

# Proceedings of the Iowa Academy of Science

---

Volume 23 | Annual Issue

Article 19

---

1916

## An Outlier of the So-Called Clinton Formation in Dubuque County, Iowa

Jesse V. Howell  
*State University of Iowa*

Copyright © Copyright 1916 by the Iowa Academy of Science, Inc.  
Follow this and additional works at: <https://scholarworks.uni.edu/pias>

---

### Recommended Citation

Howell, Jesse V. (1916) "An Outlier of the So-Called Clinton Formation in Dubuque County, Iowa," *Proceedings of the Iowa Academy of Science*, 23(1), 121-124.  
Available at: <https://scholarworks.uni.edu/pias/vol23/iss1/19>

This Research is brought to you for free and open access by the Iowa Academy of Science at UNI ScholarWorks. It has been accepted for inclusion in Proceedings of the Iowa Academy of Science by an authorized editor of UNI ScholarWorks. For more information, please contact [scholarworks@uni.edu](mailto:scholarworks@uni.edu).

## AN OUTLIER OF THE SO-CALLED CLINTON FORMATION IN DUBUQUE COUNTY, IOWA.

JESSE V. HOWELL.

During the summer of 1914 a considerable amount of grading was done at the forks of the road on the west side of Lora Hill, seven miles west of Dubuque. As a result of this work there was exposed along the road a band of peculiar reddish clay from one to two feet in thickness, underlain by the characteristic gray-green, plastic clay-shales of the Upper Maquoketa formation. The red clay is much less plastic than the underlying green shales, but is remarkable chiefly for the fact that it is composed largely of iron oxide and contains great numbers of small, rounded concretions or oölites. Also imbedded in this deep red clay are: a. numerous pebbles of smooth, polished chert, b. rounded fragments of indurated material similar to that of the clay, and c. rounded fragments of slightly iron stained shale.

The fragments belonging to the second class are crowded with oölites, but contain no fossils. Weathering has so softened the material of both oölites and matrix that it is not possible to polish the fragments for satisfactory microscopic study.

When examined under the low power of the microscope the oölites are seen to possess the same concretionary structure which characterizes similar bodies in the "Clinton" formation of Wisconsin and the true Clinton ore of the eastern states. The individual layers or coatings separate rather readily, exposing, usually, a more or less definite nucleus. Many of the oölites on being dried, show somewhat glazed surfaces, especially after removal of the outer layers.

Particularly in those portions of the clay near the contact with the unstained green shale, the red clay contains many fossils. All the forms appear to be of Ordovician age, and it seems probable that they come from the green shale, for a majority of the specimens are not replaced by iron. Two individuals, apparently sponges, are composed largely of iron oxide, but the structure has been so destroyed by weathering that their identity is not certain. Most of the fossils are silicified and all of them are broken and comminuted.

Qualitative chemical examination of the red clay reveals the presence of ferrous and ferric iron, carbonates, calcium, silica and aluminum. The oölites are largely siliceous but contain also calcium carbonate and iron.

Similar outcrops of the ferruginous material are found on the east side of Lore Hill at elevations which indicate that the bed lies in a practically horizontal position and probably is continuous throughout the hill. In one of these outcrops fragments of impure, cherty dolomite occur just above the iron band.

On the north side of the hill, twenty-one feet above the iron band, a small quarry exposes typical Niagaran dolomite containing the following fossils:<sup>1</sup>

- Halysites catenulatus.*
- Lyellia* (probably *americana*).
- Streptasma* sp.
- Cystoid (plate only).
- Plectambonites* sp.
- Orthis flabellites.*
- Dalmanella elegantula.*
- Platystrophia daytonensis.*
- Leptaena rhomboidalis.*

Evidently then the iron band lies at or near the contact of the Niagaran and Maquoketa. It is possible that most of the twenty-one feet concealed may belong to the recently described Alexandrian Series.<sup>2</sup>

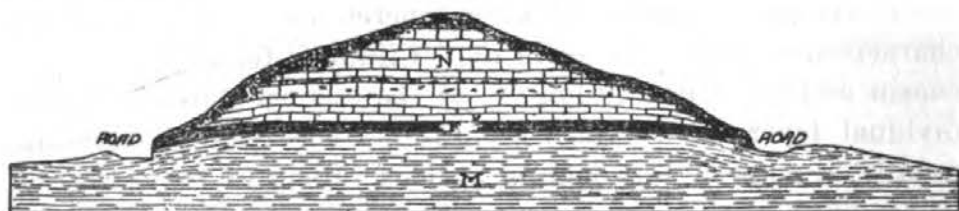


FIG. 9.

The diagram (figure 9) illustrates the probable conditions at Lore. Since the undisturbed layers are nowhere exposed it is not possible to ascertain the actual conditions. The thin band of ferruginous oölite lies between the soft, plastic shales of the top of the Maquoketa and the massive dolomite of the lower Niagaran. Probably the iron band originally was indurated, and this may yet be the condition at some distance within the

<sup>1</sup>Identified by Professor T. E. Savage, of the University of Illinois.  
Savage, T. E., Stratigraphy and Paleontology of the Alexandrian Series: 2  
Bull. Ill. Geol. Survey No. 23, 1913.

hill. But as weathering has continued inward from the sides of the hill the iron ore has softened and slumped with the soft shales underlying it. The slumping undoubtedly is aided by the pressure of the dolomites above. Considerable mingling of the two layers has taken place, and the division line between shale and iron band is not always definite.

#### CORRELATION.

The stratigraphic position of the oölitic band at Lore is practically identical with that of the so-called Clinton iron ore at Mayville and other points in eastern Wisconsin, as described by Chamberlin.<sup>3</sup> The Wisconsin ore rests on the eroded surface of the Cincinnati (Maquoketa) shale, and it too contains fossils of Maquoketa age which Chamberlin considers to have been mixed with the ore by the action of the glacial ice. Here also there is more or less mingling with the underlying clay shale, although the division in general is definite.

Thwaites<sup>4</sup> has described the "Clinton" ores of eastern Wisconsin as follows:

—————an essentially unaltered sedimentary deposit which occurs in broad lenses in eastern Wisconsin, between the overlying Niagara dolomite (Silurian) and the underlying Maquoketa ("Cincinnati") shale (Ordovician). The lenses vary greatly in thickness, one of 55 feet being the thickest known. On the other hand their extent is so meager that by far the greatest portion of the beds at the ore horizon show not even a trace of the "Clinton" ore.

Crane<sup>5</sup> speaks of the presence of a layer of red, oölitic iron ore in the Silurian of Holt county, Missouri, and suggests that it probably is of Clinton age (op. cit., p. 48). The member, however, was studied only in the material from a deep drill hole and the description is very incomplete.

Savage and Ross<sup>6</sup> have recently studied the "Clinton" deposits of eastern Wisconsin, and have found in the ore numerous fossils which indicate a closer relationship to the Ordovician than to the Silurian. They consider the ore to have been deposited in late Maquoketa time in local basins formed after the withdrawal of the main Maquoketa sea. The name "Neda Iron Ore" is proposed as a substitute for the apparent misnomer "Clinton Ore."

<sup>3</sup>Chamberlin, T. C., *Geology of Wisconsin*. Vol. II, 1877, p. 331.

<sup>4</sup>Thwaites, F. T., *Bull. U. S. Geol. Survey* No. 540, p. 338.

<sup>5</sup>Crane, G. W., *Missouri Bur. Geol. & Mines*, 2d Series, Vol. X, pp. 148-149.

<sup>6</sup>Savage, T. E., and Ross, C. S., *Am. Jour. Sci.*, Vol. XLI, 1916, pp. 187-193.

**SUMMARY.**

The marked similarity in lithologic character and stratigraphic position of the "Neda Iron Ore" and the oölitic material at Lore Hill seem to be sufficient ground for considering them parts of the same formation. It must not be assumed, however, that the sea in which they were deposited was continuous over the entire area between these widely separated outcrops. It is more probable, as suggested by Savage and Ross, that the deposition of the oölite took place in shallow, local basins which were at least intermittently connected.

It is not likely that the "Clinton" or "Neda" formation in Iowa will ever become of economic importance, for it appears to have a very limited areal distribution and but slight thickness. Further search along the Ordovician-Silurian boundary in north-eastern Iowa may, however, reveal larger patches than the one described.

GEOLOGY LABORATORY,  
STATE UNIVERSITY OF IOWA.