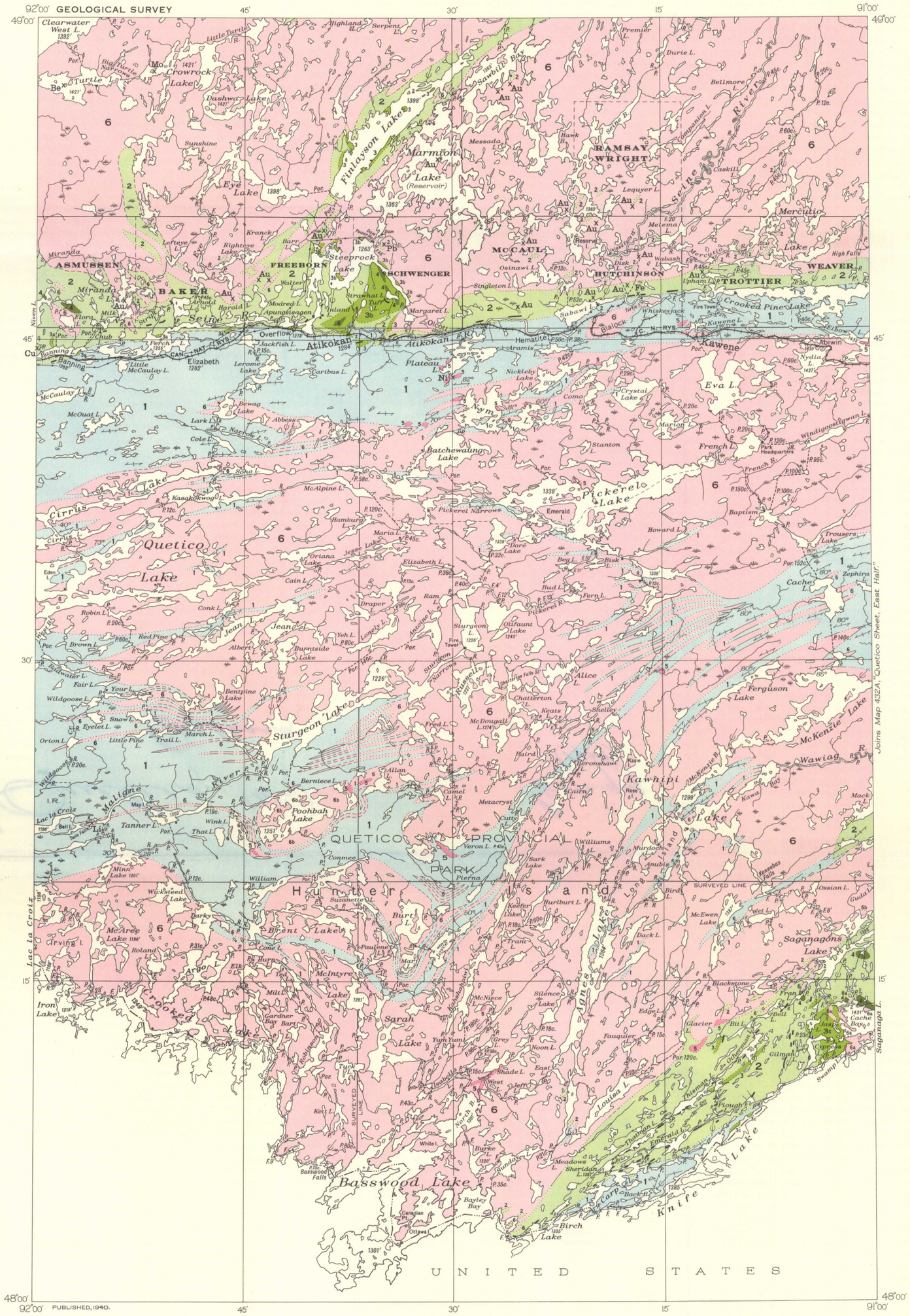
CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH

BUREAU OF GEOLOGY AND TOPOGRAPHY

GEOLOGICAL SURVEY



LEGEND

ARCHEAN (EARLY PRECAMBRIAN)

POST-WINDIGOKAN

- 6 — *Granite, granite-gneiss;* **6a,** *Saganaga granite;* **6b,** *malignite, nepheline syenite*
- 5 — *Granodiorite, diorite, hornblende gabbro*
- 4 — *Peridotite, serpentine*

WINDIGOKAN

- 3 — *Conglomerate, arkose, greywacke, slaty iron formation, volcanic rocks;* **3a, SEINE SERIES;** *conglomerate, greywacke, slaty iron formation;* **3b, STEEPROCK SERIES;** *conglomerate, arkose, greywacke, slate, limestone, iron formation, volcanic rocks;* **3c, KNIFE LAKE SERIES;** *conglomerate, arkose, greywacke, slate, slaty iron formation, volcanic rocks*

KEEWATIN

- 2 — *Greenstone (lava flows), pyroclastics; slate, greywacke, iron formation; hornblende, chlorite and sericite schist; metadiorite, amphibolite*

COUCHICHING

- 1 — *Mica schist and gneiss; slate, greywacke, impure quartzite*

Iron formation

Geological boundary (defined, approximate, assumed)
Bedding (inclined, vertical)
Schistosity (inclined, vertical)
Glacial striae
Mineral occurrence x

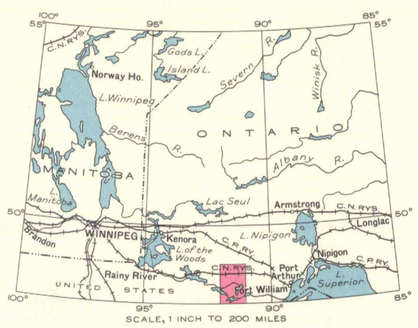
Road not well travelled
Trail or portage
Abandoned railway
Power line
Railway station and Post Office
International boundary
Township boundary (surveyed)
Township boundary (unsurveyed)
Park, and Indian Reserve boundary
Stream (position approximate)
Fall or rapid F. R.
Marsh
Height in feet above Mean sea-level 1258'

Geology by T.L.Tanton, 1937.

Base-map prepared by the Topographical Survey, 1937, from Federal Government map published in 1936. Cartography by the Drafting and Reproducing Division, 1939.

MINERAL OCCURRENCES

Au	Gold
Be	Beryl
Cu	Copper
Fe	Iron
Li	Lithium
Mo	Molybdenum
Ni	Nickel
Pb	Lead
T	Talc or Soapstone



SCALE, 1 INCH TO 200 MILES

PUBLISHED, 1940.

MAP 534A

QUETICO

(WEST HALF)

RAINY RIVER DISTRICT

ONTARIO

Scale, 1/253,440 or 1 Inch to 4 Miles

Miles 4 0 4 8 12

Approximate magnetic declination, 1°30' to 6°00' East.

PHYSICAL FEATURES

The area is a succession of hummocky hills and ridges. Unconsolidated deposits form a mantle of variable thickness over the greater part of the area; they are thin in that part of the area, notably the southern half, where lakes are numerous but in the northern half of the area they are thick and occupy extensive areas between the hills. The area as a whole varies in elevation between 1,186 and 1,900 feet above sea level. In the southeast part the local relief is greatest and some hills rise as much as 500 feet above nearby lakes; a depth of 280 feet has been recorded by sounding in Agnes lake and it is probable that the depression in the rock surface at this place is considerably deeper. In the vicinity of Steeprock lake the local relief amounts to 300 feet; and the rock floor of the lake in some places is known to be as much as 300 feet below lake level. Elsewhere and in the greater part of the map-area the local relief is less than 200 feet. The lakes in the more rocky parts of the area are connected by short rivers characterized by falls and rapids. In heavily drift-covered districts there are well developed rivers with graded valleys.

GENERAL GEOLOGY

The oldest rocks constitute the Couchiching series (1) and consist in part of slate, greywacke and impure quartzite but mainly are banded, mica schist and gneiss, the intensity of alteration increasing toward contacts with batholithic intrusives. At several localities minerals characteristic of metamorphic rocks, including garnet, andalusite, and staurolite, have been observed in the mica schists. The rocks of identifiable origin are sedimentary. It is inferred that the metamorphic rocks associated with them also have been derived from sediments. The Couchiching strata have been highly folded and probably lie in a succession of close folds. A schistose structure presumably parallel to the axes of folding, has been developed in the rocks. The planes of schistosity in the northern part of the Couchiching area strike approximately east and west, and in passing to the southern part of the map-area the strike changes to northeasterly. Where the schists are invaded by granitic masses the regional linear trend commonly gives place to curved structures, the planes of schistosity in the belts of schists conforming in direction to that of the contact of the intrusive. Faults have been observed at many places. The Couchiching sediments adjacent to unfaulted contacts with the Keewatin are nearly vertical and strike approximately parallel to the contact; the stratigraphic tops of the beds adjacent to the contact are toward the Keewatin. The Couchiching strata are believed to be everywhere older than the Keewatin.

The Keewatin (2) consists for the most part of greenstones locally showing ellipsoidal structures; with these are beds of pyroclastics, slate, greywacke and iron formation. The Keewatin rocks are metamorphosed in varying degrees; in some places they are hornblende, chlorite or sericite schists; in other places they grade into massive, crystalline, hybrid rocks. The stratified members everywhere dip at steep angles and presumably the group as a whole has been steeply folded. In many places the Keewatin rocks are cut by dykes and other small bodies of lamprophyre, porphyry and quartz porphyry; the large masses of granite and related rocks in the area are intrusive into the Keewatin at all places where the contact has been observed.

The Windigokan series (3) is represented in this map-area by assemblages of rocks characterized by the presence of a conglomerate member containing pebbles of granite and of rocks such as occur in the Keewatin. This conglomerate member and any associated strata younger than it are regarded as younger than the Keewatin. At the several places where these strata have been found insufficient information has been obtained to determine satisfactorily the distribution and structure of the beds and to discriminate between the metamorphosed members of these rocks and the older strata. The stratified members of the Windigokan series dip at steep angles and have been folded. The strike changes from place to place but within any one area in general coincides in direction with that of the longer axis of the area. The several conglomerate-bearing assemblages are believed to be younger than the Keewatin and the Couchiching. They are intruded by the batholithic igneous rocks that come in contact with them, but, as indicated by granite pebbles in the conglomerate, are younger than some granitic intrusives although these have not been identified in place. The several conglomerate-bearing assemblages contain some members that are lithologically similar, they exhibit similar structures and metamorphism, and they are similarly related to the earlier and later Archean groups now recognized. Though it is not certainly known that they were all formed at the same time it is believed they were deposited during the same geological period. This period is believed to be that in which the Windigokan series formed.

Peridotite and serpentine (4) form bodies, up to 1 mile long, invading the Keewatin. They are commonly bordered by, or intimately associated with, serpentine-bearing, talcose and chloritic schists. At some places they are cut by felsite and porphyry dykes. At Steeprock lake serpentine occurs in massive bodies and more abundantly as a fragmental rock.

Granodiorite, diorite and hornblende gabbro (5) form small and large bodies in the batholiths and pre-batholithic strata. At some places they occur along the margins of batholiths grading into the granitic rocks on one side and into metamorphosed pre-batholithic rocks on the other side. Bodies of these rocks remote from the exposed edges of the batholiths commonly vary in texture and composition within short distances and contain inclusions of altered country rock.

The granite and granite-gneiss (6) of the batholithic bodies consist chiefly of medium-grained, pink and grey, hornblende and biotite granites and gneisses. Many variations occur in composition, texture, colour and internal structure. Gradations exist between different varieties. Where seen in contact with Windigokan or pre-Windigokan strata the granites exhibit intrusive relations. The Saganaga granite body (6a) consists of pink and grey hornblende granite and granite-gneiss holding irregularly disseminated grains up to one-half inch in diameter of quartz. Similar quartz grains occur in inclusions of the greenstone country rock in the granite at Cache bay, Saganaga lake. The granite is in contact with the Knife Lake series and quartz grains like those in the granite occur in the pebbles and matrix of the Ogishke conglomerate where it is bordered by the Saganaga granite. Malignite and nepheline syenite (6b) occur in an area of about 15 square miles near Poohbah lake, and nepheline syenite occurs on a ridge near the north shore of Saganagons lake, one-half mile east of the mouth of Guda creek. The malignites are basic rocks rich in alkalies and lime. One of the varieties of malignite contains much nepheline. The nepheline syenite on Saganagons lake is a massive, pink, medium-grained rock consisting essentially of microcline, nepheline and albite; in natural outcrops the rock is porous due, presumably, to the removal by weathering of soluble mineral constituents.

ECONOMIC GEOLOGY

Keewatin metamorphosed strata form the country rock of most of the known gold-bearing quartz veins, and even where gold occurrences are in granite areas Keewatin rocks are present as inclusions adjacent to the mineralized veins. The Keewatin at places holds veins carrying lead, zinc and copper sulphides. Iron formation occurs as a Keewatin member. Keewatin schists at places have been altered to soapstone. The Windigokan strata at some localities include iron formation in which, due to alteration, concentrations of iron ore minerals occur. The Couchiching strata are not known to contain mineral deposits of value. The granite batholiths are characteristically barren. In the roof and along the margins of the batholiths, however, mineral deposits of various types have been found in the intrusive bodies.

Gold occurs in quartz veins cutting Keewatin rocks, porphyry and granite. The Keewatin rocks near the veins commonly include chlorite and sericite schists and ferruginous carbonate, and siliceous replacement bodies. The gold occurs free and intergrown with sulphide minerals.

Beryl crystals up to two inches in length, translucent and of yellowish green colour, occur in a pegmatite dyke on an island in Turtle lake. The observed crystals are not of gem quality.

Chalcopyrite has been found in Keewatin areas in quartz veins and adjacent silicified schists. Concentrations of ore quality have been reported from a prospect north of Banning.

Concentrations of iron minerals, of which the most abundant is magnetite, occur in iron formations in the Keewatin, Seine, Steeprock and Knife Lake series. At the Atikokan Iron mine, north of Blalock station, hornblende gabbro that invades Keewatin iron formation contains lenses and platy masses of magnetite mixed at some places with iron sulphides. This mine, between 1907 and 1911, produced 90,680 tons of ore averaging 60 per cent iron, 0.11 per cent phosphorus, and 2.01 per cent sulphur. At Steeprock lake massive hematite and limonite occur as replacement bodies associated with ferruginous carbonate in rocks of the Steeprock series adjacent to intrusives. Magnetic sands and muds of modern age occur at Steeprock lake.

The lithium-bearing mineral spodumene occurs as crystals up to 10 inches in diameter and makes up about 20 per cent of the volume of a pegmatite dyke, 30 feet wide, on the east shore of an island east of Bell island in Maligne river.

Molybdenite occurs in pegmatite dykes cutting granite-gneiss.

Nickel and copper sulphides occur associated with pyrite and pyrrhotite in disseminated grains and seamlets in a hornblende-rich phase of diorite that within short distances varies in texture and composition.

Galena occurs associated with zinc blende and chalcopyrite in quartz veins cutting Keewatin schists.

Soapstone occurs in altered Keewatin greenstones adjacent to acidic intrusives. Seams of talc occur in the soapstone deposits.