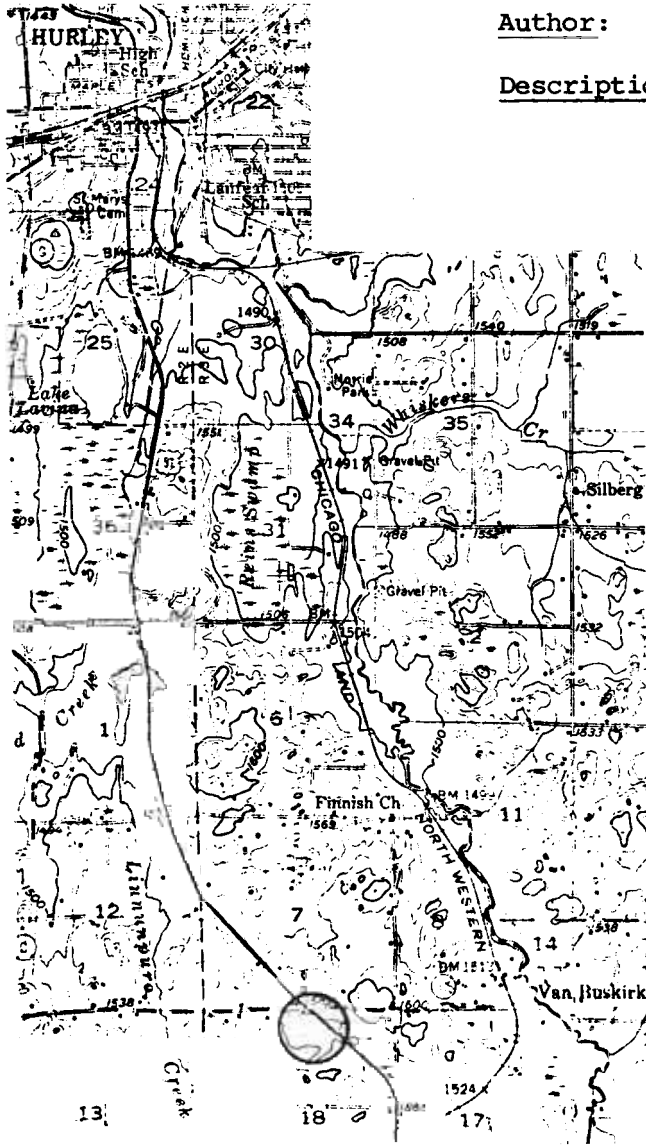


Title: Early Precambrian Granite

Location: U.S. Hwy. 51 about 5 miles south of Hurley (just south of County Hwy. C). NE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 18, T.45N., R.2E.
(Ironwood, Wis.-Mich. 15 Minute Quadrangle)



Author: Gene L. LaBerge

Description: This exposure is typical of granitic rocks intrusive into the Early Precambrian greenstones in the northern part of the Lake Superior region. Both the granites and greenstones were extensively eroded prior to deposition of the Middle Precambrian sedimentary sequence that includes the iron-formation. The contact between Early Precambrian granites and the sediments is exposed at several places along the Gogebic Range, for example at the Anvil Mine just east of Bessemer, Michigan (Schmidt and Hubbard, 1972).

The rock is a somewhat gneissic biotite quartz monzonite. There is some cataclasis (crushing) of the quartz and feldspar, presumably associated with the deformation that produced the gneissosity in the rock. Schmidt (1972) discusses some of the complex field relations within this very inhomogeneous granitic mass.

Significance: The relatively unmetamorphosed Early Precambrian granites and greenstones are part of an extensive terrane that formed about 2600-2700 million years ago (Morey & Sims, 1976). Rocks of this type and age are common for several hundred miles north of here (north of the Keweenaw rocks of the Lake Superior Basin), but are scarce or absent to the south. Rocks of probable Early Precambrian age to the south are mainly gneisses, amphibolites, and migmatites of much higher metamorphic grade, such as those we will see in the Eau Claire-Chippewa Falls area. Radiometric ages reveal that these rocks formed more than 300 million years ago, and thus constitute an older terrane (the "gneiss terrane" of Morey and Sims, 1976). The boundary between these two terranes is not exposed, but is believed to be about 10 miles south of here (see map by Sims, 1976).

Thus, there are two basically different types of Early Precambrian crustal rocks in Wisconsin, and this exposure lies near the southern boundary of the relatively unmetamorphosed greenstone-granite terrane. Question: In what type of tectonic environment was the greenstone-granite terrane developed? Is the difference in metamorphism and deformation result solely from a difference in age, that is, does it represent the last batch of greenstone-granite sequences, or is the difference more fundamental?

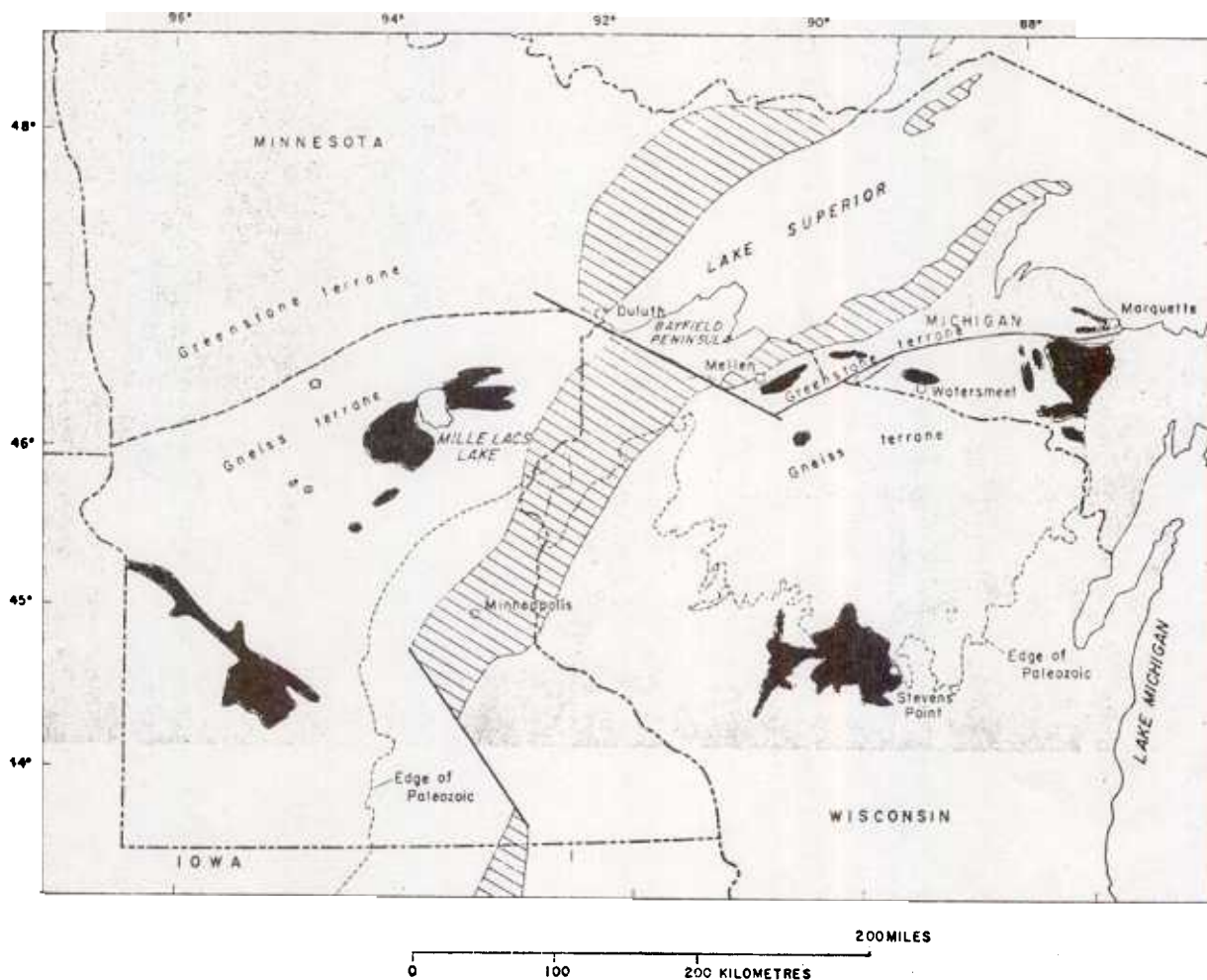


FIG. 5. Map of Lake Superior region showing distribution of Precambrian W greenstone and gneiss terranes. Modified from Morey and Sims (1976, fig. 8). Except for midcontinent gravity high (line rule), younger rocks of Precambrian X and Y ages are omitted. Heavy solid lines, possible Keweenaw transform faults, reactivated from older continental fault systems (modified from Chase and Gilmer, 1973); dense random pattern, exposure of Precambrian W gneiss; black, exposure of Precambrian W greenstone (Michigan and Wisconsin only); dark stipple, minimum inferred extent of gneiss terrane at surface and in subsurface; light stipple, minimum inferred extent of greenstone terrane at surface and in subsurface. Bayfield Peninsula is underlain by Precambrian Y or Z sedimentary rocks.

(From Sims, 1976.)

References:

- Morey, G. B. and Sims, P. K., 1976, "Boundary Between Two Precambrian W Terranes in Minnesota and Its Geologic Significance," *Geol. Soc America Bull.*, Vol. 87, pp. 141-152.
- Schmidt, R. G. and Hubbard, H. A., 1972, Penokean Orogeny in the Central and Western Gogebic Region, Field Trip A, 18th Annual Inst. on Lake Superior Geology, Houghton, Mich.
- Sims, P. K., 1976, Precambrian Tectonics and Mineral Deposits, Lake Superior Region, *Econ. Geol.*, Vol. 71, pp. 1092-1127.