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PRELIMINARY MAP, GEOLOGY OF NAQUIPERDU LAKE AREA, ABITIBI AND MISTASSINI TERRITORIES

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DEPARTMENT OF NATURAL RESOURCES

RENÉ LÉVESQUE, MINISTER

P.-E. AUGER, DEPUTY MINISTER

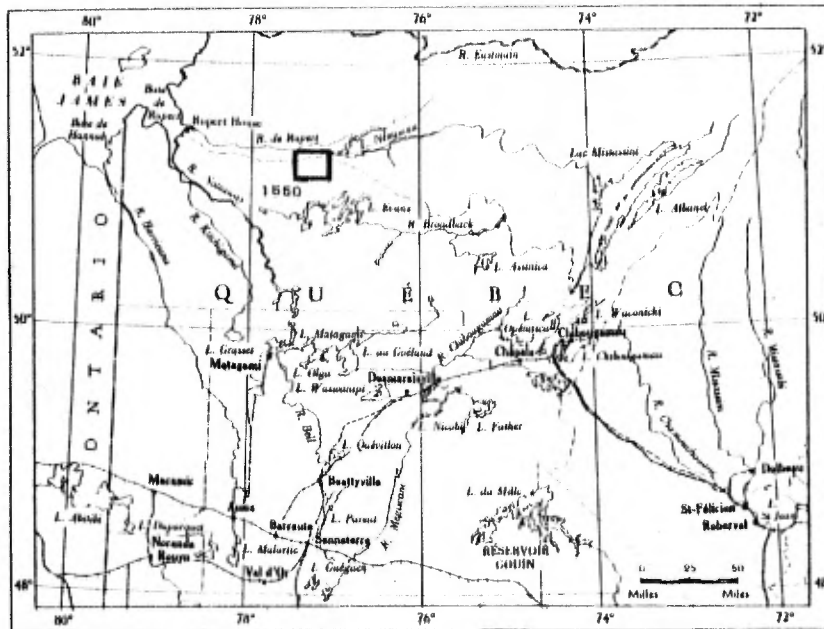
Geology of NAQUIPERDU LAKE AREA

ABITIBI AND MISTASSINI TERRITORIES

PRELIMINARY REPORT

by

Pierre R. Gillain



QUEBEC

1965

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GEOLOGICAL EXPLORATION SERVICE

H.W. MCGERRIGLE, CHIEF

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INTRODUCTION

The Naquiperdu Lake area, covering about 375 square miles, was mapped during the summer of 1963. It is 160 miles northwest of Chibougamau and 100 miles north of the new mining town of Matagami, and is bounded by latitudes $51^{\circ}07'30''$ and $51^{\circ}22'30''$ and by longitudes $77^{\circ}00'$ and $77^{\circ}30'$.

Floatplanes based at Caché lake near Chibougamau, Lalanne (Watson) lake near Matagami, and Moosonee in northeastern Ontario provide the most practical means of entering the area. Broadback and Rupert rivers provide good floatplane landings as do most of the lakes of the area. Canoe travel to the area is possible from Chibougamau and Matagami but is not practical. Canoe travel throughout the area is easy as the main rivers are joined to the principal lakes by good portages.

Relief in the area is generally low, and is greatest (about 300 feet) east of Naquiperdu lake. South of Broadback river, narrow ridges less than 150 feet high are separated by broad valleys; broad flat-topped hills with gentle slopes are found north of the Broadback. North of Naquiperdu lake and around Encaissé lake a few steep-sided valleys create a more rugged relief.

Glacial cover is everywhere abundant. Thick second-growth vegetation in some burned-over areas makes traversing difficult. Muskeg and peat bogs are common especially in the eastern part of the area south of Broadback and Rupert rivers, and in the western part north of Ouasouagami river.

Most of the area is drained by the Broadback, but the northern quarter belongs to the Rupert River watershed. Both these rivers discharge into Rupert bay.

GENERAL GEOLOGY

An east-west trending band of metasedimentary and metavolcanic rocks in the southern part of the area is bordered on both sides by predominantly granitic rocks. The granite zone north of this band grades northwest into a complex of biotite gneiss with granite layers and masses that covers most of the northern half of the area. A small metasedimentary band similar to the southern one is found in the northeast corner.

Two small bodies of serpentized ultrabasic rocks are present in the southeast quadrant. Several diabase dykes cut the older formations.

Metavolcanic and Metasedimentary Rocks

A band of metasedimentary and metavolcanic rocks underlies the area south of the Broadback and is continuous with the band to the west (Remick, 1963). It narrows to the east of the present area and probably dies out in that direction. A second band of similar metasedimentary rocks, but without volcanics, cuts through the northeast corner of the area.

Microgneiss

Biotite and/or hornblende microgneiss form 70% of the band. The outcrops generally consist of thin layers of biotite microgneiss interstratified with coarser and thicker hornblende microgneiss layers. In places, biotite occurs as irregular streaks or lenses.

A few outcrops consist only of biotite microgneiss and are so fissile that the rock could be called a schist. A coarser biotite schist is found in a few outcrops at the northern edge of the belt on Broadback river, near the granite contact. Chlorite and sericite schist are also found locally.

The rock is fine grained and made up of feldspar, quartz, biotite and/or hornblende in varying proportions. The fresh surface is dark to light grey and the weathered surface, a lighter greenish grey.

TABLE OF FORMATIONS

| | | |
|---|---|---|
| Pleistocene and Recent | Gravel, sand, clay, silt, alluvial deposits, peat | |
| Unconformity | | |
| P R E C A M B R I A N | Basic Dykes | Diabase |
| | | Serpentinized ultrabasic rocks |
| | Granitic and Gneissic Rocks | Pink granite, pegmatite |
| | | Grey to pinkish biotite granite, inclusions of amphibolite and gneiss; augen gneiss |
| | | Biotite gneiss with granitic layers and masses |
| | | Meta-gabbro |
| | | Amphibolite |
| | Metavolcanic and Metasedimentary rocks | Porphyritic lavas |
| | | Pillowed or non-pillowed lavas |
| | | Biotite and/or hornblende microgneiss |

Pillowed and non-pillowed lavas

Two main parallel zones of pillowed and non-pillowed lavas occur. The north band is 1,500 feet wide and extends westward 8 miles from the western end of Bout lake. The south band, 1,500 to 3,000 feet wide, starts east of Lavau lake, passes north of the lake and extends westward 11 miles.

The lava is fine grained and dark green to almost black, or with a bluish tinge locally. Some of the pillowed lava is lighter green. A slight schistosity is developed throughout the rock. The pillows have been elongated parallel to the general structural direction.

A few layers of metasedimentary rock similar to, or more feldspathic than, those in the microgneiss are interstratified with the lavas. Gabbroic and amphibolitic horizons also present are described below.

Porphyritic lavas

Porphyritic lavas of more acidic composition than the volcanic rocks just portrayed occur between the two flows described above at their west end. Zoned plagioclase phenocrysts are set in a finer matrix that is light grey to grey depending on the amount of ferromagnesian present. The latter also occur as phenocrysts here and there. The average size of the plagioclase phenocrysts is $\frac{1}{4}$ inch, but in the smaller and thinner bands of porphyries, phenocrysts easily seen on the weathered surface may be difficult to distinguish on the fresh surface. The porphyritic lavas are schistose to massive; the outer parts of the hills which they form being very schistose, whereas the central parts are massive.

Amphibolite

Amphibolites occur throughout the area. A number of them are classified with the lavas, where there is reason to believe that they are of such origin. They are fine to medium grained (rarely coarse grained), black to dark green, and usually very schistose.

A band of rock west of Lavau lake and probably representing a former lava belt is classified with the amphibolites. It is composed of amphibolite proper, meta-gabbro, and hornblende-bearing metasedimentary rocks. The amphibole content of some of these rocks is as high as 90% in some outcrops.

Amphibolites are also found at the metasedimentary rock - granite contact. Many contain epidote, and in this case the plagioclase is fresher and biotite commonly occurs.

Amphibolite-like masses are also found in the biotite gneiss with granite layers and masses either at the contact of the gneiss with the granite or as a band in the granite. Gradation from a biotite gneiss to a hornblende gneiss or amphibolite can be seen on the shore of Naquiperdu lake.

Meta-gabbro

Bands and lenses of medium to coarse rock having the composition of a metamorphosed gabbro are found in the lava. They may represent coarser phases of the flows or former sills. They are dark green and contain varying proportions of hornblende and plagioclase. Many appear massive but are actually slightly schistose owing to the elongation and linear arrangement of hornblende crystals.

A band of meta-gabbro in the area to the west intrudes the metasedimentaries (Remick, 1963). Although no outcrop of a similar rock has been found in our area, the possible extension of the band into the area has been indicated on the map.

Granitic and Gneissic Rocks

Biotite gneiss with granite layers and masses

Biotite gneiss with granitic layers and masses underlies most of the northern half of the area. This rock type is not homogeneous or uniform, and outcrops vary considerably in the amounts of gneiss or granite present. Also, single outcrops composed of either gneiss or granite are found. A few outcrops west of Naquiperdu lake consist of a very fine-grained, black to dark grey gneiss, quite similar to some of the microgneiss. The texture and composition of the granite and the texture and structure of the gneiss are also variable.

The bands of biotite gneiss and granite vary from a few inches to a hundred feet wide. Narrow parallel bands of the two rocks give the appearance of lit-par-lit gneiss, but a pinch and swell structure is more common. Granite and gneiss are in places so intermixed that a granitic gneiss has resulted.

The grain size of the gneiss increases with the increasing amount of granite present and coarse biotite flakes usually are present at contacts of the two types of rock.

The gneiss is rusty and consists of white feldspar, quartz, and biotite. The granite is grey to pinkish and similar to the granite described below.

In some fine-grained biotite gneiss with granite layers, garnet is found at the contact of the two or very close to it. Garnet is found in the granite away from the gneiss but

never in the gneiss away from the granite.

Grey to pinkish granite

Grey to white granite borders the metasedimentary and metavolcanic band on both sides; layers and masses of it are found in the biotite gneiss, and it forms the principal rock in the elongated granitic mass in the northwest corner of the area. A pinkish coloration is noted in many outcrops.

The granite is massive to foliated, rarely gneissic, and varies in grain size from fine to extremely coarse, resembling a pegmatite. There is no real contact between the fine-grained and the coarse-grained material, nor even a true gradation, but rather an interlocking of the two.

The granite is composed of plagioclase, quartz, potash feldspar, and a little biotite. Where the granite contains gneissic xenoliths or lenses, usually there is an increase in the percentage of biotite, and a transition from biotite-poor granite through biotite-rich granite to the gneiss can be noted.

Much of the white granite contains garnet which develops along stringers of biotite flakes left in the rock after assimilation of gneissic layers. On Broadback river south of Masayuqui lake and also at the east edge of the area, white to slightly pink granite with sericite and garnet occurs.

Several outcrops of granite in the northwestern part of the area contain both biotite and hornblende. Also, many inclusions of gneiss and amphibolites are present, the rock is pinker, and much of it is gneissic or at least foliated.

Augen gneiss

Augen gneiss is found only in a band parallel to the metasedimentary and metavolcanic zone and lies between this zone and the granite band straddling the Broadback. It consists of subhedral to anhedral crystals of plagioclase, embedded in a groundmass of hornblende and biotite with a little quartz.

Pink granite

Although pink to reddish granite is found throughout the area, except in the metasedimentary and metavolcanic band, it nowhere forms a mappable unit. It is most common along the Broadback where it intrudes the grey to pinkish granite. It is fine to coarse grained and poor in mafic minerals. Red-stained quartz crystals are common locally.

Pegmatites

Pink pegmatites are widely scattered throughout the

area, and are most common on Broadback river, south of Masayuqui lake, and north of Bout lake. They are concordant bodies 15 to 20 feet wide, consisting mainly of feldspar, quartz, and biotite with disseminated beryl crystals 1/10-1/4 inch in size.

Serpentinized Ultrabasic Rocks

Two hills of serpentinized ultrabasic rocks occur in the southeast quarter of the area. One is on the north shore of Lavau lake at the point where the lava band approaches the lake; the other is near the south shore of Bout lake, and near the end of the northernmost lava band.

They form rounded hills about 75 feet high and about 1,000 feet in diameter. The rock is dark green on the fresh surface and brownish red weathering. It is cut by small veinlets containing fibrous material perpendicular to the walls.

Diabase

Diabase is the youngest consolidated rock in the area. It forms dykes a few feet to 200 feet thick, all striking S.45°E. except for one that strikes N.45°E. The thin dykes and the margins of the thicker ones are chilled and show thin laths of feldspar in an aphanitic groundmass. The central parts of the thick dykes have a typical diabasic texture.

PLEISTOCENE AND RECENT

A thick blanket of sand and gravel covers the area. Drumlinoid hills are elongated parallel to the glacial striae, which trend S.35°W. to S.45°W. Thus, the direction of ice movement is probably to the southwest.

Finer clays and silts are found on Ouasouagami river where they form the base of a much dissected topography. Peat bogs are found on Rupert river in the northeast corner of the area, and on the Broadback in the southeast corner.

Raised beaches were noted on the north shore of the Broadback in the southeast quadrant.

STRUCTURAL GEOLOGY

The structural trend in the area changes in a broad arc from northeast to east-southeast. The northeast trend is the continuation of the one in the Colomb-Chaboullié area to the southwest (Remick, 1963).

All dips taken on schistosity and foliation in the southern half of the area are to the south. In the northern half, a few north dips are found along a line joining Tordu creek to

Naquiperdu lake. North of this, dips are again to the south except in the northeast corner where all dips are to the north.

Pillow structures are common in the lavas but have been so elongated parallel to the structural trend that an accurate determination of tops of flows is rarely possible. However, the determinations made indicate that the tops face south in at least the north band of lava.

Lineations on drag folds are found principally in the metasedimentaries and indicate plunges to the southwest at about 40°.

ECONOMIC GEOLOGY

Only traces of mineralization were encountered during the present mapping. Pyrite is disseminated in the porphyritic lavas. Pyrite and pyrrhotite were found in metasedimentary rocks on Ouasouagami river, two miles from its junction with the Broadback. A highly weathered and rusty zone 50 feet wide extends from the west shore of the Ouasouagami to the middle of the river bed, before disappearing under the water. An assay of the rock gave 0.02 ounce of silver per ton, 0.01% copper and 0.01% lead; neither gold nor nickel was present.

Disseminated crystals of beryl up to $\frac{1}{4}$ inch long were found on Broadback river, south of Masayuqui lake, and north of Bout lake.

During the summer of 1963 several groups of claims were staked and considerable prospecting was done by mining interests.

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