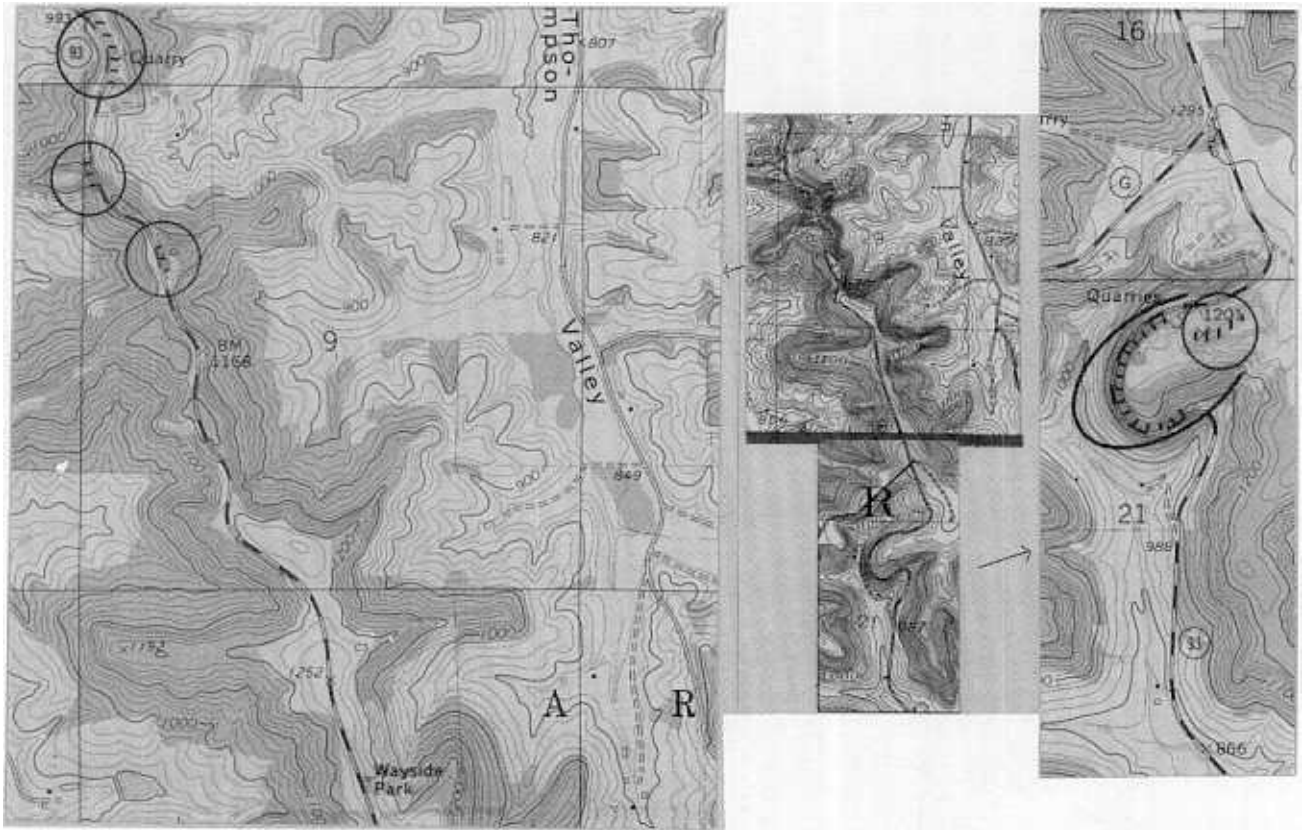


Title: Arcadia South

Location: Composite section from outcrops and quarries located along State Highway 93 and extending from 1.8 miles to 3.5 miles south of its intersection in Arcadia with State Highway 95 in the SE $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 9, T.20N., R.9W., Trempealeau County (Tamarack 7.5-minute topographic quadrangle, 1973).



Author: M. E. Ostrom (modified from Twenhofel, et al, 1935, Nelson, 1956, Mitby, 1967, and Ostrom 1970).

Description: This stop displays the St. Lawrence and Jordan formations to good advantage and it also illustrates one of the problems in the Upper Cambrian Stratigraphy in Wisconsin, namely determining the limits and relationships of the Black Earth Dolomite and Lodi Siltstone members of the St. Lawrence Formation.

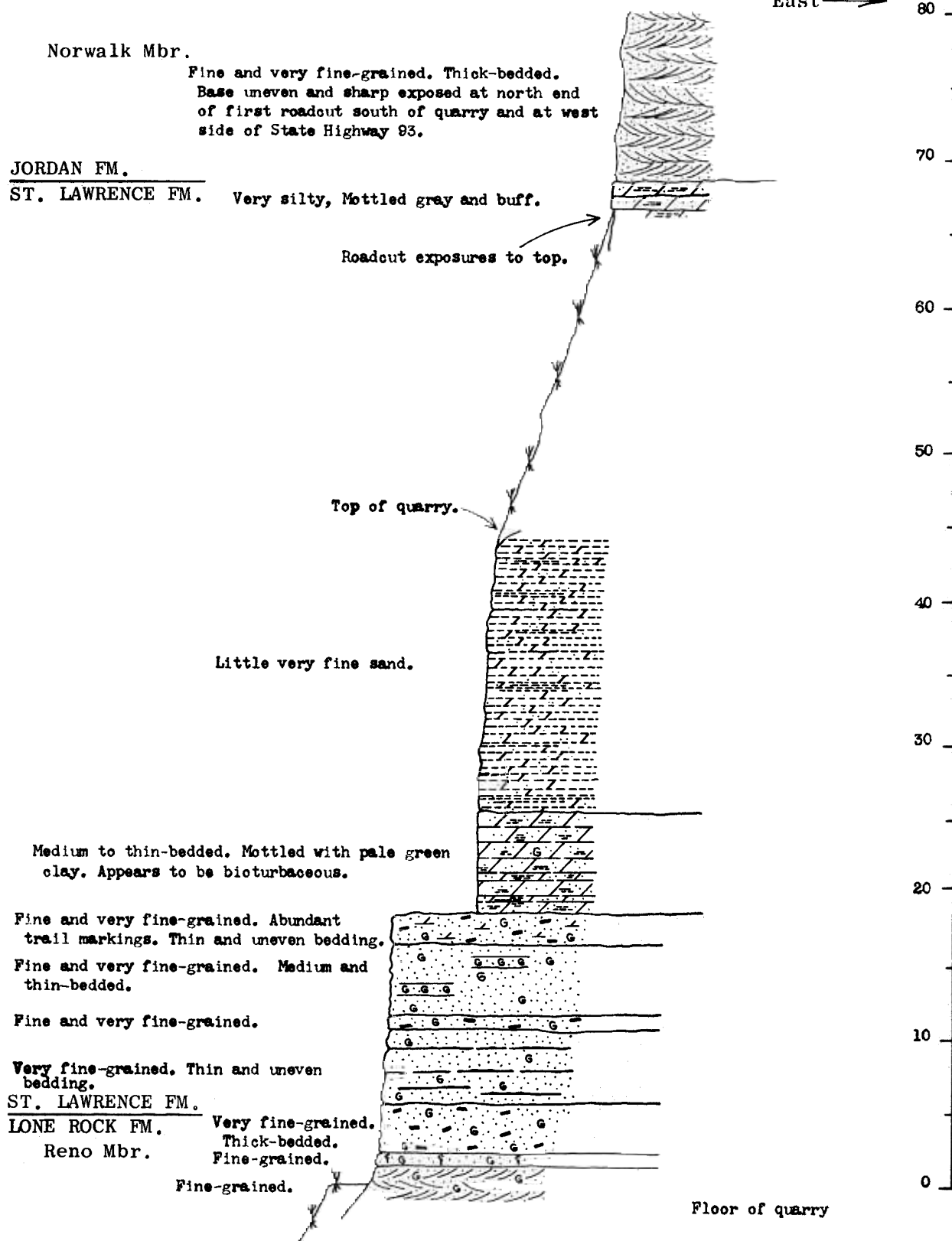
Nelson (1956) studied these units in the Upper Mississippi Valley area. He defined the Black Earth as ".....sandy dolomite and interbedded dolomitic siltstone and fine-grained sandstone" and in the vicinity of Black Earth and Madison and at localities along the Mississippi Valley as dolomite that is "...generally massive, brown to buff, slightly glauconitic...(with) ...algal structures locally." The Lodi Member consists of ".....siltstone, generally dolomitic, and dolomitic sandstone."

The fact that his definitions indicate both the Black Earth and the Lodi

↑
Continued

ARCADIA ROADCUTS & QUARRY
SW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 9, T. 20N., R. 9W.

East →



CONTINUED

ONEOTA FM. (Upper part not described)

Stockton Hill Mbr. Medium-grained. Appears to be brecciated locally.

JORDAN FM.

Sunset Point Mbr.

Medium-grained, friable.

Medium-grained.

Fine to medium-grained.

Coarse and fine-grained. Few white siliceous bands.

Coarse and fine-grained. Shale with little sand.

Fine-grained.

Fine and medium-grained. Some iron oxide.

Fine and coarse-grained. Friable.

Coarse and fine-grained. Medium-grained. Friable.

Fine-grained. Carbonate & silica concretions.

Medium-grained. Scattered carbonate concretions.

Medium and fine-grained. Pea-sized carbonate concretions at base.

Medium-grained.

Medium and fine-grained.

Medium and fine-grained. Some silica concretions.

Medium-grained. Abundant carbonate concretions.

Medium-grained. Friable, white & brown.

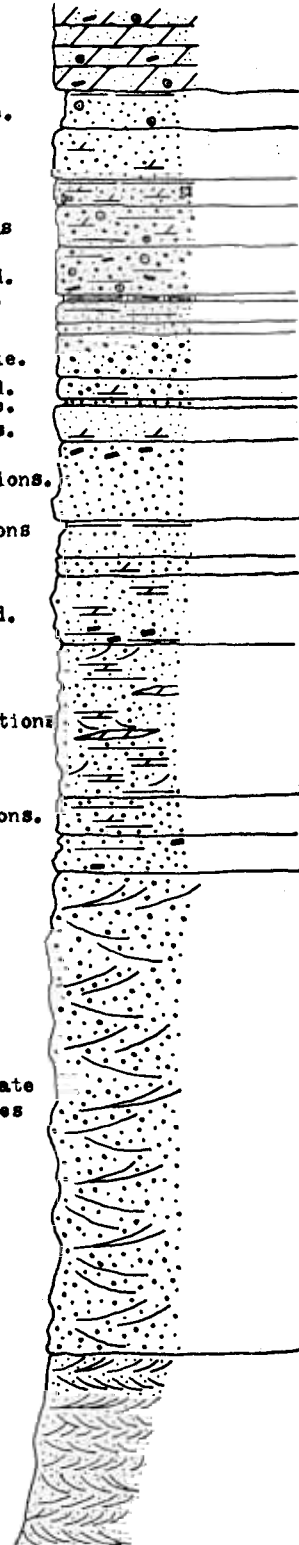
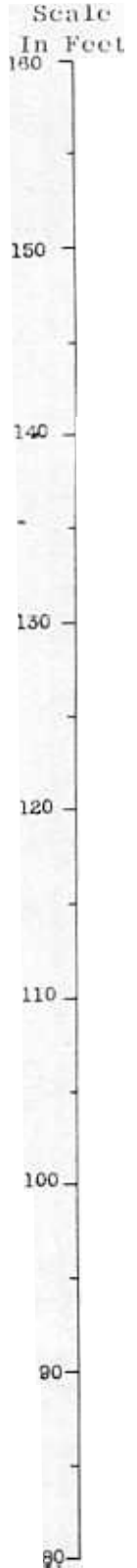
Van Oser Mbr.

Coarse and medium-grained. Pea-sized carbonate concretions near top grading to large masses toward base. Thick-bedded.

Norwalk Mbr.

Fine and very fine-grained. Thick-bedded.

East →



Continued

can consist of dolomitic siltstone and fine-grained sandstone is reason why it is commonly very difficult to distinguish the two members as can be seen at this exposure. Here Nelson assigned the lower 17 feet of the St. Lawrence to the Lodi the middle 12-foot portion to the Black Earth, and an overlying 15-foot section to the Lodi for a total thickness of about 44 feet. Close examination of the outcrop reveals that if a Black Earth Dolomite occurs here it is probably the 7 feet of very silty dolomite in the interval from 19 feet to 26 feet above the base of the exposure. However, there does not appear to be any marked difference in lithology such as would suggest the presence of Black Earth lithology rather than Lodi. The Wisconsin Geological and Natural History Survey recognizes the Black Earth as a medium to thick-bedded, medium to coarsely-crystalline dolomite that is locally silty, sandy and glauconitic with fossil algae and with the possible exception of several thin beds assigns all of the St. Lawrence Formation of this exposure to the Lodi Member. The Norwalk Member of the Jordan Formation consists of very fine and fine-grained non-silty sandstone which is thick-bedded to thin-bedded. At this exposure it is separated from the underlying silty and dolomitic Lodi by a sharp and uneven surface interpreted to indicate post-Lodi erosion. At the majority of outcrops of this interval in Wisconsin the contact appears to be completely gradational. However, the fact that the Norwalk and Van Oser constitute a thick body of sandstone similar in character to the Galesville and others of the Cambrian and Ordovician sandstones of this region suggests that the Jordan probably had a similar origin, namely that it formed on an erosion surface by a process of coalescing of beach deposits in a transgressing sea, but that in at least this area erosion was a minor factor.

The Van Oser Member of the Jordan Sandstone is characterized by medium-grained sandstone with some coarse and a little fine. Contact of the Van Oser with the Norwalk is commonly though not always sharp. At this exposure the contact is slightly uneven. Contact relations of overlying beds will best be examined at subsequent stops.

Field study by McGannon (1960) led him to propose the name Stockton Hill Formation for those strata between the Lone Rock Formation below and Jordan Formation above. The top of the Lone Rock is marked by 3 feet of flat-pebble conglomerate overlain by 0.7 feet of "wormstone", a burrowed, glauconitic, calcareous, silky fine-grained sandstone. McGannon's Stockton Hill Formation extends 36.7 feet upward to 6.4 feet below the top of the quarried section. The lower 24.1 feet are assigned to the Lodi Member; the upper 12.6 feet to what he has named the Red Wing Member. The upper 6.4 feet which he assigned to the Jordan Formation contains from 28 to 50 percent carbonate and from 35 to 50 percent of silt and finer particles which does not conform to other descriptions of the Jordan. Contact of fine-grained Jordan Sandstone containing only minor carbonate and silt can be observed in the first roadout above the quarry and west of Highway 93. It is believed this is the actual contact. The Wisconsin Geological and Natural History Survey retains the name St. Lawrence Formation for what McGannon proposes to call the Stockton Hill Formation and assigns all of the St. Lawrence at this exposure to the Lodi Member.

The Jordan Sandstone is divided on the basis of composition, texture, and bedding characteristics, into three members, the lower Norwalk, the middle Van Oser, and the upper Sunset Point. These can be traced throughout southwestern Wisconsin and into eastern Minnesota and Iowa.

The Jordan Sandstone is overlain by the Oneota Dolomite Formation of the Prairie du Chien Group.

Quarries in the Oneota Formation are located along Highway 93 south of the Jordan Sandstone outcrops and at the crest of the ridge which forms the Skyline Drive. The Oneota is a primary source of crushed stone used for construction throughout much of southern Wisconsin. This is a "portable operation", namely the crushing and processing equipment is portable as opposed to stationary.

Significance: This stop illustrates the contact relationship of the Lone Rock Formation with the St. Lawrence Formation and of the second cycle with the third cycle. It also illustrates a major use of Wisconsin's dolomite formations.

What is the major difference between the Lone Rock and St. Lawrence Formations? The St. Lawrence and Jordan Formations? Where would you place the contact of the Lone Rock with the St. Lawrence? The St. Lawrence with the Jordan? The Jordan with the Oneota? What were their environments of deposition and what is the supporting evidence? What similarities and differences can you make between the same lithotypes of the 3 cycles you have seen? How do you interpret these differences? Why have the quarries in the Oneota Dolomite been developed in this area? (consult a geologic map of the state). What environmental and economic problems are associated with quarrying? Portable versus stationary operations?

References: Twenhofel, Raasch, and Thwaites, 1935; Melby, 1967; Nelson, 1956; McGannon, 1960; Ostrom, 1970.