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**DISCOVERY OF A HAMILTON FAUNA  
IN SOUTHEASTERN MICHIGAN**

**BY**

**G. M. EHLERS AND MARY E. COOLEY**



**UNIVERSITY OF MICHIGAN  
ANN ARBOR**

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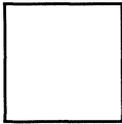
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110

133

150



CONTRIBUTIONS FROM THE MUSEUM OF GEOLOGY

UNIVERSITY OF MICHIGAN

*Editor:* EUGENE S. McCARTNEY

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(Continued on inside of back cover)

## DISCOVERY OF A HAMILTON FAUNA IN SOUTHEASTERN MICHIGAN

G. M. EHLERS AND MARY E. COOLEY

DURING the summer of 1925 the Board of Water Commissioners of the City of Detroit made a series of borings beneath the bottom of the Detroit River just north of the head of Belle Isle in order to determine the nature of the material which must be excavated for the installation of a water intake tunnel. The drill cores obtained from these borings were examined for the Board of Water Commissioners by Professor W. H. Sherzer of the Michigan State Normal College. Certain sections of the cores were found to be highly fossiliferous by Professor Sherzer, who subsequently obtained permission to send a set of these sections to the writers for study.

After being studied by the writers, the fossils from the drill cores were sent to Dr. E. O. Ulrich of the United States Geological Survey for further examination. The writers were especially desirous of having Dr. Ulrich see this material because he is now engaged in a study of related Devonian faunas of the northern part of the Southern Peninsula. In the course of his examination of the material Dr. Ulrich was assisted by Dr. R. A. Bassler and Mr. Erwin R. Pohl of the United States National Museum. To these gentlemen the writers wish to acknowledge their indebtedness for examining the fossils and for giving helpful opinions regarding the stratigraphic position of the fauna.

The rock from which the fossiliferous drill cores were obtained is a bluish-gray shale, the top of which is about 458 feet above sea-level and about 117 feet below the river level. Intervening between the top of the shale and the river bottom is glacial till of varying thickness; beneath the shale is a limestone, which with little doubt is the Dundee. According to Professor Sherzer,

the drill encountered about 35½ feet of shale, most of which is dry and flaky and contains little pyrite and very few fossils of conspicuous size. The basal 4 to 5 feet of the shale differs from the shale above in being highly fossiliferous; in places this basal part passes laterally into an impure, argillaceous limestone with considerable pyrite, which is chiefly in the form of pyritized fossils.

Nearly all sections of drill cores examined by the writers were obtained from the basal 4 to 5 feet of shale and argillaceous limestone; a few pieces of fossiliferous core came from the shale about 12 feet above the top of the Dundee limestone. The fossils at the two positions in the shale seem to belong to the same fauna.

The fossils as indicated by the list of identifications given below belong to a fauna of Hamilton age.

#### FOSSILS FROM HAMILTON SHALE BELOW BOTTOM OF DETROIT RIVER AT HEAD OF BELLE ISLE

##### COELENTERATA — ANTHOZOA

*Cystiphyllum* sp.  
*Aulopora*, n. sp.  
*Ceratopora*, n. sp.

##### ECHINODERMATA — CRINOIDEA

Numerous columnals

##### MOLLUSCOIDEA — BRYOZOA

*Ascodictyon stellatum* Nicholson and Etheridge  
*Fistulipora utricula* Rominger  
*Pinacotrypa elegans* (Rominger)  
*Heterotrypa barrandei* (Nicholson)  
*Lioclema minutum* (Rominger)  
*Fenestella* sp.  
*Polypora* sp.  
*Orthopora*, several species  
*Streblotrypa hamiltonensis* (Nicholson)  
*Cystodictya* cf. *incisurata* (Hall)

MOLLUSCOIDEA — BRACHIOPODA

*Craniella hamiltoniae* Hall  
*Rhipidomella cyclas* Hall  
*Leptostrophia perplana* (Conrad)  
*Stropheodonta demissa* (Conrad), middle or later Hamilton type  
*Stropheodonta* near *costata* Owen  
*Pholidostrophia iowaensis* (Owen), var. No. 1  
*Pholidostrophia iowaensis* (Owen), var. No. 2  
*Tropidoleptus carinatus typicalis* Williams  
*Chonetes* near *coronatus* (Conrad)  
*Chonetes lepidus* Hall  
*Chonetes scitulus* Hall  
*Chonetes setigerus* (Hall)  
*Chonetes vicinus* (Castelnau)  
*Chonetes* sp., No. 1  
*Chonetes* sp., No. 2  
*Chonetes* sp., No. 3  
*Leiorhynchus laura* (Billings)  
*Cryptonella* cf. *planirostris* Hall  
*Atrypa reticularis* (Linnaeus)  
*Spirifer* near *mucronatus* (Conrad)  
*Ambocoelia umbonata* (Conrad) — small  
*Cyrtina hamiltonensis* Hall  
*Athyris* cf. *cora* Hall  
Young indeterminable brachiopod

MOLLUSCA — PELECYPODA

*Pterinea flabella* (Conrad)  
*Aviculopecten exactus* Hall  
*Aviculopecten princeps* (Conrad)

MOLLUSCA — GASTROPODA

*Platyceras* sp.  
*Styliolina fissurella* (Hall)  
*Styliolina spica* (Hall)  
*Tentaculites bellulus* Hall

ARTHROPODA — TRILOBITA

*Phacops* near *rana* (Green)

ARTHROPODA — OSTRACODA

*Primitiopsis punctulifera* (Hall)  
*Ulrichia conradi* Jones

Bollia unguia Jones  
Ctenobolbina, several species  
Beyrichia kolmodini Jones  
Dizygopleura sp.  
Moorea bicornuta Ulrich  
Strepula plantaris Jones

In spite of the very close relation that most of the forms noted in this list bear to their kind in the eastern Hamilton faunas none is exactly the same. Mr. Pohl, who is engaged in a very detailed study of the eastern Hamilton faunas, believes this fact would be even more evident if additional material were available. The faunal association, furthermore, is quite distinct. It is entirely unlike the typical Traverse fauna of the northern part of the Southern Peninsula of Michigan and the Middle Devonian faunas of Thedford, Ontario, and of Wisconsin, Iowa and Missouri. It bears a superficial resemblance to the so-called Traverse faunas of northwestern Ohio. Its closest relationship, however, is with faunas near the middle of the Hamilton sections in western and west-central New York. According to Dr. Ulrich, "Just which, if any, of the known sequence of Hamilton faunal zones it represents is not entirely clear. Probably it falls into some interval not represented by deposits in New York."

The stratigraphic relationships of the shale of the Belle Isle region are of much interest and must be considered in reclassifying the Middle Devonian deposits of southeastern Michigan. The shale makes up the basal beds of strata which heretofore have been assigned to the Traverse,<sup>1</sup> but in view of the fact that the shale contains a fauna quite distinct from any of the typical Traverse faunas, it is open to question whether there is any Traverse in southeastern Michigan.

The supposed Traverse of southeastern Michigan was referred to that formation because it is similar in lithologic character

<sup>1</sup> See map of Wayne County, Michigan, showing hard rock geology and artesian well conditions: *Michigan Geol. and Biol. Surv.*, Publ. 12, Geol. Ser. 9, Pl. 25, 1913, and geological map of Michigan: *Michigan Geol. and Biol. Surv.*, Publ. 23, 1917.

and stratigraphic position to the Traverse in the northern part of the Southern Peninsula. It is underlain by the Dundee limestone, which Grabau<sup>2</sup> considered the stratigraphic equivalent of the Lower Traverse (Bell shale and overlying Long Lake shales and limestones), and overlain by black shales similar to the Antrim shales, which occur above the typical Traverse in the northern part of the Southern Peninsula. The assignment of beds in northwestern Ohio to the Traverse by Professor Stauffer<sup>3</sup> also suggests the presence of Traverse in southeastern Michigan.

Although there has been published considerable evidence indicating the presence of Traverse strata in southeastern Michigan, the validity of this evidence now seems open to serious doubt. In the first place, the beds in southeastern Michigan are not exposed, being known only from drill cores, and no attention has hitherto been paid to their faunal content, which we now know to be quite different from that of the typical Traverse. Further, it seems to the writers that the relationship between the Dundee and the Lower Traverse is not nearly so close as Grabau has stated. The formations have few species in common; the forms which have been reported as common to the formations are not exactly the same and on closer examination will probably show distinct varietal or specific differences. The black shale above the supposed Traverse may be a southern extension of some bed now referred to the Antrim shale.

As regards the presence of Traverse strata in northwestern Ohio, the fossils listed by Stauffer<sup>4</sup> as occurring in this area do not suggest a typical Traverse fauna. Nearly all the forms noted by Stauffer and also reported by Grabau as occurring in the typical Traverse belong to species which, as commonly understood, have considerable vertical range in the Middle Devonian. Until these forms are finely discriminated and carefully compared with the types of the species, many of which must also

<sup>2</sup> Grabau, A. W., *Preliminary Report on the Fauna of the Dundee Limestone of Southern Michigan: Michigan Geol. and Biol. Surv.*, Publ. 12, Geol. Ser. 9, pp. 366-367, 1913.

<sup>3</sup> Stauffer, C. R., *The Middle Devonian of Ohio: Geol. Surv. of Ohio*, 4th Ser., Bull. 10, pp. 144-156 and 183-186, 1909.

<sup>4</sup> *Op. cit.*

be restudied because they originally were not finely discriminated with stratigraphic relations in mind, no close correlation can be made. Furthermore, the writers have had an opportunity to examine the fauna of the so-called Traverse of northwestern Ohio exposed in the quarries of the Sandusky Lime and Cement Company about two and one-half miles southwest of Sylvania and are convinced that the fauna of these particular deposits is distinct from the typical Traverse faunas. As a matter of fact the fauna, which will be described by Grace A. Stewart of Ohio State University, contains many forms suggesting a close relationship to the fauna of the shale below the bottom of the Detroit River near Belle Isle. The typical Traverse evidently is not present in northwestern Ohio, and as a result of the study of the fossils from these drill cores it seems equally probable that the Traverse failed to extend even into southeastern Michigan. At least no evidence of such extent is now known.

From the preceding discussion it is obvious that there is no evidence proving definitely that the shales and limestones between the Dundee and supposed Antrim of southeastern Michigan have Traverse affinities. Accordingly the writers suggest that these strata for the present be classified as "Middle Devonian." They refrain from naming the shale making up the basal part of Middle Devonian strata below the bottom of the Detroit River until the upper limit of the fauna of this shale is determined and further studies on the Traverse and other Middle Devonian faunas of Michigan are completed. For the time being this shale may be spoken of as the "shale with a Hamilton fauna" in order to indicate its faunal and stratigraphic relationships.

(Continued from inside of front cover)

9. Devonian Cephalopods from Alpena in Michigan, by Aug. F. Foerste. Pages 189-208, with 5 plates. Price, \$.35.
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