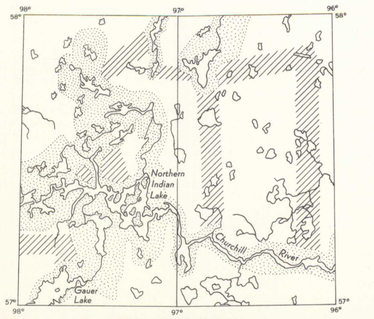
GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 64H



SCALE, 1 INCH TO 20 MILES

Area examined by shore line and land traverses

Area examined from aircraft

LEGEND

PRECAMBRIAN

7 Intermixed gneiss, amphibolite (1) and granitic rocks (2-6)

6 Syenite

5 Quartz monzonite, fine grained

4 Granite, medium grained or porphyritic

3 Quartz monzonite, mainly medium grained

2 Granodiorite, quartz diorite, diorite

1 Schist, gneiss, amphibolite

Drift-covered areas located (by ground traverse, from an aircraft) ..... DRIFT DRIFT

Outcrop boundary (defined, approximate, assumed) .....

Geological boundary (defined, approximate) .....

Foliation (inclined, vertical, dip unknown) .....

Lineation (inclined, horizontal) .....

Zone of intense foliation, probable fault .....

Glacial striae .....

Ridges, mainly sand .....

Geology by R. Kretz, 1958

Stream (approximate) .....

Fall and rapid ..... F. R.

Marsh .....

Height in feet above mean sea-level 585

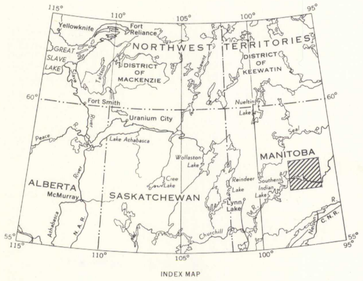
Base-map prepared from air photograph mosaic without ground control

Cartography by the Geological Survey of Canada, 1959

Approximate magnetic declination, 8° 56' East

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario

In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-coloured.



INDEX MAP

PUBLISHED, 1959
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2-1959

MAP 2-1959
GEOLOGY
NORTHERN INDIAN LAKE
MANITOBA

Scale: One Inch to Four Miles = $\frac{1}{253,440}$

Miles
4 2 0 4 8 12

DESCRIPTIVE NOTES

Approximately 90% of the area is drift covered. Rock is well exposed along parts of the Churchill River and on the shores of Partridge Breast Lake and Northern Indian Lake.

Schist, gneiss, and amphibolite (1) are composed of various combinations and proportions of plagioclase, biotite, hornblende, garnet, muscovite, sillimanite, quartz and potassium feldspar, with local minor tourmaline, sphene, apatite, zircon, epidote, chlorite, carbonate, magnetite, and pyrite. Probably the most common mineral assemblage is hornblende-biotite-plagioclase-quartz, with hornblende and biotite comprising approximately 40% of the rock volume. Grain size ranges from less than 1/2 mm. to 1 cm., and averages about 1 mm. Nearly all of the rocks have visible planar and minor linear features defined by mineral grain orientation (foliation and lineation). The rocks are, in general, heterogeneous. Pods and layers are produced by variations in mineral proportions and grain size. Some granitic rocks are associated as dykes, irregularly shaped masses, and larger masses of unknown shape. They are composed of potassium feldspar, quartz, and one or more of the minerals muscovite, garnet, biotite, and tourmaline.

An amphibolite layer at Northern Indian Lake contains quartz-feldspar veins, some of which have the form of boudins and ptygmatic folds. They indicate that much movement has occurred within the amphibolite; in places, a lengthening of twice the original volume and a shortening of one-half.

Granodiorite, quartz diorite, and diorite (2) form a group of rocks composed of combinations of plagioclase, potassium feldspar, quartz, hornblende, and biotite; with local, minor magnetite, pyrite, sphene, apatite, zircon, allanite, chlorite, epidote, muscovite, and carbonate. These rocks contain approximately 10-50% biotite and hornblende, 0-20% quartz, 0-30% potassium feldspar, and 40-70% plagioclase. The grain size is 1-3 mm., and nearly everywhere a strong foliation is apparent. The rock is remarkably homogeneous within distances of a few centimetres or metres. Locally, however, lenticular and tabular inclusions, a few centimetres in dimension and aligned with the foliation, occur as swarms in the rock. These are composed of fine- to medium-grained mesocratic assemblages of biotite-hornblende-feldspar. Pegmatite-aplite dykes and irregular masses are common. These are fine- to coarse-grained rocks composed of potassium feldspar, quartz, plagioclase, and locally biotite. Commonly they are folded, faulted, and stretched in boudinage style, and clearly indicate the nature and intensity of movement within the granodioritic rocks.

Quartz monzonite (3) consists of plagioclase, potassium feldspar, quartz, and biotite. Hornblende is locally present, and minor constituents are magnetite, pyrite, sphene, apatite, zircon, chlorite, epidote, muscovite, and carbonate. The proportion of plagioclase to potassium feldspar is approximately 1:1, and biotite is commonly about 10% of the rock volume. The grain size is 1-3 mm. A foliation and lineation are locally present, but not pronounced. The rock is nearly homogeneous. Tabular and irregular inclusions of gneiss or amphibolite are rare. A small proportion of the outcrop area consists of fine- to coarse-grained aplite-pegmatite masses. These are tabular or irregularly shaped and commonly have gradational contacts with the enclosing rock. They are composed of potassium feldspar, quartz, plagioclase, and in some cases, biotite.

Several zones of intense foliation, which are probably zones of shear movement, occur near the inlet of Northern Indian Lake. Compositional lineation within these zones is parallel to the lineation in the surrounding quartz monzonite, thus indicating that shear movement occurred within much of the quartz monzonite mass.

Granite (4) is the most abundant rock observed in the area. It is composed of potassium feldspar, plagioclase, quartz, biotite, and locally hornblende with minor magnetite, pyrite, sphene, apatite, zircon, allanite, chlorite, epidote, muscovite, and carbonate. Plagioclase and potassium feldspar are the most abundant minerals; biotite rarely exceeds 10% of the rock volume. At Thorsteinson Lake granite is a homogeneous rock, with a grain size of 2-4 mm. and little or no apparent foliation and lineation. At the north end of Northern Indian Lake it contains tabular carlsbad twins of potassium feldspar, 1-5 cm. long, which are commonly aligned to give the rock a foliation. On the south shore of Northern Indian lake the granite has a pronounced lineation, defined by aggregates of biotite grains, but has no foliation. Variations of grain size, mineral proportions, and intensity of foliation and lineation produce a large variety of rocks.

Fine- to medium-grained tabular or irregularly shaped inclusions of hornblende-biotite-feldspar gneiss or amphibolite occur locally. Aplite-pegmatite dykes and masses, composed of potassium feldspar, quartz, plagioclase, and biotite, locally cut the granite.

Fine-grained biotite-quartz monzonite (5) consists of plagioclase, potassium feldspar, quartz and biotite, with minor magnetite, sphene, apatite, chlorite, epidote, and muscovite. The grain size is about 1 mm. and the grain orientation is apparently random. The rock is remarkably homogeneous. Gneiss-amphibolite inclusions and aplite-pegmatite masses are rare.

Syenite (6) is made up of potassium feldspar, plagioclase, hornblende, and biotite, with minor quartz, magnetite, sphene, apatite, zircon, allanite, chlorite, epidote, and carbonate. The grain size is 2-4 mm., and foliation is not pronounced. Gneiss-amphibolite inclusions and pegmatite masses occur locally.

Mixed rocks (7) include a large variety of rocks whose dominant feature is that they are mixtures of two or more rock units. Most commonly the mixture is of two units: hornblende-biotite-feldspar gneiss or amphibolite (1), and a granitic rock (2-6, mainly 4). These are intermixed on a small or large scale. Many of these mixed rocks may be classified as migmatite, veined gneiss, or schlieren granite.

Some structural features have already been noted. Variations in strike and dip of the schists and gneisses of Partridge Breast Lake indicate broad folding of these rocks about steeply plunging axes. A fault is on the south shore of Northern Indian Lake. Here granite is in contact with granodiorite, and both rocks have developed a pronounced compositional lineation adjacent to the contact. In general, lithologic boundaries appear to pass indiscriminately across planar and linear structures in the rocks.

The relationship of pegmatite to enclosing rock is noteworthy. Pegmatites containing muscovite, garnet, and tourmaline occur only in the schists and gneisses of Partridge Breast Lake, which in themselves, also contain these minerals. Pegmatites containing hornblende and biotite occur in hornblende-biotite granitic rocks. Pegmatites containing little or no quartz were found only in syenite. Some pegmatite-aplite masses have formed by a mechanism of replacement or recrystallization of previously existing rock; others are dilation dykes.

In general, the data at hand do not warrant statements on the origin and evolution of the rock units. Evidence of replacement on a small scale is abundant; indications of the previous existance of large volumes of silicate melt do not exist.

Drift is mainly clay and sand. Locally pebbles, cobbles and boulders are mixed with sand. Ridges and hummocky areas composed mainly of sand, trend south and may be eskers or moraines. Striae trend south except in the southeast where some trend southwest or west.

No mineral deposits are known to occur in the area. Small amounts of magnetite, pyrite, and possibly pyrrhotite were seen locally in most crystalline rocks of the area. A small vein of sulphide minerals, 1 inch across, was observed on the south shore of Partridge Breast Lake, south of its outlet.

MAP 2-1959
NORTHERN INDIAN LAKE
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