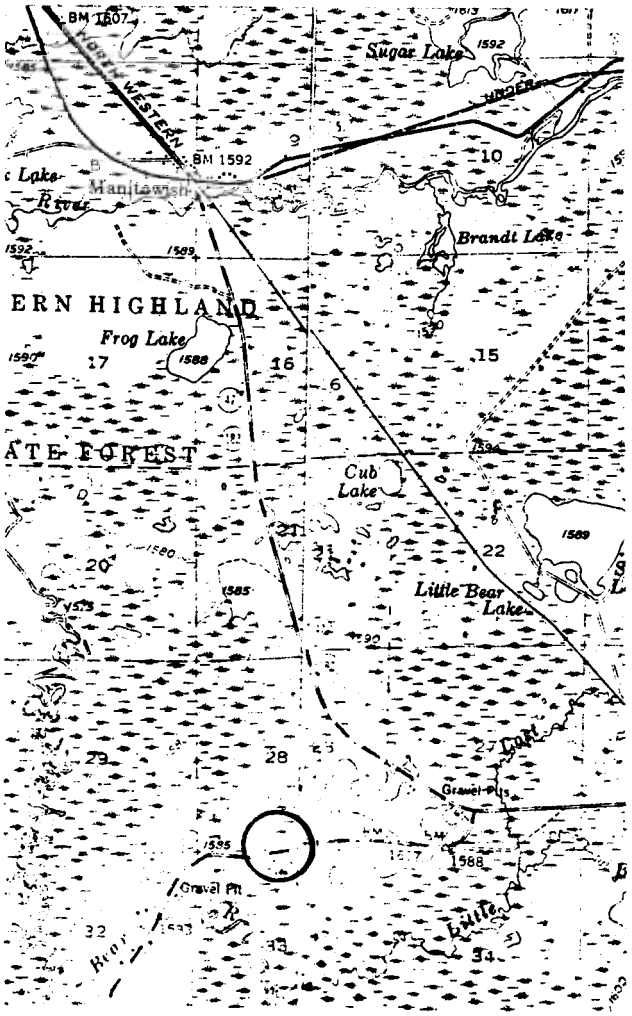
Title: Powell Kyanite

Location: SE¼, SW¼, Sec. 28, T.42N., R.4E.
(Mercer 15 Minute Quadrangle) on Hwy. 182



Author: Gene L. LaBerge

Description: The exposures here are a coarse-grained quartz-plagioclase-biotite-kyanite-muscovite-garnet-staurolite schist or gneiss. Grain size of most minerals is .5-1 cm, but kyanite blades up to 5 cm are present. Clusters of possible sillimanite needles are present in some of the coarser material.

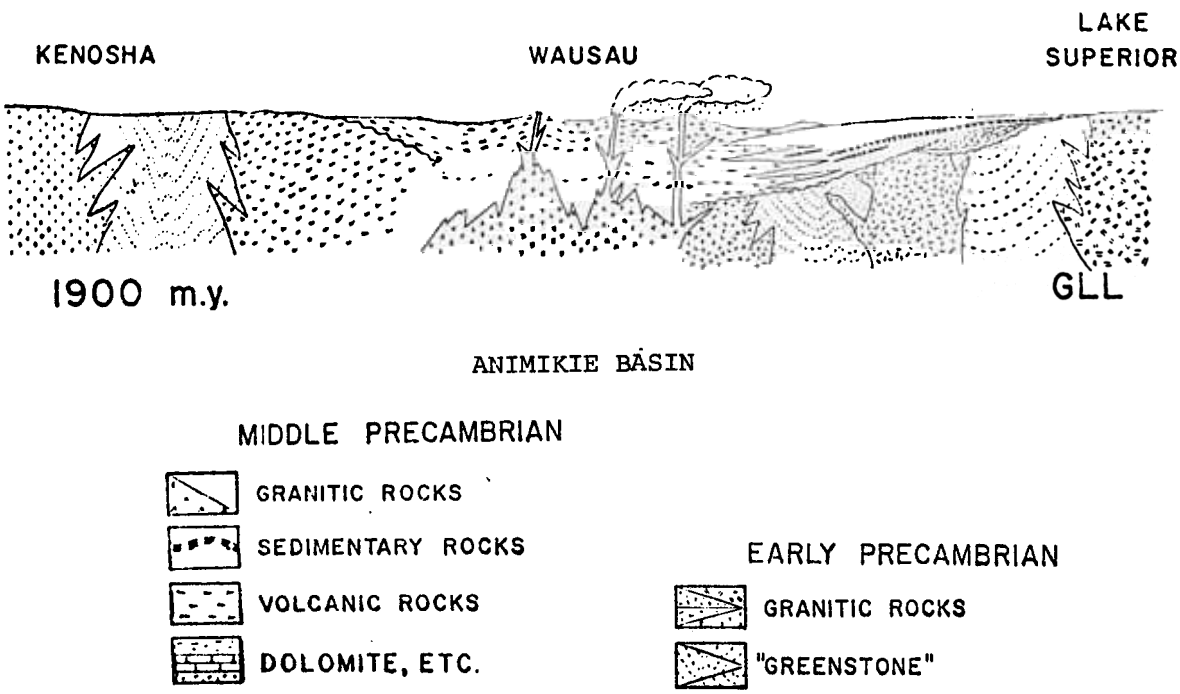
Numerous rod-like (boudinaged?) quartz pods and scattered quartz-feldspar or pegmatites are present. The rocks have been intensely deformed with complex small-scale folds visible on several of the outcrops. Determine the orientation of the fold axes.

Although this is an isolated exposure of Precambrian rocks, it has been traced to the northeast by exploratory diamond drilling in the early 20th Century (see report by Allen and Barrett, 1915). James (1955) includes this area in his "Watersmeet Node," an elongate area of high-grade regional metamorphism. The metamorphic intensity decreases outward in all directions from this central high (Dutton & Bradley, 1970). The exploratory drilling that established this as part of a belt of metamorphic rocks was done along a linear magnetic anomaly caused by a metamorphosed magnetite-rich iron-formation. Metamorphism here reached at least the kyanite, and perhaps the sillimanite grade. Question: What causes the oval-shaped area of high grade metamorphism in this part of Wisconsin?

Significance: These rocks are generally believed to be highly metamorphosed equivalents of the Tyler Slate we examined near Hurley. Their association with magnetic iron-formation is an important aspect leading to the correlation If this interpretation is valid, then these rocks must have been deformed

and metamorphosed during the Penokean Orogeny, about 1800-1850 million years ago. Recall that the slates and iron formation at Hurley were largely unmetamorphosed and undeformed during the Penokean Orogeny, and that Early Precambrian greenstones and granite occur between here and Hurley. Thus, there is no simple transition from the relatively unmetamorphosed and metamorphosed rocks to the north and those exposed here.

West along this zone at Butternut the iron-formation and graywackes are interbedded with volcanic rocks. Approximately 30 miles south of here the Middle Precambrian rocks are dominantly volcanics. Thus, the Animikie Basin becomes progressively volcanic in character southward as shown in the diagram.



(From LaBerge, in preparation)

References:

Allen, R. C. and Barrett, L. P., 1915, Contributions to the pre-Cambrian Geology of Northern Michigan and Wisconsin: Mich. Geol. and Biol. Survey, Pub. 18, Geol. Ser. 15, pp. 65-129.

Dutton, C. E. and Bradley, R. E., 1970, Lithologic, Geophysical and Mineral Commodity Maps of Precambrian Rocks in Wisconsin, U.S.G.S. Misc. Geol. Inv. Map I-631.

James, H. L., 1955, Zones of Regional Metamorphism in the Precambrian of Northern Michigan: Geol. Soc. Amer. Bull., Vol. 66, pp. 1455-1487.