CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS
GEOLOGICAL SURVEY OF CANADA

PRELIMINARY SERIES

SHEET 63M

LEGEND

PRECAMBRIAN

6	Granite, granodiorite, quartz diorite, pegmatite. Minor amounts of granite and granodiorite may be older than 2
5	Gabbro, pyroxenite and amphibolite (probably of more than one age)
4	Granitized rocks. Includes granitized 2 and 3, migmatites and augen gneiss
3	KISSEYNEW GNEISS: biotite-quartz gneiss, garnet-mica-quartz gneiss, minor quartzite and limestone. Feldspathization common. Includes narrow bands of 1
2	Quartzite, greywacke, arkose, mica schists and conglomerate, minor staurolite and sillimanite schist and gneiss
1	Hornblende gneiss, quartz-hornblende gneiss, plagioclase-hornblende gneiss; 1a, basalt, andesite, agglomerate and tuff; 1b, quartz-plagioclase-hornblende gneiss

Geological boundary (defined, assumed)
Bedding (inclined, vertical)
Bedding (dip known, top of bed unknown)
Gneissosity (inclined, vertical, dip unknown)
Structural trend (as seen on air photographs)
Fault (approximate, assumed)
Glacial striae, showing direction of ice movement
Mineral occurrences (copper, Cu; gold, Au; nickel, Ni; pyrite, pyrrhotite, s; radioactive minerals, ra) × Cu

Geology by J. Satterly and J. R. Marshall, 1929, 1930; A. J. Budding, 1954; A. J. Budding and S. J. T. Kirkland, 1955; R. L. Cheesman, 1955; S. J. T. Kirkland, 1956; F. C. Taylor, 1956

Geology compiled by F. C. Taylor

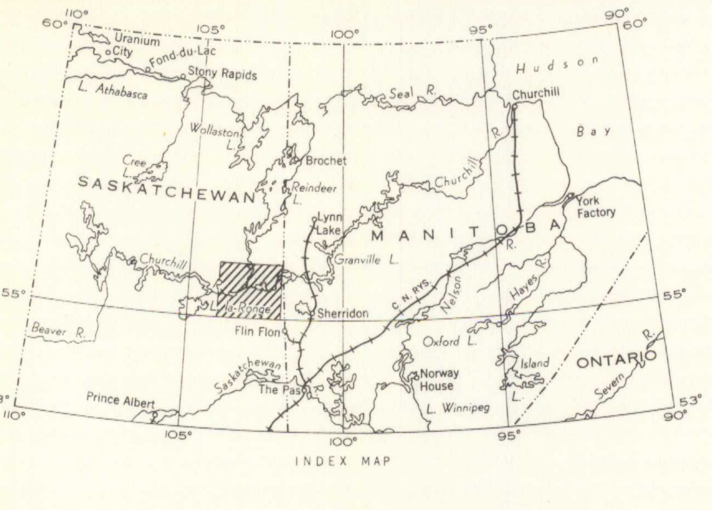
Winter road
Trail, or portage
Power transmission line
Interprovincial boundary
Indian Reserve boundary
Fall or rapid
Marsh or muskeg
Height in feet above mean sea-level 963

Cartography by the Geological Cartography Unit, 1958

Approximate magnetic declination, 16° 48' 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.



MAP 1-1958

PELICAN NARROWS

SASKATCHEWAN

Scale: One Inch to Four Miles = 1/253,440

Miles

DESCRIPTIVE NOTES

Outcrop is common along lake shores but glacial lake clay and till cover much of the rock particularly along the Churchill River system, west of Palf Lake, and in the Pagato River area. With the exception of burned-over parts the entire map-area is heavily forested with black spruce, poplar, white birch, jack pine, tamarack, and white spruce.

Glaciation moved west-southwestward. Glacial striae, ice polish, and friction cracks are common.

Parts of the area have been mapped in greater detail by Budding[1] (63M/12, 13), Budding and Kirkland[2] (63M/11), Cheesman[3] (63M/1 E½), and Kirkland (63M/6 N½), and the results of their work are incorporated in this map.

All the bedrock is Precambrian. Metamorphism is common, especially in the layered rocks, and results in gradational contacts. Most contacts are, therefore, arbitrarily drawn. The oldest rocks are primarily of sedimentary origin with a few inter-layered volcanic rocks. The volcanic rocks have been grouped with hornblende-rich sedimentary rocks.

The hornblende-rich rocks (1) are common in the west half of the area. In the east most bands are too narrow and short to be differentiated. These rocks are dark green, fine to medium grained and distinctly laminated and gneissic, a feature enhanced by the parallel arrangement of hornblende grains and by alternating hornblende-rich and quartz- or feldspar-rich layers. Pink garnet is a common constituent locally; biotite is more rarely present elsewhere. The bulk of the hornblende gneiss is of sedimentary origin although some is indistinguishable in the field from meta-volcanic rocks, and the two probably grade into each other. Some small metamorphosed basic intrusions may also be present. Recognizable volcanic rocks (1a), which consist of fine- to medium-grained, dark green, basalt, andesite, agglomerate and tuff, are relatively scarce. These rocks rarely show pillows, amygdules and flow top breccias. Most commonly they are massive or gneissic with thin alternating layers of hornblende and plagioclase, and locally epidote. In the Planinshek Lake area Budding[1] reports a quartz-plagioclase-hornblende rock (1b), chiefly gneissic, which may be of volcanic origin.

The sedimentary rocks (2) are chiefly massive to thin-bedded, grey to light grey, medium-grained quartzite, arkose and greywacke. Except for bedding and rare crossbedding, primary structures are absent. Mica, garnet, and more rarely hornblende are common constituents. Two types of conglomerate are present near Grassy Narrows. The one contains cobbles of quartzite in a quartzite matrix and the other is composed of a variety of cobbles, chiefly of granitic rocks, also in a quartzite matrix. A gneissic conglomerate occurs south of Manawan Lake. Staurolite and sillimanite schists, probably derived from clay-rich beds, are locally common in the southwest part of the area.

The Kisseynew gneiss (3) which underlies most of the map-area consists of metamorphosed sedimentary rocks (2) and lesser amounts of hornblende gneiss (1). Numerous types of gneiss are present but are so intermixed that separation is impossible on the present scale of mapping. They are chiefly light grey, fine- to medium-grained, quartz-rich gneisses derived from the sedimentary rocks, and they grade into hornblende gneiss possibly derived from volcanic rocks or greywacke. The ferromagnesian minerals are chiefly hornblende and biotite. Garnet is a common constituent. Locally quartzite is abundant but crystalline limestone is rare and impure. Lithology differs both along and across the strike because of changes in metamorphic intensity. Feldspathization is common. Foliation is well developed and probably conforms with stratification.

The Kisseynew gneiss is everywhere closely associated with granitized rocks, and in some places these have been mapped separately as rock unit 4 . All gradations between gneiss and granite or granodiorite occur and areas mapped as gneiss commonly contain much granitic rock in the form of lit-par-lit injections, lenses, and small dykes. Similarly some of the granitized and migmatite areas (4), and many of the plutons of granite and granodiorite (6), contain numerous irregular masses or inclusions of gneiss.

Stocks of gabbro and pyroxenite, now chiefly amphibolite (5), are present at widely separated localities. The pyroxenite is grey-green, medium to coarse grained and massive.. Tourmaline is present in the small stock southeast of Nataweuse Lake. The gabbro is commonly hornblende-rich, medium to coarse grained and foliated. Garnet is common locally. Emplacement prior to regional folding and metamorphism is suggested by gradational contacts with the sedimentary rocks (2), the Kisseynew gneiss (3) and the hornblende gneiss (1), and by a foliation parallel to the regional trend. Dykes of granite, granodiorite and pegmatite cut the gabbro stocks at Gilson and Melgurd Lakes although the amphibolite on the island at the south end of Wood Lake may be younger than the granodiorite.

The granitic rocks (6) include granite, granodiorite, quartz diorite and pegmatite. With the exception of the pegmatite these rocks are chiefly medium grained, grey to pink, and massive to gneissic. Granodiorite is the commonest type. It forms a large pluton in the Manawan Lake-Wood Lake area; smaller plutons are common along the crests of folds and their contacts are chiefly conformable with structures in the host rocks. These rocks are partly intrusive and partly the result of granitization. Two ages of granite and granodiorite are probably present, as a conglomerate (2) near Grassy Narrows contains granitic boulders and probably lies on a granodiorite erosion surface. Pegmatite dykes up to 100 feet thick are common. Except for small amounts of mica and tourmaline, only quartz and feldspar were noted in any of the dykes examined.

Dykes of basalt, diabase, and trap occur within the granodiorite batholith in the Manawan Lake-Wood Lake area and a few cut other rock types. All these dykes are short and rarely exceed 30 feet in thickness.

Folding is the most prominent structural feature of the area. Folding is complex with the possible exception of the northeast part, where a northerly trend is consistent over a wide area. Isoclinal folding may be present as bedding and foliation planes commonly dip in the same direction for great distances across the strike. Trend lines, derived from air photograph examination, form complex patterns, many of which are similar to those farther east as studied by Kalliokoski[5]. There, he concluded that movement was from north to south and resulted in recumbent folds.

Most of the faulting is probably a late feature in the structural history of the area. Evidence of early faulting related to the period of folding and metamorphism is probably destroyed and is difficult to recognize because of the absence of horizon markers. The only major fault strikes northward through Grassy Narrows and continues north to White Lake. This fault is well defined from the air but the fault zone is mostly covered by drift or water. Small subsidiary faults occur close to the main break. Movement along the fault is not known; however, metamorphism is commonly more intense on the east side and this may be due to deeper erosion suggesting that the east side moved upward relative to the west.

No economic mineral deposits are known but numerous showings offer encouragement to the prospector. Chalcopyrite with pyrrhotite or pyrite and locally pentlandite, occur in several widely separated localities. The sulphide minerals are commonly associated with shearing or basic intrusions (5). Many of the chalcopyrite occurrences are along the Keg Lake-Trade Lake-Churchill River area and along the Grassy Narrows-White Lake fault. Cheesman[3] reports that 10 to 30 feet of massive pyrite with small amounts of chalcopyrite and sphalerite was discovered by drilling just north of Schotts Lake. Radioactivity has been detected at four localities, all in pegmatite dykes. These are at Bailey Lake, Iskwatam Lake, east of Tabbernor Lake, and at Manawan Lake. Quartz veins at Laonil Lake contain gold associated with tourmaline, pyrite, and pyrrhotite.

[1] Budding, A. J.: Geological Map of Planinshek-Brabant Lakes Area; Sask. Dept. of Mineral Resources, Prel. Ed. 1955, and unpub. information.
[2] Budding, A. J., and Kirkland, S. J. T.: Geology of the Reindeer River Area; Sask. Dept. of Mineral Resources, Report No. 22, 1956.
[3] Cheesman, R. L.: Geology of the Mari Lake Area; Sask. Dept. of Mineral Resources, Report No. 23, 1956.
[4] Kirkland, S. J. T.: Geology of the Manawan Lake area; Sask. Dept. of Mineral Resources, Report No. 27, 1957
[5] Kalliokoski, J.: Interpretation of the Structural Geology of the Sherridon-Flin Flon Region, Manitoba; Geol. Surv., Canada, Bull. 25, 1953.

MAP 1-1958
PELICAN NARROWS
SASKATCHEWAN
SHEET 63M