CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES, FORESTS AND SCIENTIFIC SERVICES BRANCH

GEOLOGICAL SURVEY OF CANADA

PAPER 49-12

lat. 57°00'–58°00'
long. 100°00'–102°00'

Preliminary Map

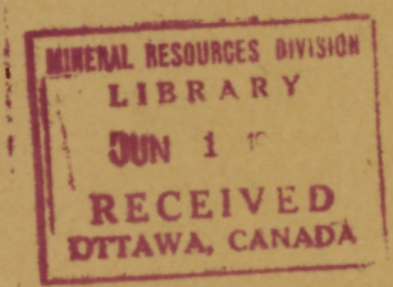
BROCHET
MANITOBA

(Map and Descriptive Notes)

scale 4 m. to 1"

By

N. R. Gadd



OTTAWA

1949

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Descriptive Notes for Brochet Map, Manitoba

Accessibility

The map-area is accessible by water routes from Flin Flon and Sherridon, but is reached most conveniently by aircraft. The canoe route from Flin Flon begins at Beaver Lake, and follows Sturgeon-weir River and Pelican Lake to Frog Portage, then Churchill River to Southend at the outlet of Reindeer Lake. From Sherridon the route is along Kississing and Churchill Rivers to Granville Lake, thence north to Hughes River via Eden Lake. An alternate route follows Churchill River and Barrington River to Barrington Lake. These routes are arduous and require many time-consuming portages, particularly at low water. Airline distances from Sherridon to Brochet, on Reindeer Lake, and to the north end of Barrington Lake are 190 miles and 130 miles respectively; from Flin Flon the distances are 220 miles and 170 miles respectively.

Travel within the area during the field season of 1948, a dry season, was slow and rather difficult, as many streams, normally navigable, were too low to float a canoe, and others were navigable only for short distances.

Field and Office Work

The map is a compilation of information obtained from shoreline and ground traversing (See key map for actual area covered), aerial reconnaissance, and the study of air photographs. Prior to the field season a careful study was made of air photographs of the area; lineaments, areas of abundant outcrop, and topographic features such as eskers, glacial-lake beaches, and drumlins were plotted on a base map, and water systems that were apparently navigable noted.

A party of eight men, working in pairs, did shoreline reconnaissance in the major outcrop areas. Land traverses supplemented this work. Many of the lineaments observed on the photographs proved to be joint fractures; the nature and origin of many others are unknown because the bedrock features are obscured by a mantle of glacial drift.

Low-level reconnaissance flights over parts of the map-area not covered by ground observations, and further study of air photographs at the end of the field season, allowed a somewhat broader interpretation of field observations and some interpolation.

Topography and Glacial Features

Brochet area is one of low relief. In most parts, hills are no more than 200 feet above the level of adjacent lakes, but some bedrock hills in the northeast corner of the area rise to about 400 feet. The elevation of Reindeer Lake is 1,150 feet above sea-level; lakes in the northeast about 1,350 feet.

The height of land between Churchill River and South Seal River drainage basins extends from the north end of Melvin (Gull) Lake to Eyrie Lake and north. The area to the south and west of the divide drains west to Reindeer Lake and south to Hughes Lake and Barrington Lake, thence south to Churchill River; most of the remaining area drains eastward to Big Sand Lake and South Seal River. Drainage is effected by shallow, meandering streams that flow in young valleys cut in glacial drift; some few flow in part over bedrock.

Stippled areas on the map are areas of heavy drift cover and very few rock outcrops. Much swamp and muskeg is included. The glacial drift is chiefly fine to coarse sand and gravel, with some areas strewn with angular to subangular boulders apparently of local origin. Some of the boulders have been identified with rock outcrops not more than ¼ mile distant from their bedrock source. Most prominent among glacial features are the several eskers. One esker extends the full length of the map-area, about 70 miles, and reaches a maximum height of about 150 feet above the level of Goldsand Lake. Abandoned beaches of glacial lakes are found on Long Point (House Point) in Reindeer Lake and at many places along the shores of Brochet Bay and Paskwachi (Stump) Bay and several miles inland from the lake.

Glacial striae were observed in many parts of the area. They have a southerly trend, the strike varying from south 5 degrees east at Barrington Lake to south 15 degrees west at Reindeer Lake. A field of drumlinoid drift ridges east and southeast of Brochet Bay has the same trend.

General Geology

Metasedimentary rocks of Kisseynew type are the oldest in the area. Small lenticular masses, and some few larger belts, of hornblende gneiss and schist and amphibolite of doubtful origin are interbedded with the sedimentary rocks. These beddod rocks were intruded by a few small stocks of gabbroic rocks and dykes of diorite. The whole was tightly folded and sheared, and injected, metamorphosed and partly assimilated by granitic intrusions, which have shown their influence in all parts of the area. Probably more than one period of granitic intrusion is represented.

Rocks of sedimentary origin (1)[1] have been recrystallized as

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[1] Numbers, in parentheses, are those of map-units in map-legend

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equigranular fine- to medium-grained gneisses. Original bedding structures are represented by bands of slightly different colour and mineral composition. Variations in colour and composition depend on the distribution of the original sediments and upon the amount of material added by injection of granitic rocks. Most of the sedimentary rocks are light to dark grey, and are composed of quartz, feldspar not more calcic than oligoclase, and dark brown, green, or near black biotite in widely varying proportions. Quartz-sericite schist was observed in a bay off the west side of Vandekerchove (Brightsand) Lake, but quartz normally constitutes no more than 50 per cent of the rocks. The rocks would appear to be the metamorphic equivalents of greywacke, arkose, and minor, impure quartzite. Common accessory minerals are blood-red garnet, magnetite, sphene, and apatite. A few gneisses carry

a fibrous amphibole, probably anthophyllite.

Hornblende gneiss, hornblende schist, and amphibolite (2) are not abundant; only a few bodies are sufficiently large to be mapped separately on the present scale; others are included in the general group of sedimentary rocks. The general habit is narrow lenses several feet or yards long in banded sediments; xenoliths of amphibolite a few inches to a few feet in diameter are common in the granites near Paskwachi (Stump) Bay and Bear Bay on Reindeer Lake, and along Sawbill River. Lenses of hornblende gneiss and schist in the banded rocks have the same general appearance as the sedimentary gneisses, but the ferromagnesian mineral is dark green hornblende. Larger masses of amphibolite and hornblende gneiss are dioritic in appearance. Crystals of hornblende up to one-quarter inch long form about 60 per cent of the rock; up to 10 per cent of the mafic minerals may be hypersthene or other pyroxene. Flesh-pink to white oligoclase-andesine, a few grains of quartz, and dark brown or green mica are the other essential minerals. Accessory minerals are magnetite, sphene, some apatite, and grains of calcite. These rocks may be metamorphosed calcareous sediments; some may be derived from andesitic lava, such as is associated with sedimentary rocks in adjoining areas to the south.

A large part of the area is underlain by a complex of igneous and sedimentary gneisses (3). Though in some places the rock types may be distinguished from one another, the units are too small to be mapped separately. Furthermore, no part of the area and no map-unit is entirely free from injections of granitic rocks. Thus it has been necessary to subdivide the banded rocks on the basis of proportion of recognizable granitic material calculated roughly in the field as percentage of exposed area; those in which the estimated percentage is less than 40 are mapped as sedimentary gneisses (1), those with between 40 and 75 per cent as 'gneissic complex' (3), and those with more than 75 per cent as granitic gneisses (6). Contacts between map-units, where exposed, are gradational; in

most places they are obscured by glacial drift. Therefore they are shown on the map as 'assumed'. The gneissic complex is characterized by narrowly banded gneisses of fine to medium grain, which vary in colour from almost white to dark grey; the injected material is commonly pink. Where assimilation of sedimentary rock by granitic material is advanced, the bands are not easily delimited, and no appreciable difference in composition between bands of different colour is observed. Where contacts between bands are fairly sharp, the composition of pink bands corresponds with that of larger masses of granite and granite-gneiss; grey bands contain more quartz (up to 50 per cent) and plagioclase; biotite also is more abundant.

Basic intrusive rocks (4) are not abundant. One small stock occupies the islands and part of the shores of Melvin (Gull) Lake. It consists of gabbro, in which hornblende and plagioclase in the labradorite range (An_{68-70}) are the essential minerals, and small areas of anorthosite and diorite. Alteration produces fairly abundant brown biotite and traces of chlorite and sericite. The borders of the stock are injected by pegmatite and aplite stringers.

Sheared and slightly pyritized, dark grey to greenish diorite (5) outcrops at the north end of Barrington Lake and on Brochet Bay. Bodies of diorite too small to be mapped on the present scale are grouped with the granitic rocks.

Granitic intrusive rocks (6) are the most abundant rocks of the area. Large masses of porphyritic granite, granite and granodiorite, their gneissic facies, and associated pegmatite and aplite underlie more than 50 per cent of the area mapped. Most abundant of the granites is very coarsely porphyritic, flesh pink or grey granite; phenocrysts of feldspar up to 5 inches long have been observed, but phenocrysts as much as 2 inches long are common. The rock is rich in quartz, and normally 10 to 20 per cent of it is biotite. Near Paskwachi Bay, Bear Bay, and along part of Sawbill River, the mafic mineral is hornblende. Medium-grained, equigranular granitic rocks vary in composition from quartz-rich granite to granodiorite in which the plagioclase (oligoclase-andesine), occupies

25 to 30 per cent of the volume. They are second in order of abundance.

White to flesh-pink leuco-granite (alaskite) and pegmatite are common facies of the granite; they consist of quartz, potash feldspar, and some oligoclase, and less than 5 per cent dark brown mica. This granite is closely associated with sedimentary gneisses, notably south of Paskwachi Bay, on Vandekerchove (Brightsand) Lake, and along Hughes River; it may be younger than most of the granitic rocks.

Accessory minerals of the granites are apatite, garnet, sphene, and some epidote.

Care should be taken in the identification of dark green rocks that occur as small, irregular bodies within the granites. The green rocks may weather grey, pink, brick-red, dark green, or rusty brown. Freshly broken surfaces vary in colour from amber, through grey-green, to dark green, the most common colour; the colours apparently are inherent in the component minerals, and, on cursory examination, the rocks might be mistaken for basic types. Actually, the composition varies between granodiorite and quartz-rich microcline granite; very dark green hornblende and hypersthene form roughly 10 per cent of the rock. The coloration is due to an unidentified, green, secondary mineral, possibly chlorite, which fills interstices and the numerous fractures and replaces some crystals of plagioclase.

In the time available for field work it was impossible to obtain a clear picture of bedrock structures of the area. However, structural trends are shown on the map as revealed by observations on the ground, from the air, and on air photographs. It is interesting to note that these trend lines pass freely from one map-unit to another, and exist within areas in which granite is the major rock type. This may be an indication of the formation of much of the granite by "granitization".

Economic Notes

The small stock of basic intrusive rocks at Melvin (Gull) Lake is of interest to the prospector, as copper-nickel deposits of importance have been found in similar rocks at Lynn Lake to the south of the map-area. Evidence of mineralization in this stock and in other rocks of the area is slight. Disseminated iron pyrite is found in some of the gneisses and in the sheared diorite.

A small gossan was observed in the west arm of Vandekerchove (Brightsand) Lake. Disseminated pyrite is found in a small outcrop of quartz-sericite schist. Overlying drift and soil is brick-red and charged with tiny particles of magnetite; iron rust coats boulders and gravel for one-quarter mile along the shore in the vicinity of the outcrop. Two large boulders of massive sulphides, chiefly pyrite, lie on this shore; their origin is not known.

A lead-zinc deposit in Paskwachi (Stump) Bay, just west of the Manitoba-Saskatchewan boundary, was described by Stockwell, (Brown Mineral Claims, Geol. Surv., Canada,) Sum. Rept. 1928, pt. B, p.68). Paskwachi Bay is part of a power development reservoir in which the water level has been raised about 9 feet and, as a result, the mineral showing now lies under water.

Magnetic compass deviations up to 45 degrees were noted on the ground and at an altitude of 700 feet above the area indicated on the map. The cause of deviation could not be determined because the area is heavily drift-covered.