

A few notes about Geology in the Lake Opinicon Area

By Frank Phelan

This is not intended to be a comprehensive report on bedrock geology, rather to point out some factors which impact on prospects for mining as a commercial pursuit, whether mica or phosphate (and some other minerals).

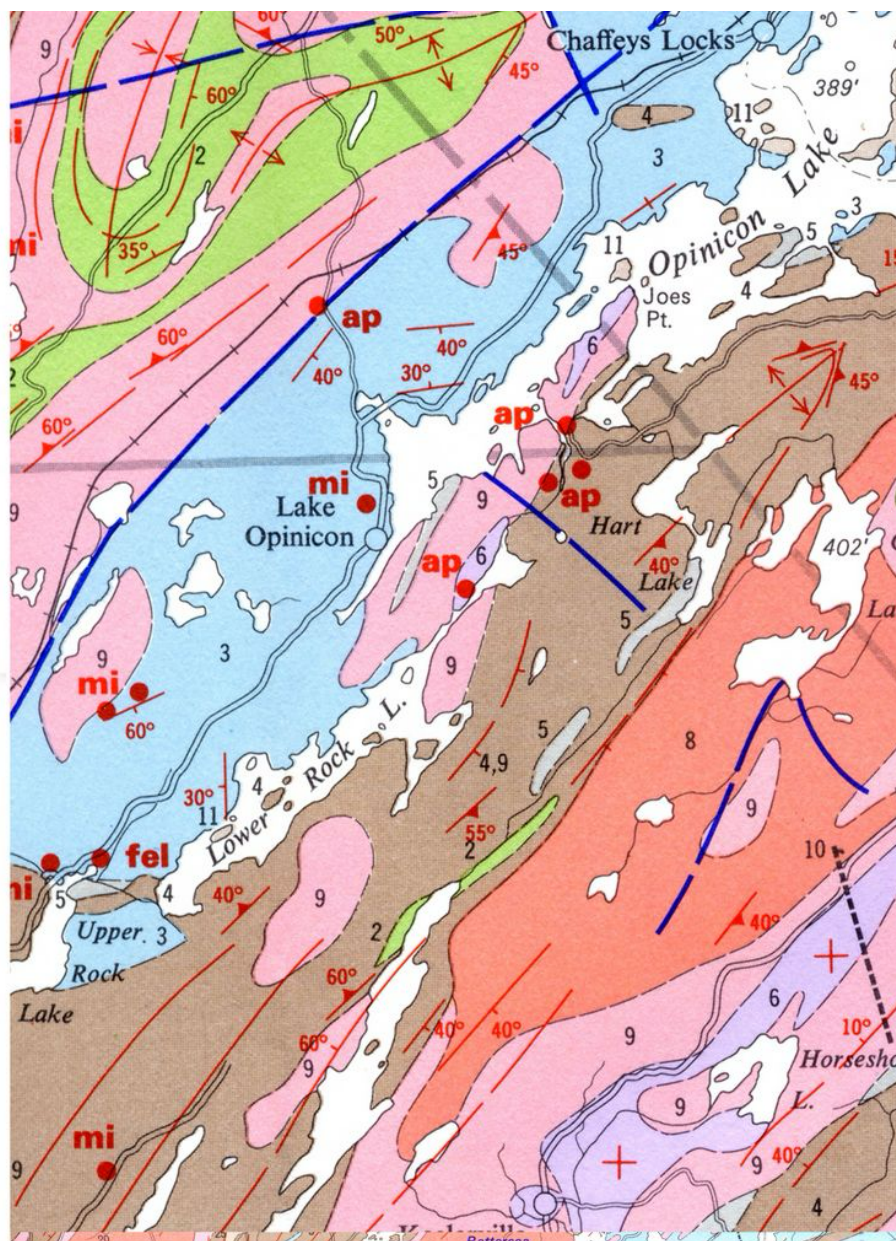
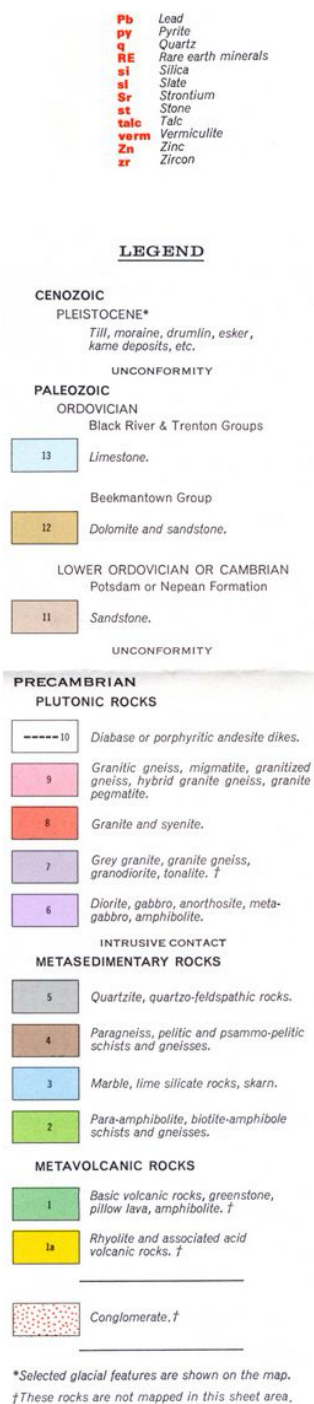
The Lake Opinicon area lies alongside the Frontenac Arch or Axis, an ancient (Precambrian) rock type, dating from more than a billion years ago. What we see today are the remnants of a great mountain range which has been worn away over the millennia. Under the weight of those ancient mountains, the rocks were subjected to tremendous pressure and temperature, resulting in admixtures of rock types and mineral concentrations. This Frontenac Arch or Axis is the local continuation of the Canadian Shield which extends into the United States as the Adirondacks.

Since Lake Opinicon is at the margin of this formation, there is a meeting of younger rock types with the ancient, resulting in a highly varied local geology. Add in a series of glaciation events, glacial lakes and inland seas in the area, and the local geology becomes complex. This complexity has provided opportunities for easy access to and mining of certain minerals and ores.

Figure 1, a section of Map 2054 of the Canadian Geological Survey, is centered on Lake Opinicon Village, and with Opinicon Lake on a diagonal. In this map, it is noticeable that the comparative geology of areas north and south of the lake are very different. Note that the red dots, which depict mine sites reflect this difference. [ap = apatite (phosphate); mi = mica; fel = feldspar]. Although mica and apatite may occur together, in the locality, mica mines are generally located north of the lake and phosphate mines are generally located south of the lake, reflecting the differences in local geology.

This diagonal shift in rock type has long been noted. Vennor (1873: *Report of Explorations and Surveys in the Counties of Addington, Frontenac, Leeds and Lanark*, by Mr. Henry Vennor, addressed to Alfred R.C. Selwyn, Esq. F.G.S., Director of the Geological Survey of Canada) described a syncline or trough running through the area of Opinicon Lake. "A line, which may be said to represent as nearly as possible the axis of this synclinal, runs from about the centre of Wright's Island, — situated in the Rideau, towards the north-west corner of South Crosby township, — south-westward through the south-eastern corner of Bedford, and midway between Buck Lake and Opinicon and Rock Lakes in Storrington and Loughboro' [sic] townships. The outline of this trough is clearly indicated by two out-crops of white crystalline limestone, a north-westerly and a south-easterly one, which converge on their south-westward course until they meet or almost meet at the extreme south-western end of Buck Lake in Loughboro' [sic]."

Hugh Robert Wynne-Edwards in his local research from the 1960s (Wynne-Edwards, H.R. 1967. *Geological Survey of Canada Memoir 346: Westport Map-Area, Ontario, with special emphasis on the Precambrian Rocks*) depicts the change in geology across Opinicon Lake in two ways. In Figure 2, the different metamorphic units are displayed and reflect differing mineralogy. In Figure 3 details of the rock types occurring on either side of Opinicon Lake are provided.



Map 2054

This scan is the
 centre 1/3 of Map 2054

GANANOQUE AREA
 ONTARIO

Vertical alignment of map is very close
 to N-S. Use lakes & township boundaries
 for exact alignment

Figure 1. An excerpt from Map 2054, Geological Survey of Canada.

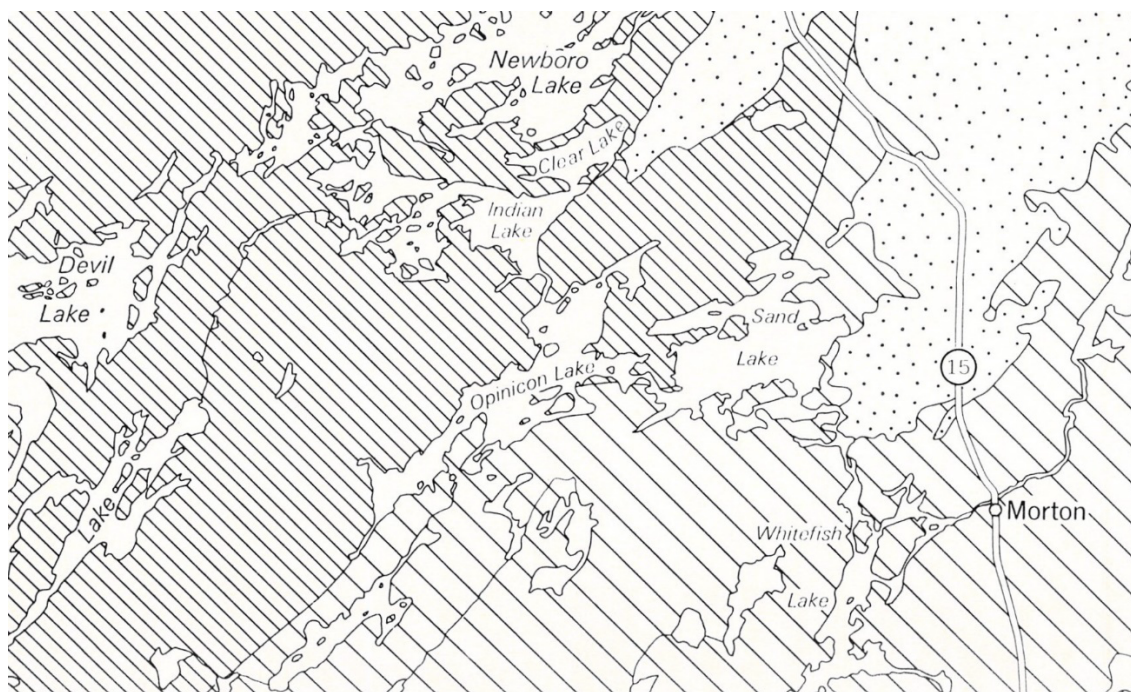
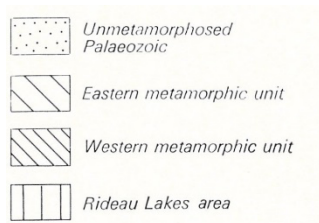


Figure 2: Metamorphic Units in Westport Map-Area.

A portion of Figure 1, p44 of Wynne-Edwards, H.R. 1967. *Geological Survey of Canada Memoir 346: Westport Map-Area, Ontario, with special emphasis on the Precambrian Rocks.*

Legend:



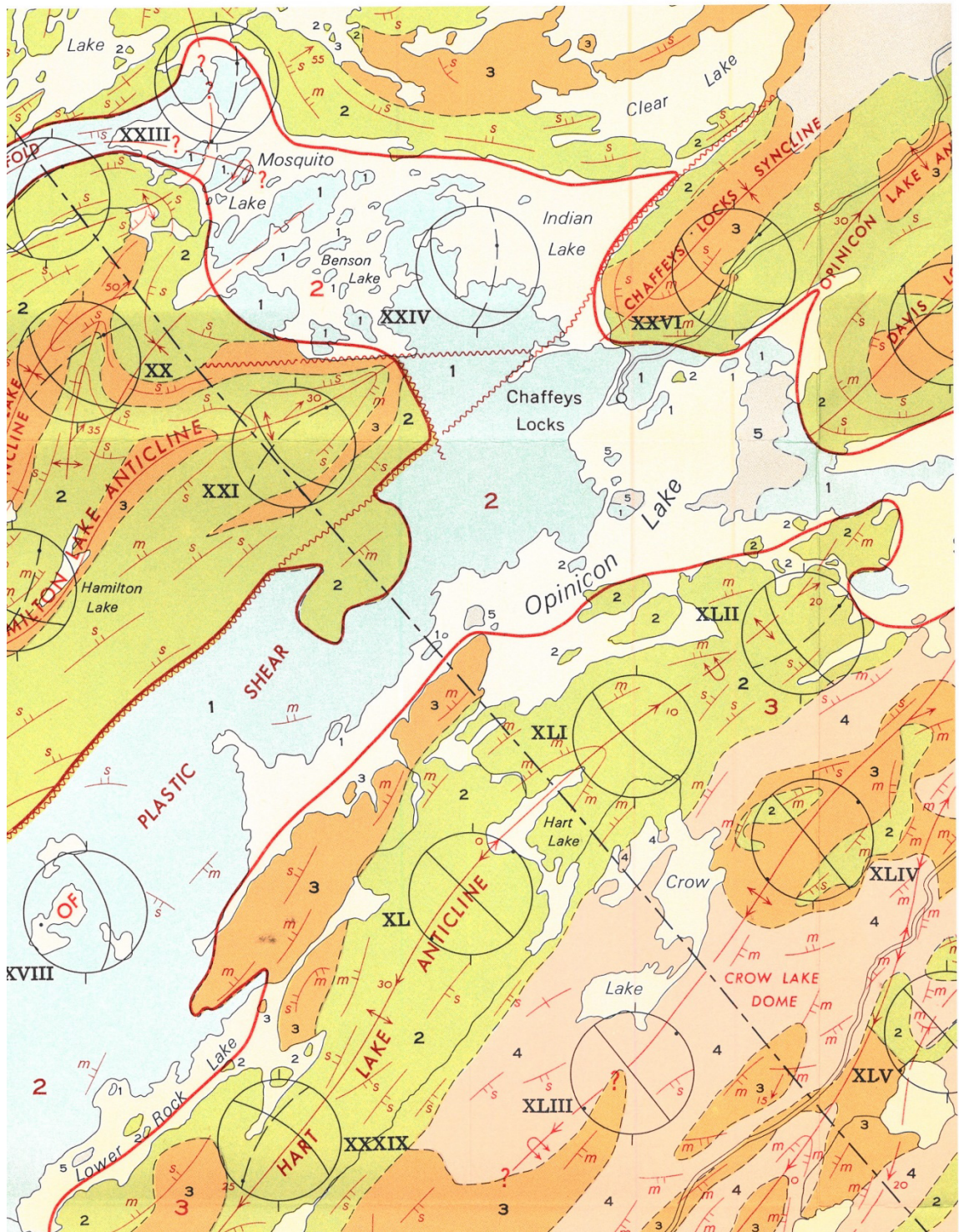


Figure 3: Interpretative Structural Map of Westport Map-Area, Ontario, Part of Fig 21 of (Wynne-Edwards, H.R. 1967. *Geological Survey of Canada Memoir 346: Westport Map-Area, Ontario, with special emphasis on the Precambrian Rocks*)

Mica and phosphate are often found together in the crystalline limestone formations of the area. Below are some internet images of the target minerals.



Phlogopite Mica. Géry Parent - Own work. CC BY-SA 3.0 Attribution-ShareAlike 3.0 Unported



Peloidal phosphorite or phosphate rock. James St. John. CC BY 2.0. Attribution 2.0 Generic Deed