	4
FIGS. 7-9. Views of two typical pygidia. 7-8, external and internal views of Hypotype No. 47200; 9, internal view of Hypotype No. 47201. Both × 1.	
FIGS. 11-12. External and internal views of a smaller pygidium which may belong to <i>D. (B) canaliculata</i> . Figured specimen No. 47202. × 2.	
FIGS. 13-14. External and internal views of a typical cranidium showing the smooth, unfurrowed glabella. Hypotype No. 47203. × 1.	
FIGS. 15-16. Left and right librigenae. Hypotypes No. 47204. × 1.	
<i>Cyrtodechenella welleri</i> (Stauffer)	5
FIG. 10. External view of an average-sized pygidium. Hypotype No. 47205. × 1.	

EXPLANATION OF PLATE III

	PAGE
<i>Phacops pipa</i> (Hall and Clarke)	6
Figs. 1-2. Internal and external views of an incomplete, large cephalon showing the incipient genal spine and the glabella. Because of the trigonal, protruding anterior part of the glabella this specimen may possibly be referred to <i>P. nasutus</i> Stumm. Figured specimen No. 47206. × 1.	
Figs. 3-4. External and internal views of a large pygidium showing the characteristic ornamentation and the doublure. Hypotype No. 47207. × 1.	
Figs. 5-6. Side and internal views of an incomplete cephalon on which the notched flange on the doublure is well preserved. Hypotype No. 47208. × 2.	
FIG. 7. Dorsal view of a thoracic segment showing the tubercle on the center of the axial ring. Hypotype No. 47209. × 2.	
Figs. 8-9. External and internal views of a pygidium on which the ornamentation is unusually well preserved. Hypotype No. 47210. × 1.	
FIG. 11. Side view of same specimen as original of Figs. 1-2.	
Figs. 12-15. Four views of a small but complete cephalon. Hypotype No. 47211. × 1.	
<i>Dechenella</i> (? <i>Basidechenella</i>) sp. A.	5
FIG. 10. Dorsal view of cranidium showing incised glabellar furrows. Figured specimen No. 47212. × 1.	

PLATE III

