Title: Montreal River

Location: In Montreal River Gorge from mouth in SE$\frac{1}{4}$, SW$\frac{1}{4}$, Sec. 7, T.47N., R.1E Iron County (Little Girls Point 15-minute topographic quadrangle, 1956). Can be reached by road and foot path from Michigan side of river and northeast of power dam.

Author: M. E. Ostrom, modified from R. D. Irving (1880, p. 191-192) and Hite (1968, p. 111).

Description: Gorge cut in Keweenawan sediments and volcanics by Montreal River. Exposures from river mouth upstream to Superior Falls are in the Upper Keweenawan Freda Formation. Further upstream, as at the Saxon Power Station, Middle Keweenawan volcanics and interbedded sediments are exposed. A summary section of rocks exposed in the Montreal River gorge is as follows:

PRECAMBRIAN

Upper Keweenawan (13,550.0 ft.)

Freda Sandstone Formation (12,000 ft. +)

Sandstone, red and brownish red, fine-grained, abundant feldspar, shaly. 12,000.0 ft.

Nonesuch Shale Formation (350 ft.)

Shale and fine-grained sandstone; black to brown, abundant feldspar, calcareous, micaceous; layers of black shale, thinly laminated, up to 50 feet thick. 350.0 ft.

Outer Conglomerate Formation (1200 ft.)

Conglomerate, boulders 4 to 15 inches in diameter of basalt, rhyolite, gabbro, quartzite, vein quartz, slate, iron formation, granite, and others. Little sandy matrix; much calcite. 1200.0 ft.

Middle Keweenawan (1,209.0 ft.)

Alternating layers of volcanic flows (diabase), red shaly and feldspathic sandstone, and thinly laminated red shale. 1,209.0 ft.

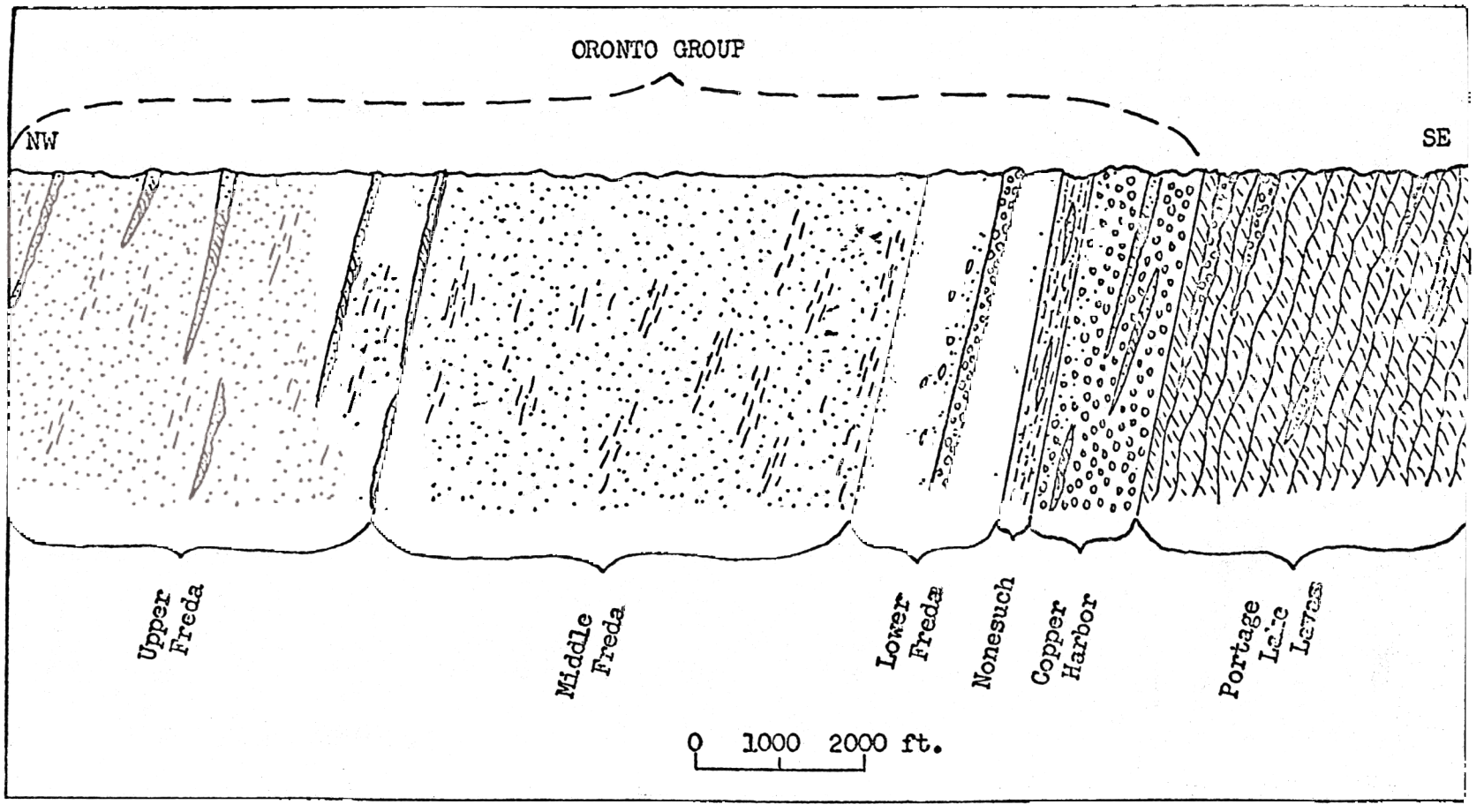
A detailed description of the Freda Sandstone section from Superior Falls downstream to the Superior Power Station (modified from Hite, 1968, p. 111):

PRECAMBRIAN

Upper Keweenawan

Freda Sandstone Formation (100.0 ft.)

9.0'	9.0'	8.	Siltstone, red, micaceous and laminated, interbedded with white to green feldspathic sandstone, fine-grained, thin-bedded.
-29.0'	20.0'	7.	Sandstone, red, fine-grained, abundant feldspar, bedding poorly developed, shale pebbles common in upper part.
29.0' -33.0'	4.0'	6.	Sandstone, red, very fine- and fine-grained, laminated, cross-bedded.
-51.0'	18.0'	5.	Shale and fine siltstone, brick red, abundant feldspar micaceous, laminated, interbedded coarse-grained cross-bedded sandstone 6 ft. below top of unit.
51.0' -77.0'	26.0	4.	Sandstone, red, very fine- to fine-grained, abundant feldspar, laminated, with micro cross-bedding which becomes more abundant upward in section; distorted bedding in middle portion of section.
77.0' -87.0	10.0'	3.	Siltstone, red, micaceous with abundant feldspar, laminated with shales and cross-bedded siltstones.



Idealized section of the Oronto Group along the Montreal River, Wisconsin

Mouth of river is at left of diagram.

87.0' -95.0'	8.0'	2.	Siltstone, red, micaceous with abundant feldspar, irregular laminations with micro cross-bedding and ripple marks in upper part; interbedded with red fine-grained sandstone.
95.0' -100.0'	5.0'	1.	Sandstone, red, fine-grained, abundant feldspar, laminated, rib and furrow structures.

Significance: Principals of geologic history and of geomorphic processes are illustrated by this exposure. The geologic section as shown in the idealized cross-section (Hite, 1968, p. 26) indicate both a major change in materials deposited in the area and a significant structural deformation. The lithologic and structural relationship of these rocks to both older and younger rocks is significant to reconstructing the regional historical geology. For example, how are they related to younger and essentially flat-lying rocks exposed to the west and north of this area and which contain less feldspar and less shale? Why are these rocks assigned to the Precambrian? What was the source of materials which formed these rocks?

Geomorphic processes of distribution and construction relating to both stream and wave action are in evidence. Explain the steep bluffs of the Lake Superior shoreline, the "bar" of boulders which blocks the mouth of the Montreal River, the deep gorge from Superior Falls to the lake shore, and the reason for the location of Superior Falls. Have these features been formed by recent events relating to man's activities? For example, are the steep bluffs along the lake shore a product of natural events? Are they man-caused? A combination of the two?

References: Irving, 1880; Thwaites, 1912; Hite, 1968