Proceedings of the Iowa Academy of Science

Volume 69 | Annual Issue Article 55

1962

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Recommended Citation
Dorheim, Fred H. and Kock, Don L. (1962) "Unusual Exposure of Silurian-Devonian Unconformity in Loomis Quarry Near Denver, Iowa," *Proceedings of the Iowa Academy of Science, 69(1),* 341-350.
Available at: https://scholarworks.uni.edu/pias/vol69/iss1/55

Literature Cited

Black, R. F. (in manuscript). Ice wedges and permafrost of the Arctic Coastal Plain of Alaska. U. S. Geol. Survey Prof. Paper.

Hopkins, D. M., and Sigafoos, R. S. (1951). Frost action and vegetation patterns on Seward Peninsula, Alaska. U. S. Geol. Survey Bull. 974-C. p. 51-100.

———— (1954). Role of frost thrusting in the formation of tussocks. Am. Jour. Sci., v. 252, p. 55-59.

Koranda, John J. (unpublished manuscript). The plant ecology of the Franklin Bluffs area, Alaska. Botany Dept., University of Tennessee.

Leffingwell, E. deK. (1915). Ground-ice wedges; the dominant form of ground-ice on the north coast of Alaska. Jour. Geology, v. 23, p. 635-654.

Muller, S. W. (1947). Permafrost or permanently frozen ground and related engineering proglems. Ann Arbor, Mich., J. W. Edwards, Inc., 231 p.

Pewe, Troy L. (1954). Effect of permafrost on cultivated fields, Fairbanks, Alaska. U. S. Geol. Survey Bull. 989-F.

Troll, Carl (1958-translation). Structure soils, solifluction, and frost climate of the earth. U. S. Army Snow, Ice & Permafrost Research Establishment, Corps of Engineers, Translation 43.

Taber, Stephen (1943). Perennially frozen ground in Alaska; its origin and history. Geol. Soc. America Bull., v. 54, p. 1433-1548.

Unusual Exposure of Silurian-Devonian Unconformity in Loomis Quarry Near Denver, Iowa[1]

FRED H. DORHEIM[2] AND DON L. KOCH[2]

Abstract. In the Loomis quarry, located in the NW¼ sec. 29 T. 91N., R. 13W., Bremer County, Iowa, there is an unusual exposure of an unconformity between the Silurian and the Devonian sediments.

Several Niagaran hummocks rise approximately 30 feet above the general Silurian level with Devonian sediments (Cedar Valley and Wapsipinicon) desposited against the flanks of the Niagaran remnants.

A basal Wapsipinicon breccia is exposed in this section. Chert from the Silurian forms an important part of the breccia.

INTRODUCTION

A most remarkable exposure of an irregular Silurian surface with Devonian sediments deposited along the eroded flanks can be seen in the Charles Loomis quarry located in the NW¼ sec. 29, T. 91N., R. 13W., Bremer County, Iowa. This quarry is generally known as the Denver Quarry. The location of the quarry and the routes leading to it from either Waverly or Denver are shown in figure 1.

This study was made possible through the cooperation of Beu

[1] Presented with the permission of Dr. H. Garland Hershey, State Geologist, and Director of the Iowa Geological Survey.

[2] Iowa Geological Survey, Iowa City, Iowa.

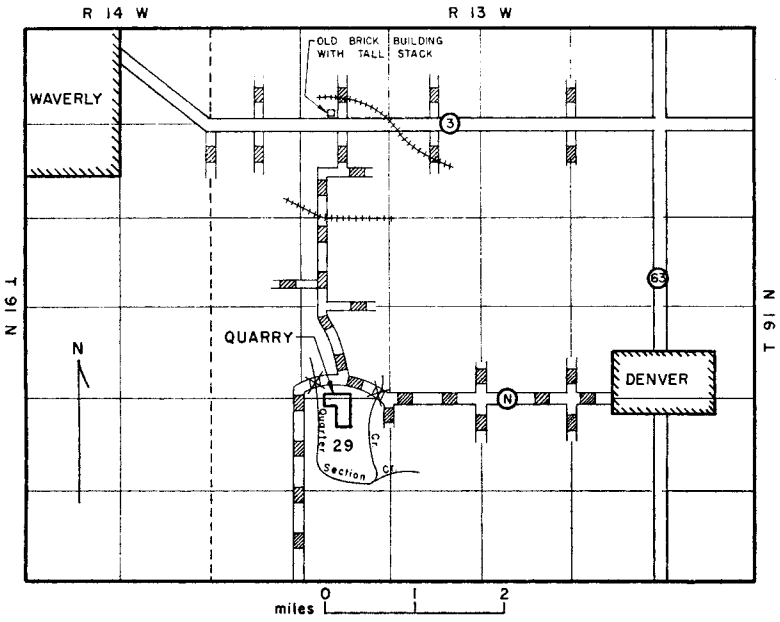


FIG. 1 — LOCATION MAP OF DENVER QUARRY

and Sons Limestone Company, who opened and operated the quarry, and of the owner, Mr. Charles Loomis. The work was done as a part of Iowa Geological Survey official activities. Associates at the Iowa Geological Survey have made helpful suggestions. Dr. Brian F. Glenister, State University of Iowa, helped in the identification of fossils.

Discussion

General

The locations of the various features to be discussed are shown in figure 2. Of special note is the Niagaran hummock about midway on the west wall flanked on the north by sediments of the Wapsipinicon Formation. Hummock, as used here, refers to elevations above the general Silurian top, either as conspicuous rises or as lesser undulations. Two Niagaran hummocks occur in the east face of the quarry with Devonian sediments deposited adjacent to each of them. A fourth hummock is exposed in the stripped area northeast of the quarry. Here an area of 0.1 acre of Niagaran rock can be seen surrounded by Devonian sediments.

Stratigraphy and Lithology

The following stratigraphic section was measured along the north wall of the quarry (fig. 2). The bed numbers used in this section are the same as those used on the graphic section (fig. 3).

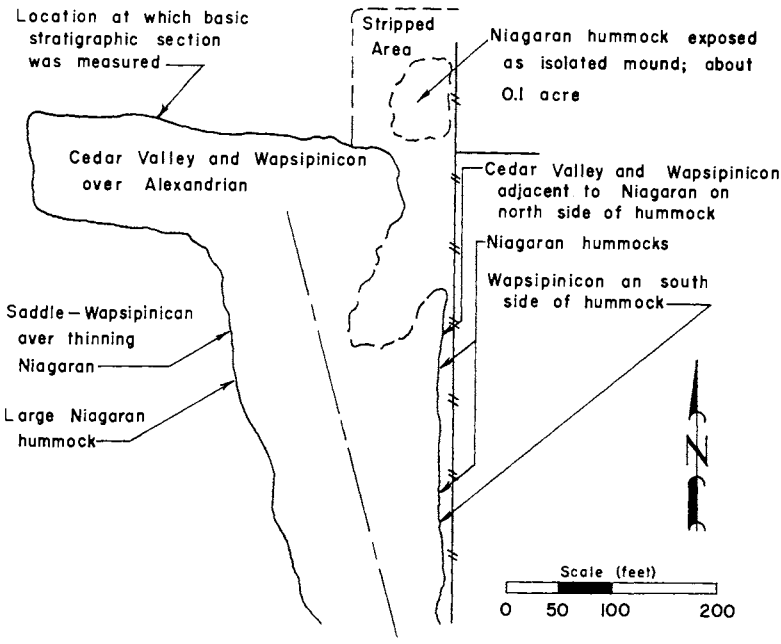


Fig. 2 – Map of Denver Quarry, showing location of Niagaran hummocks.

Stratigraphic Section as Observed Along North Wall of Quarry

Bed	*Description*	*Thickness*
Pleistocene		
	Loess and till	about 12′
Devonian System		
	Cedar Valley Formation.	
1.	Limestone, grayish-orange (10YR7/4) to very pale orange (10YR8/2), medium clastic, with numerous brachiopod fragments and a few crinoidal stem sections. Badly weathered reticulate atrypoid brachiopods are locally abundant in lower part of bed. Dendrites of manganese oxides occur throughout. The beds are platy and badly slumped with geest distributed throughout	10′ max.
2.	Breccia composed of fragments of grayish-orange (10YR7/4) calcareous dolomite, soft and friable, in a matrix of calcareous shale. Most of the fossils are very poorly preserved. Among those collected are *Productella, Schizophoria meeki* Fenton & Fenton, *Atrypa devoniana* Webster, and *A. lineata* Stainbrook. Manganese oxides occur as scattered specks along with glauconite in the upper part of this bed and are abundant in the lower part	15′
	Wapsipinicon Formation	
3.	Limestone, very pale yellowish-brown (10YR7/2) to yellowish-gray (5Y7/2), lithographic to very fine crystalline, laminated to brecciated with large solution cavities (fig. 8-A) and some flutings. The breccia is composed of small blocks of lithographic limestone in a limestone matrix. Bedding is irregular	5′

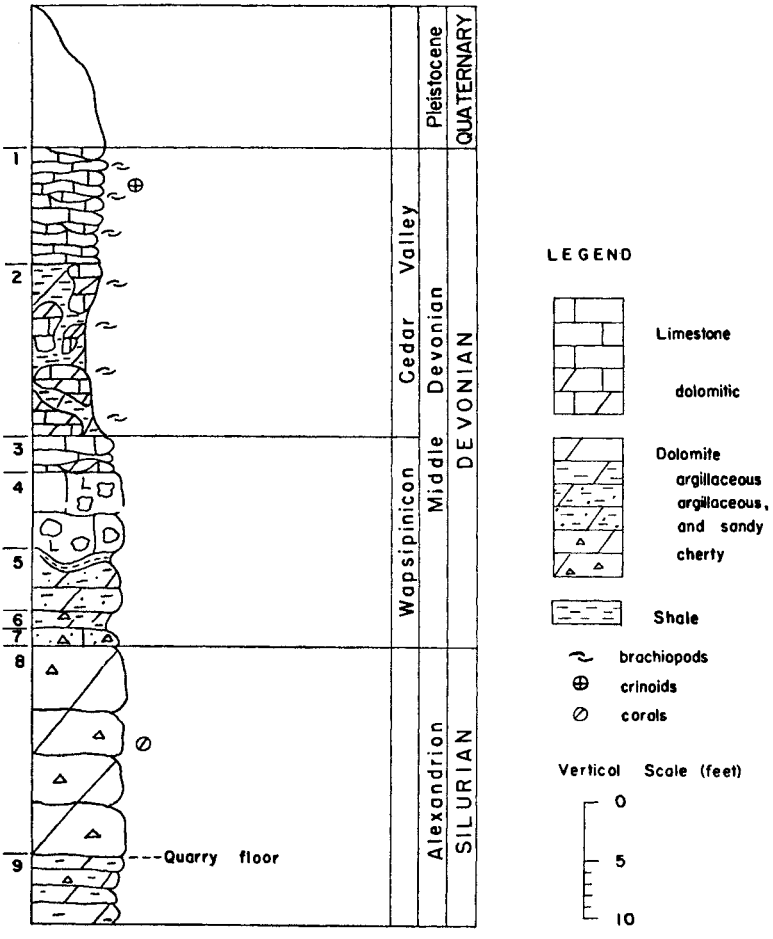


Fig. 3 – Stratigraphic section as exposed in north face of quarry and in sump along west face.

4. Limestone, as in bed 3 but more massive and with irregular solution cavities ..... 6-8′
5. Dolomite, pale yellowish-orange (10YR8/6), soft structureless, friable. Thirty percent of an insoluble residue sample consisted of clay and silt. A thin layer of dark-brown to orange to gray clay, silt, and sand caps the dolomite. When treated with acid about 30 percent of a sample from this layer digested. The remaining 70 percent was two-thirds clay and one-third quartz silt. Total thickness of bed 5 varies from ..... 3½-5′
6. Limestone, vari-colored, mostly yellowish-gray (5Y7/2), very dolomitic, very argillaceous; with a few grains of rounded quartz sand and angular grains of dark gray chert sand. Less than 10 percent of the sample is composed of very sharp chips

of white (N9) chert. These white chert chips were derived from the Silurian ..... 1.5′

7. Limesotne breccia (fig. 8-B), grayish-yellow (5Y8/4) to very pale orange (10YR8/2), very coarse, fragmental; with a few sand grains, angular gray chert, and large angular chips of white chert ..... 1.5′

Silurian System
Alexandrian Series

8. Dolomite, grayish-orange (10YR7/4) to yellowish-gray (5Y-7/2), medium-fine, hard; with crystalline calcite and chert nodules. The chert is medium-gray (N-6) to yellowish-gray (5Y7/2) in the center of the nodule but weathers white on the surface. Silicified *Stromatopora* and corals common ..... 18′

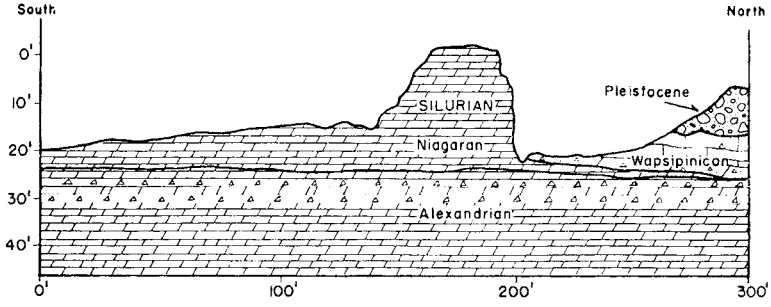


Fig. 4 - Diagram of west wall of quarry showing large Silurian hummock with Devonian beds deposited on and adjacent to the eroded surface.

It is significant that neither the Niagaran nor the upper 8 feet of the Alexandrian is represented in this section.

The Silurian rises most conspicuously above the quarry floor in the large hummock on the west side (figs. 4 and 6), nearly to the level of the top of bed 2 (fig. 3), the middle of the Cedar Valley, as exposed in the quarry. At this point there is approximately 25 feet of Niagaran underlain by about 8 feet of interbedded chert and dolomitic limestone of the Alexandrian. The eroded Niagaran diminishes in thickness to the south and disappears toward the southern end of the quarry. The north side of this hummock falls vertically for approximately 17 feet, where the Wapsipinicon lies unconformably on the thin remnant of Niagaran.

Two Niagaran hummocks occur on the east side of the quarry (figs. 5 and 7) with a chert rubble deposited between them. This chert rubble is present on the north end of the northern hummock, covered by a normal Wapsipinicon and Cedar Valley sequence. The southern hummock is flanked on the south with chert rubble and irregular or broken blocks of basal Wapsipinicon breccia above it.

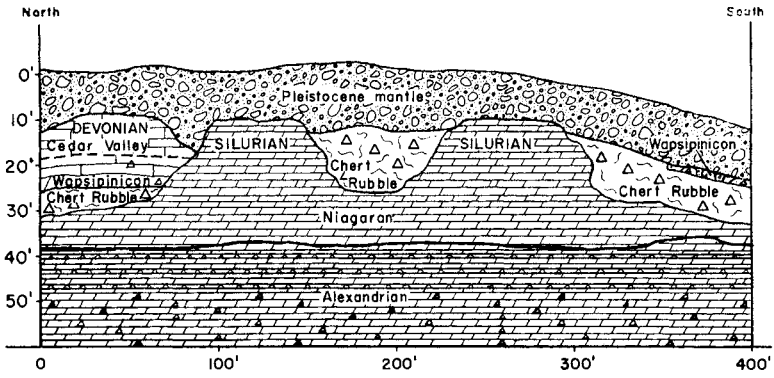


Fig. 5– Diagram of east wall of quarry showing two Silurian hummocks with Devonian beds deposited on and adjacent to the eroded surface.

The chert rubble is post-Niagaran, pre-Wapsipinicon. At present there is not enough evidence to support a closer age determination.

Paleontology

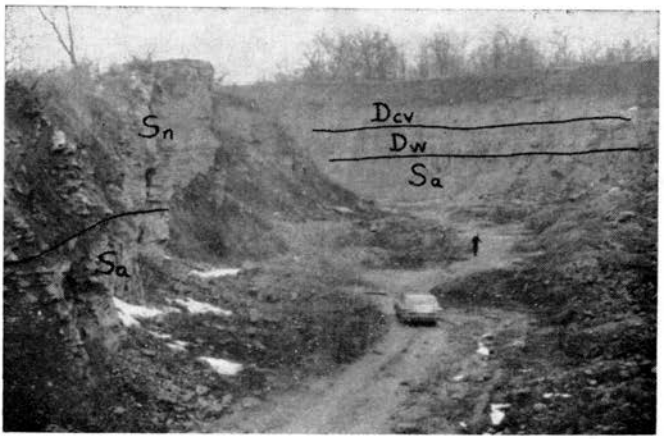
Silicified *Favosites* and *Stromatopora* occur abundantly in the Silurian strata represented in this quarry. Rare, but present in the Niagarian, are a few poorly preserved *Pentamerus ablongus.*

The following fossils were collected from the Cedar Valley exposed in the north face (fig. 6-A) and at the north end of the east face (fig. 5): *Atrypa devoniana* Webster, *A. lineata* Strainbrook, *Schizophoria meeki* Fenton & Fenton, *Productella, Gypidula,* and small, high spired, turreted gastropods. The fossils collected from these beds are representative of the Solon member of the Cedar Valley and, more particularly, of Stainbook's "independensis zone" of the Solon. *Atrypa devoniana* Webster has little value as a zone fossil unless the variety can be determined. According to Stainbrook (1940) *Schizophoria meeki* Fenton & Fenton is an "independensis zone" fossil and *Productella* and *Gypidula* are characteristic of the lower Solon of the North Iowa section.

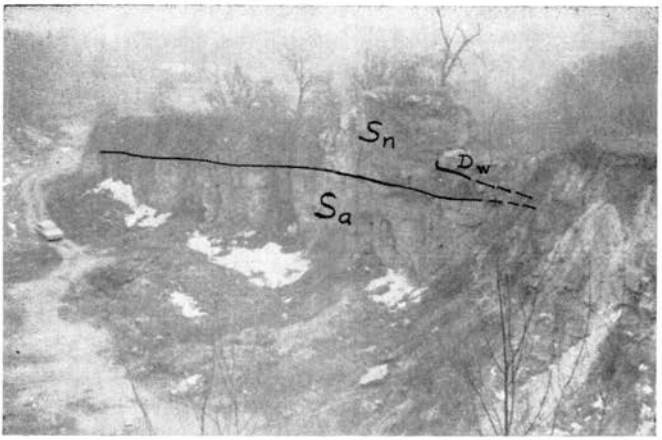
Special Lithologies

There are several lithologic characteristics in the Wapsipinicon Formation that are worthy of mention. In parts of the Davenport member (fig. 3, beds 3 and 4), solution has created a gross cavernous porosity and some fluting. This is shown in figure 8-A.

A basal Wapsipinicon breccia is well developed in this quarry and is illustrated in figure 8-B. The large white, angular chert particles are derived from the cherts of the Silurian. Since the



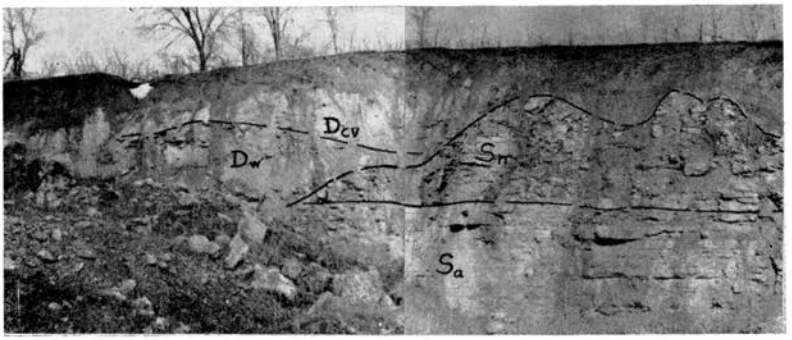
A



B

Fig. 6.— Denver quarry. A. North and west faces, looking north. B. West wall, looking south. The large Silurian hummock stands out from Devonian bed at right

Niagaran, as observed in the quarry, is chert free these particles must have been incorporated from an Alexandrian chert residium in close proximity. The particles are too sharp to have been transported far.



A

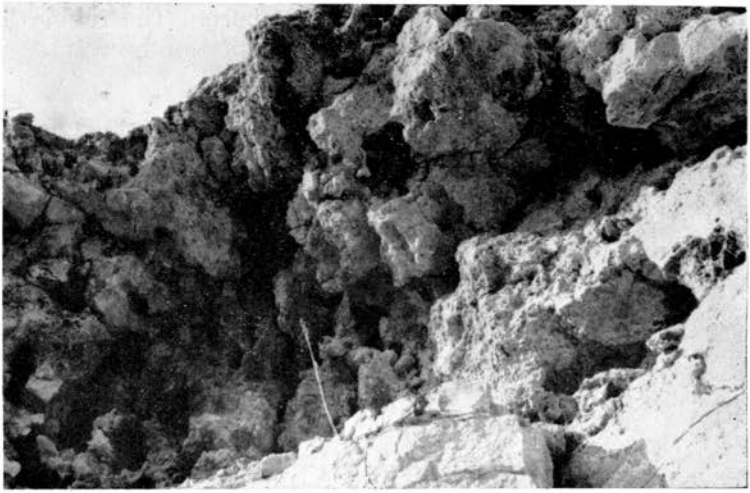
B

Fig. 7.— East face. A. Northern Niagaran hummock with Devonian beds on north flank and chert rubble on south flank. B. Southern Niagaran hummock is flanked by chert rubble on north and south and also by Wapsipinicon on south

Conclusions

The hummocky Silurian surface with its flanking Devonian sediments depicts an unconformable contact, illustrative of the pre-Wapsipinicon erosion and the post-Silurian sedimentary environment. This feature, though probably quite extensive, is not usually exposed, especially in glaciated areas.

The "chert rubble" (fig. 5) appears to be an allogenic deposit derived from a weathered Alexandrian terrain and deposited on the Niagaran surface. This deposition may have occurred any



A

B

Fig. 8.—Close-up of portion of north face of quarry A. Extreme solution in Davenport limestone. B. Basal

time from post-Niagaran to pre-Wapsipinicon. The rubble lies on eroded Niagaran and below the Wapsipinicon breccia.

Literature Cited

Stainbrook, M. A., 1942, Orthid Brachiopods of the Cedar Valley Limestone of Iowa. The American Midland Naturalist, vol. 23, no. 2, p. 492.

A Late Wisconsin Giant Beaver in Northern Iowa

W. D. FRANKFORTER[1]

Abstract. Few discoveries of giant beaver, *Castoroides*, remains have been made in Iowa and these have usually been found under circumstances precluding determination of their geologic ages. The specimen reported herein from near Garner, Hancock County, Iowa, was recovered from a peat bed which lies within the border of a late Wisconsin, probably Cary, terminal moraine. According to radiocarbon dates recently announced for organic muck overlying till in a nearby peat bog the minimum date for the till would have to be approximately 12,000 b.p., thus older than Two Creeks interstadial.

This find, places the giant beaver in Iowa during Two Creeks time or possibly slightly later. This is the latest survival yet reported for this form in Iowa and compares favorably with its terminal date reported in Ohio.

Other giant beaver finds in Iowa are described and some general statements are made about the development of this animal.

INTRODUCTION

Remains of the giant beaver, *Castoroides*, have been rarely found in Iowa. A recent discovery near Garner, Hancock County, is only the seventh specimen to come to the attention of the author. Four have been mentioned previously in scientific reports and the remainder are discussed herein.

The Garner specimen consists of a fragment of the upper left third molar, the lower left second molar, and a partial incisor from the left ramus. These items were found by Mr. Richard Brouwer in a peat deposit on his farm two miles south and one mile west of Garner, in the S½, NE¼, sec. 11, T. 95N., R.24W. They were discovered in 1960 and were taken to Robert Brower of Garner, who was then a student at the State University of Iowa, Iowa City. He, in turn, submitted them to the author for identification and, subsequently, they were donated to San-

[1] Sanford Museum, 117 East Willow, Cherokee, Iowa.