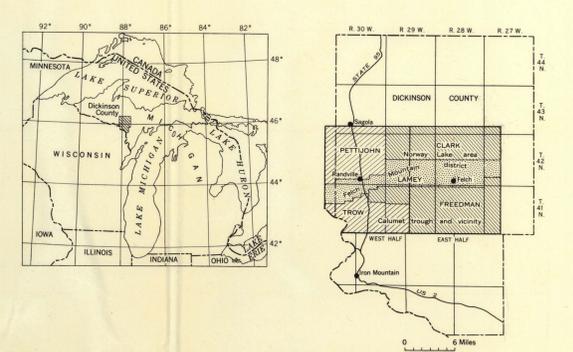




EXPLANATION  
Complete explanation for plate 1  
Outcrop areas shown by darker shade

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|---|--|---|
| <p><b>Upper Proterozoic</b></p> <ul style="list-style-type: none"> <li> <b>DCs</b><br/>Sediments and dolomite<br/>Shows only on cross-sections</li> <li> <b>Dikans</b><br/>Scattered thin dikes</li> <li> <b>Granite, gneiss, quartzite, etc.</b><br/>Mainly narrow irregular dikes and sills. Much granitized, many small bodies not shown. g and p shown only in outcrop</li> <li> <b>Metalsilicates and metagabbros</b><br/>Massive dark rocks, amphibolite in some parts of the area. Dikes and sills</li> <li> <b>Dolomite granitoid</b><br/>Massive granitoid, dark-gray to dark-green, fine-grained</li> <li> <b>Michigan slate</b><br/>In western part of area, mostly massive dark-gray granitoid with interbedded siliceous or silty, locally siliceous and granitic. In northern part of area, exposed rock is soft, red to greenish Michigan granitoid and slate</li> <li> <b>Handbook formation</b><br/>Very poorly exposed. Amphibolite information indicates use in vicinity of gneiss and amphibolite. In places a massive siltstone. Present only in northern part of area</li> <li> <b>Talbot formation</b><br/>Thin-bedded rock. Quartzite layers alternate with iron-rich layers composed of magnetite, hematite, goethite, and pyrite. Hard, massive, strongly magnetic</li> <li> <b>Fels formation</b><br/>Mainly a mica schist with thin quartzite layers. In places includes a distinctive greenish-gray quartzite-schist rock. Contains magnetite. Locally includes some metagabbro not mapped separately</li> <li> <b>Handful dolomite</b><br/>Mainly massive light-colored dolomite, normally crystalline with abundant tremolite in the Fels and Calumet areas, fine grained structure. Locally shows chert structure. Some interbedded siliceous and granitic in northern part of area</li> <li> <b>Sturgeon quartzite</b><br/>Massive vitreous quartzite, with abundant crossbedding and ripple marks. Lowermost and uppermost parts fine grained, siliceous</li> <li> <b>Fern Creek formation</b><br/>This unit, mostly conglomerate, present only in western part of map area. Contains siltstone in northern Dickinson County</li> <li> <b>Granite and granite gneiss</b><br/>Massive, gray or pink, multi-phased, locally porphyritic. Shows dark spots and abundant inclusions and masses of amphibolite, a conglomerate and chert in part of the central crystalline block. Probably includes some quartzite of much younger age</li> <li> <b>Bedded gray gneiss</b><br/>Well-placed gray gneissic rock with upper of amphibolite, some as much as 100 feet thick</li> <li> <b>Handford gneiss</b><br/>Complex of metamorphosed volcanic, sedimentary, and basic igneous rocks. Age uncertain, may be essentially part of the Dickinson group</li> <li> <b>St-Me-Lake amphibolite</b><br/>Massive fine- to medium-grained, dark-colored hornblende, plagioclase rock</li> <li> <b>Silberg schist</b><br/>Mainly dark hornblende and biotite schist. Contains some quartzite. Contains magnetite, chert, which is common. Rock and strongly magnetic</li> <li> <b>East Branch schist</b><br/>Mainly massive light-colored schist, commonly showing crossbedding, with thick beds of conglomerate, siltstone, metagabbro, flows and sills</li> <li> <b>Granite gneiss</b><br/>In part, red siltstone, in part, pink, fine grained to medium grained. Marked schistosity throughout</li> </ul> | <p><b>Lower Proterozoic</b></p> <ul style="list-style-type: none"> <li> <b>Michigan group, undifferentiated</b></li> </ul> | <p><b>Cambrian and Ordovician</b></p> <ul style="list-style-type: none"> <li> Outcrop or outcrop area</li> <li> Probable outcrop area, from aerial photographs</li> <li> Contact, approximately located</li> <li> Inferred contact</li> <li> Quarried where available</li> <li> Fault, approximately located</li> <li> Probable fault</li> <li> Anticline</li> <li> Dashed where approximately located, quarried where referred</li> <li> Syncline</li> <li> Dashed where approximately located, quarried where referred</li> <li> Plunge of minor anticline</li> <li> Plunge of minor syncline</li> <li> Strike and dip of axial plane of minor fold, and plunge of axis</li> <li> Strike of minor fold with vertical axial plane, and plunge of axis</li> <li> Plunge of closely spaced minor folds</li> <li> Strike and dip of beds</li> <li> Symbol used for overturned beds as well as for those in normal position</li> <li> Strike of vertical beds</li> <li> Horizontal beds</li> <li> Strike and dip of beds and plunge of lineation</li> <li> Top direction shown by crossbedding</li> <li> Top direction shown by graded bedding</li> <li> Top direction shown by ripple marks</li> <li> Top direction shown by sheet structures in dolomite</li> <li> Top direction shown by gull structures in gneiss</li> <li> Strike and dip of cleavage</li> <li> Strike and dip of foliation</li> <li> Strike of vertical foliation</li> <li> Bearing and plunge of lineation</li> <li> Horizontal lineation</li> <li> Strike and dip of foliation and plunge of lineation</li> <li> Strike of vertical foliation and plunge of lineation</li> <li> Strike and dip of joints</li> <li> Strike of vertical joints</li> <li> Mine</li> <li> Quarry or open pit</li> <li> Trench</li> <li> Test pit</li> <li> Diamond-drill hole</li> </ul> |
|---|--|---|



Base map compiled from air photographs on grid showing sections of standard size  
INTERIOR GEOLOGICAL SURVEY, WASHINGTON, D. C. 20515  
Geology by L. D. Clark, Jacob Freedman, H. L. James, C. A. Lamey, F. J. Pettibone

PRECAMBRIAN GEOLOGY OF CENTRAL DICKINSON COUNTY, MICHIGAN

Scale 1:24,000  
1 Mile