PRELIMINARY GEOLOGIC MAP OF THE SOUTHERN PART OF THE CHAMPION 7 1/2 MINUTE QUADRANGLE MARQUETTE COUNTY, MICHIGAN

by

W. F. Cannon

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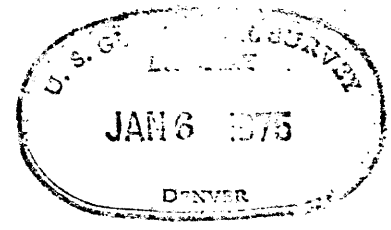


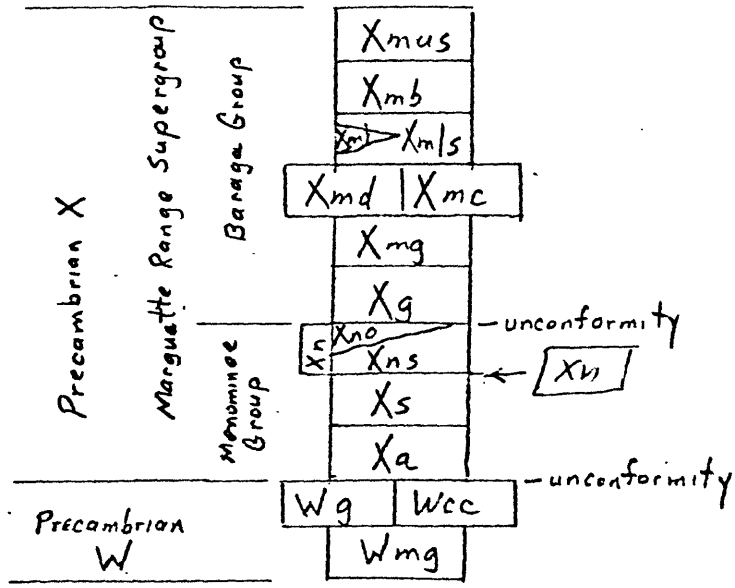
U.S. Geological Survey open-file map

Work done in cooperation with

Geological Survey Division,

Michigan Department of Natural Resources

Correlation of map units.



Description of map units

Xmus

Michigamme Formation- upper slate member (Precambrian X). Near base is black carbonaceous pyritic slate which is overlain by a thick sequence of interbedded dark gray to blue gray metagraywacke and argillite in beds a few inches to a few feet thick, some of which contain abundant stuarolite porphyroblasts.

Xmb

Michigamme Formation - Bijiki Iron-formation Member (Precambrian X). Generally banded (1/4-1/2") grunerite-chert iron-formation with some interbeds of fine grained graywacke, but in detail is highly variable both along and across strike. In places it is strongly magnetic but commonly changes to non-magnetic rock within a few feet along strike making it difficult to accurately trace magnetically. In strongly folded areas such as in sections 29 and 30, T. 48 N., R. 29 W. and in brecciated zones the grunerite and magnetite have been oxidized within a few hundred feet of the surface to earthy red hematite and limonite, in places botryoidal or stalactitic. Hematite and limonite commonly cement brecciated chert and where chert has been largely removed by solution the material has been mined as iron ore.

Xmls

Michigamme Formation- lower slate member (Precambrian X). Variable and poorly exposed unit with dark gray to black siltstone and graywacke, black graphitic pyritic slate, black to dark gray massive to thickbedded quartzite. Individual outcrops are designated "q" where mostly quartzite or graywacke and "s" where mostly slate or siltstone. The finer grained rocks commonly have well developed slaty cleavage and coarser grained rocks in places have prominant fracture cleavage. The member contains at least two and possibly more thin units of gruneritic iron-formation (Xmi) which are lithologically indistinguishable from the Bijiki Iron-formation Member.

Xmc

Michigamme Formation- Clarksburg Volcanics Member (Precambrian X). Well bedded pyroclastic rocks of mafic to intermediate composition with lesser amounts of flow rock and argillaceous metasedimentary beds. Pyroclastic beds vary from about 1" to several feet thick and are interbedded tuff and agglomerate with fragments as much as several feet in diameter. Fragments are mostly volcanic rocks, now amphibolite, and less commonly argillaceous or cherty metasedimentary rocks and rarely granitic rocks. Flows are massive or vesicular, fine to medium grained amphibolitic rock. Metasediments form units from a few inches to a few tens of feet thick and are thin bedded quartzose biotite-garnet schist, in places magnetic.

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Xmd

Metadiabase (Precambrian X). Dark green to black metamorphosed mafic rock varying from massive plagioclase-amphibole rock with preserved diabasic texture to biotite amphibole schist. Larger bodies are commonly massive to slightly schistose but generally have highly schistose margins, whereas smaller bodies are typically highly schistose. In places are garnetiferous, especially in more schistose varieties and near contacts where cutting Negaunee Iron-formation.

Xmg

Michigamme Formation- Greenwood Iron-formation Member (Precambrian X). Thin bedded (1/2-1/4") gray-brown meta-argillite with alternating beds of quartz-rich and biotite-rich rock. Biotite-rich units are commonly garnet-bearing and, in places, magnetic.

Xg

Goodrich Quartzite (Precambrian X). Poorly exposed unit. Near Champion mine is massive to thick bedded ferruginous quartzite near base and generally less ferruginous up section. Locally highly aluminous and rich in andalusite porphyroblasts. On north limb of Marquette Trough is unknown in outcrop and its presence is only inferred from data to the east and west of the quadrangle.

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Xno

Negaunee Iron-formation (Precambrian X). Xno-Interbanded gray chert and hematite magnetite mixtures. Forms thin unit near top of formation and contains bodies of high grade hematite-magnetite ore mined extensively at Champion mine and to a lesser extent at operations in SW 1/4, Sec. 32, T. 48N., R. 29W.

Xns

Xns- Banded grunerite-magnetite-chert iron-formation. Most is interlayered beds (1/2-1") of white to gray chert and grunerite-magnetite mixtures in which grunerite predominates. Less commonly chert beds are rare or absent and banding is expressed by variations in grunerite-magnetite ratios.

Xn

Undifferentiated iron-formation- known mostly from geophysical measurements or drilling.

Xs

Siamo Slate (Precambrian X). Very poorly exposed unit known from a single exposure in Sec. 36, T. 48 N., R. 29 W. where it is interbedded gray argillite, black slate and gray quartzite. The unit is projected along the north flank of the Marquette Trough where a few drill holes report slate and dirty quartzite. A discontinuous weak magnetic anomaly in this area may be caused by an iron-rich unit in the Siamo.

Xa

Ajibik Quartzite (Precambrian X). A few drill holes indicates a thin unit of vitreous quartzite at the base of the Precambrian X section but the unit is unknown in outcrop except for a very small exposure of gray to white vitreous quartzite believed to be the upper part of the Ajibik in the NW 1/4, Sec. 36, T. 48 N., R. 29 W. Near the E 1/4 corner of Sec. 26, T. 48 N., R. 29 W, a thin basal conglomerate is exposed in contact with Precambrian W granitic rocks. There about 6" of highly feldspathic polymictic conglomerate with mostly quartz and chert pebbles is preserved as a thin skin partly mantling an exposure of granitic rock.

Wcc

Compeau Creek Gneiss (Precambrian W). Granitic rocks south of the Marquette Trough. Typically coarse grained and massive and largely mineralogically homogeneous in outcrop.

Wg

Granitic rocks (Precambrian W). Massive to foliated pink to gray granitic rocks north of the Marquette Trough. Much like Compeau Creek Gneiss to the south but correlation is uncertain.

Wmg

Metagabbro Complex (Precambrian W). Massive to schistose amphibolite and layered mafic to intermediate volcanic rocks.

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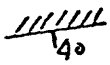
Map Symbols


Area of abundant outcrop

Strike and dip of bedding


Strike of vertical bedding

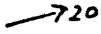
Strike and dip of overturned bedding.



Strike and dip of bedding showing stratigraphic top direction determined from cross beds

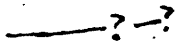
Strike and dip of cleavage, schistosity, or foliation


Strike of vertical cleavage, schistosity, or foliation



Bearing and plunge of fold axis

Contact


Fault, querried where inferred


Mine shaft


Mineral prospect


Margin of surface mine or caved ground


Diamond drill hole: vertical, inclined

Crest of positive magnetic anomaly from ground magnetic traverse


Crestline of positive magnetic anomaly from dip needle survey by Justin Zinn (1929)