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Recent grading of a road in Jackson county, Iowa, led to the uncovering and subsequent discovery of an outlier of Devonian limestone. This outlier was first noted while the author was searching for a suitable quarry site in Jackson county, southeast of Maquoketa. The area is located south of center section 33 Maquoketa township, just about one-fourth mile north of the Clinton-Jackson county line (Fig. 1).

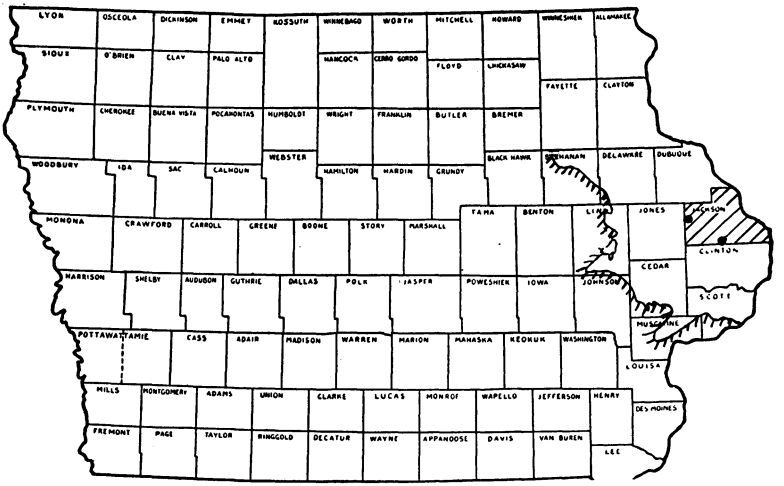

Figure 1. Relationship of Jackson County outliers to Devonian boundary.

With the exception of an area along the Mississippi River and a smaller area around the town of Preston, where Ordovician rocks are exposed, Jackson county is underlain by Silurian dolomites of the Niagara Series. Other than the Devonian outlier found by Norton near Canton, the nearest known Devonian is approximately thirty-five to forty miles south and south-west (Fig. 1).

The outlier described by Norton (1893) and later by Savage (1905) is located near the middle of section 18 Brandon township (Fig. 1) and is described as consisting of sandstones, shales, and a limited exposure of limestones of the Fayette breccia.

The Devonian outlier located southeast of Maquoketa lies within the area covered by Kansan drift and by loess mantle. It is a hilly

terrain, timbered and pastured. The valley along which the outcrops are seen is in the valley of Silver Creek.

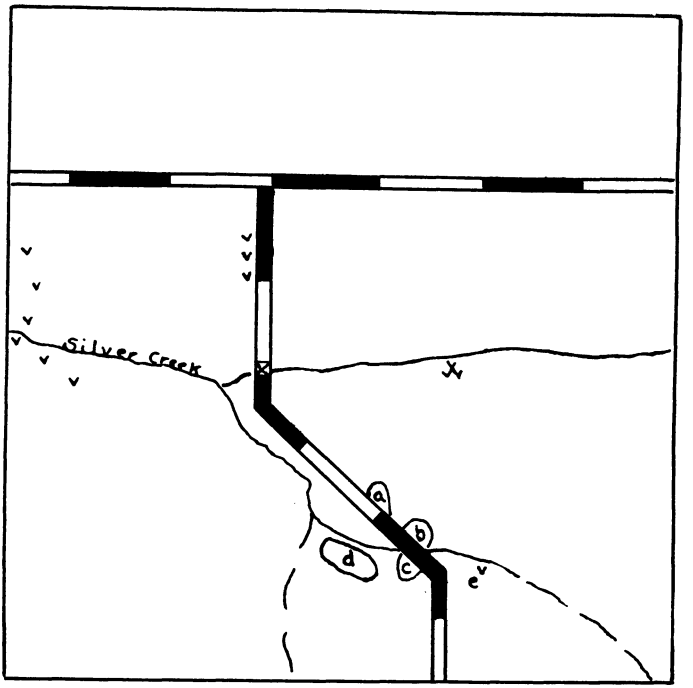

Figure 2. Section 33 Maquoketa Township. Silurian rock outcrops. Quarry in Silurian dolomite.

Fig. 2 shows the location of the outlier outcrops and of the slope along which Devonian talus is evident. At "a" Davenport stone crops out in the ditch along the east side of the road. There is about one foot of section exposed here. The stone is a dolomitic limestone breccia composed of buff, hard, lithographic particles recemented in a hard calcareous cement. A freshly broken piece gives off the pungent petroliferous odor characteristics of both the Davenport and the Spring Grove. At "b" there is a vertical section of approximately three and one-half feet of rock exposed along the slope. Part of this section is brecciated. It is generally a light bluish-gray, fine-grained limestone but contains some pockets of gray shale. At this location most of the fossils were found. This section belongs to the Rapid member of the Cedar Valley formation. Toward the south end of the outcrop, where the ditch has been deepened a little, the contact between the Rapid and the Solon can be seen. At "c" about three feet of Solon is exposed along the west side of the road where a rock nose was truncated by

grading. A number of *Cystiphyllum,* usually associated with the Solon, are found near the upper part of this exposure. On the back side of the cut ("c"), a wedge of Rapid limestone overlies the Solon. The Solon at this location lies directly on rocks that appear to be Silurian in age. No rock outcrops occur along the slope at "d", but the slope is strewn with talus that appears to be of Devonian origin. At "e" approximately ten feet of soft, buff, Silurian dolomite is exposed along the south bank of the creek. Also, about one-fourth mile north of the outlier area, a quarry is being operated in a forty-foot face of Silurian dolomite.

The following fossils, generally associated with the lower Rapid member of the Cedar Valley formation, were collected in the upper part of the exposure at "b" or on the back slope at "c" and have been identified by M. A. Stainbrook.

Atrypa devoniana Webster
Atrypa trowbridgei Fenton and Fenton
Zaphrentis putilla Savage
*Crinoid stems (*Megistrocinus?*)
Cystodectya hamiltonensis Ulrich.
Tylothyris subvaricosus (Hall)
Spirifer cedarensis (?) Owen
**Schizophoria* sp. (iowensis Hall?)
**Spinatrypa bellula* Stainbrook
Chonetes schucterti Cleland
Cyrtina umbonata Hall
Cyrtina triquetra Hall

The following fossils, also identified by Stainbrook and generally associated with the upper Solon, were found at the very base of the exposure at "b" and throughout the lower part of "c".

Cystiphyllum sp.
Cladopora magna Hall
Cladopora fecunda Hall
Hexagonaria profunda (Hall)
Favosites sp.
Spirifer iowensis Owen
Spirorbis sp.
Zaphrentis sp.
Cyathophyllum sp.
Tylothyris subvaricosis (Hall)

It is significant that here, in an outlier of rather limited extent and so far from the recognized boundary of the Devonian sea (Fig. 1, taken from Stainbrook's maps, unpublished), a section representing three units of Devonian deposition exists. It is also significant that, although all three units are represented in a section that meas-

*These were fragments only.

ures less than eight feet from top to bottom, each unit maintains the lithologic and faunal relationships and characteristics that are found where they are represented by more than one hundred feet of section. At this location the lower Wapsipinicon is entirely missing and, although the Davenport is seen at "a", at "c" the Solon lies directly on Silurian limestones.

Dr. Norton, in discussing the outlier near Canton on the Jackson-Jones county line, concludes that the Devonian sea once carried its boundary at least that far into Jackson county and that the sediments deposited were the result of normal marine deposition. He did not believe they represented an isolated area of deposition connected to the main Devonian sea by an estuary.

Summary and Conclusions

An outcrop of limestone and dolomitic limestone located near center section 33, T. 84 N., R. 3 E. of the 5th Prime Meridian, Jackson county, Iowa, includes three units of Devonian deposition, Davenport, Solon, and Rapid. The area under consideration is an outlier and as such represents a north-easterly extension of the Devonian sea. An erosional unconformity has transgressed, for a limited area, the entire Wapsipinicon formation and, for a wider area, all of the Wapsipinicon except the Davenport.

The discovery of this second Devonian outlier in Jackson county does nothing to change the conclusions expressed by Norton, but merely adds new evidence to strengthen those conclusions.

Acknowledgments

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