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PRELIMINARY REPORT, GEOLOGY OF TUK RIVER AREA, SAGUENAY COUNTY

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DEPARTMENT OF NATURAL RESOURCES

RENÉ LÉVESQUE, MINISTER

P.-E. AUGER, DEPUTY MINISTER

Geology

of

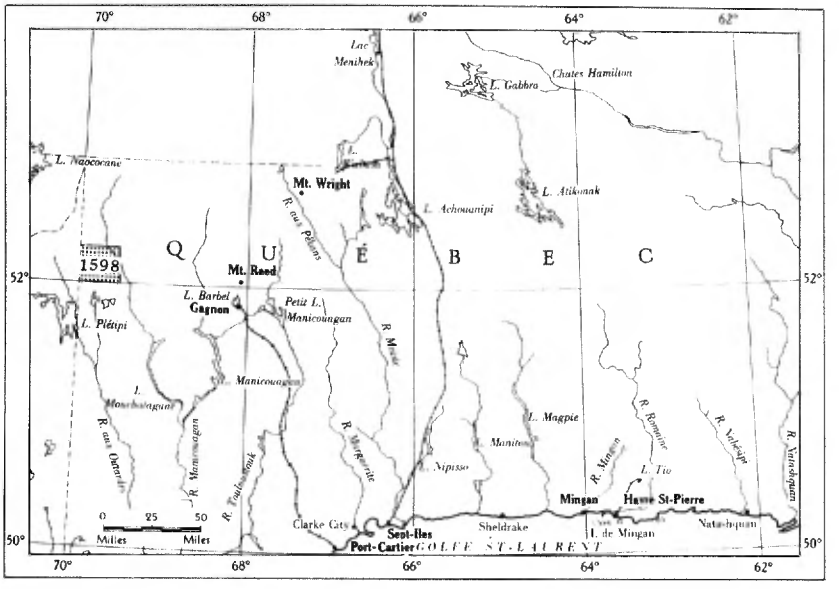
TUK RIVER AREA

SAGUENAY COUNTY

PRELIMINARY REPORT

by

T. Hashimoto



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QUEBEC DEPARTMENT OF NATURAL RESOURCES

RENÉ LÉVESQUE, MINISTER P.-E. AUGER, DEPUTY MINISTER

GEOLOGICAL EXPLORATION SERVICE

H.W. MCGERRIGLE, CHIEF

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INTRODUCTION

The Tuk River area, mapped during the summer of 1964, is bounded by latitudes 52°00' and 52°15' and longitudes 69°30' and 70°00'. It lies in the northwestern part of Saguenay county, about 210 miles north-northwest of Baie-Comeau and 70 miles slightly north of west of the iron-mining center of Gagnon. It covers 370 square miles, including all of Bernard township, almost all of Noël, and a narrow strip of Forget township along the eastern border, as well as unsubdivided ground in the north. The map-area is immediately east of Upper Outardes River area and north of Matonipi Lake area, both mapped in 1963 by Bérard (1964a; 1964b).

The best means of access is by float-plane, the nearest bases being at Louise lake (close to Manicouagan-5), about 100 miles to the southeast, and at Gagnon. Within the area the scarcity of navigable waterways makes canoe travel very difficult.

Most of the area is moderately forested by coniferous trees, the common types being jack pine and black spruce. Balsam fir and tamarack are scarce; birch and poplar, rare. The area has been burnt over several times.

Game is sparse, but porcupine, rabbit, beaver, mink, muskrat, moose, caribou, partridge, duck and goose were seen during the course of the field work. Fishing is not good, but some pike, lake trout and speckled trout were caught.

As a whole the map-area has a rolling topography with the average relief about 200 feet. Low hills and swamps are generally characteristic, except in the northeast corner of the area where hills rise 500 to 1,000 feet above Mouchalagane river. The area drains southward to St. Lawrence river via Mouchalagane-Manicouagan and Outardes rivers.

Although Pleistocene glaciation played an important role in fashioning the present topography, the hills and valleys generally reflect trends in the bedrock structures. As a whole the area has an east-west trend which coincides with the rough trend of the underlying rocks. Glacial striae indicate that the direction of movement of the ice was north-south. In the central part of the map-area and the northern three-quarters of the western half rock exposures are relatively scarce owing to the widespread morainal cover left by the receding ice.

GENERAL GEOLOGY

The consolidated rocks of the area are Precambrian in age. Granite gneiss and/or gneissic granite, biotite paragneiss, layered quartz-plagioclase-biotite gneiss, and amphibolites form about 85% of the exposed rocks. The remaining 15% is essentially made up of leucogranite, anorthositic gabbro, micaceous quartzite and ultrabasic rocks.

The granite gneiss or gneissic granite or both appear to be the oldest unit in the map-area. It is overlain by the other gneisses and intruded by small bodies of leucogranite, granite pegmatite, anorthositic gabbro, and ultrabasic rocks. The age relations between the layered quartz-plagioclase-biotite gneiss, biotite paragneiss, amphibolites, and anorthositic gabbro are not clear. The ultrabasic rocks are probably the youngest rocks in the area.

The origin of the granite gneiss and/or gneissic granite is not known. The other gneisses except the amphibolites are probably metasediments. All the amphibolites appear to have been derived from gabbro and/or basalt.

The rocks in the area have been strongly deformed. Except for some of the leucogranite, tourmaline granite, granite pegmatite and ultrabasic rocks they are generally well foliated. The folding is complex, but the major directions of folding are roughly east-west and north-south. No large faults were recognized.

Table of Formations

CENOZOIC	Recent Pleistocene	Peat, river and beach deposits Silt, sand, gravel, boulders
Unconformity		
PRECAMBRIAN		Ultrabasic rocks Leucogranite, tourmaline granite, pegmatite Amphibolite Biotite paragneiss, quartzite Layered quartz-plagioclase-biotite gneiss Metabasalt and metagabbro amphibolites Micaceous quartzite Anorthositic gabbro Granite gneiss and/or gneissic granite

Granite Gneiss and/or Gneissic Granite

The granite gneiss or gneissic granite or both make up about 50% of the exposed rocks and are the most abundant rock types. This unit is a medium-grained, gneissic rock composed mainly of microcline, plagioclase, quartz and biotite. Both the weathered and fresh surfaces are usually white to light gray but some pink varieties occur.

A typical sample is composed of 65% microcline and plagioclase, 25% quartz, and 10% biotite. In places muscovite occurs but is minor. In a few exposures just north of Marsac lake the mafic mineral is hornblende.

Anorthositic Gabbro

A small mass of anorthositic gabbro occurs in the southwest corner of the map-area. This rock is medium grained, gray, and generally slightly foliated. Its main constituents are 60-70% plagioclase and 30-40% hornblende.

Micaceous Quartzite

Micaceous quartzite is exposed in the northeast and north-central parts of the map-area where it is interlayered with metabasalt and metagabbro amphibolites. It is medium grained, white to light gray, and well foliated. Quartz makes up 80-90% of the rock, and biotite and muscovite comprise usually about 10%. Plagioclase and microcline are present in minor amounts.

Metabasalt and Metagabbro Amphibolites

The metabasalt and metagabbro amphibolites are found in the northeast section of the area. These amphibolites are similar in composition and the distinction between them, made in the field, is based mainly on differences in relict grain size.

The metabasalt amphibolite is fine grained, dark green, and foliated. It consists of 50% plagioclase and 50% hornblende, with a minor amount of chlorite.

The metagabbro amphibolite is medium grained and dark green, and is composed of 50% plagioclase and 50% hornblende. The rock is generally foliated but some is rather massive.

Layered Quartz-plagioclase-biotite Gneiss

The layered quartz-plagioclase-biotite gneiss is migmatitic in appearance. The rock consists essentially of two parts: a well-foliated, gray, medium-grained biotite paragneiss, and numerous, virtually concordant quartz-plagioclase layers or stringers from ½ inch to several inches thick. The quartz-plagioclase stringers are igneous-appearing, medium to coarse grained, and generally grayish white, though some have a slight pinkish tinge. The biotite paragneiss portions usually contain roughly equal amounts of quartz, plagioclase and biotite.

Biotite Paragneiss, Quartzite

The biotite paragneiss is gray and medium to coarse grained. Most of it contains approximately equal amounts of quartz, plagioclase and biotite, but in some cases the ratios of these minerals vary considerably. In places where the paragneiss has a high content of biotite and is coarse grained, the rock is shiny in appearance. Epidote is a common accessory. Hornblende, muscovite and microcline are locally present in minor amounts. The minerals show a very good planar orientation.

One outcrop of quartzite was found in the south-central part of the map-area. It is medium grained, white and well foliated, and is composed of 90% quartz and 10% muscovite. Microcline and plagioclase are minor constituents.

Amphibolite

This amphibolite forms small lens-like bodies interbanded with the layered quartz-plagioclase-biotite gneiss and biotite paragneiss. The rock is medium to coarse grained, dark green, and commonly well foliated. It is generally composed of equal amounts of plagioclase and hornblende. Minor amounts of biotite and quartz are locally present.

Leucogranite, Tourmaline Granite, Pegmatite

The leucogranite is pink, medium to coarse grained, and usually massive, though some is foliated. It is normally composed of 65% microcline and plagioclase, 30% quartz, and 5% or less biotite. Some of it contains muscovite.

The tourmaline granite is found in the northeast part of the map-area where it intrudes the metabasalt and metagabbro amphibolites. The rock is white with a slight yellowish tinge, medium to coarse grained, and usually massive. A typical sample is made up of 55% microcline and plagioclase, 30% quartz, and 15% black tourmaline.

White and pink, leucocratic granite pegmatites consist mainly of microcline, plagioclase and quartz. Some contain biotite and muscovite in minor amounts.

Ultrabasic Rocks

The ultrabasic rocks occur as small intrusives and are thought to be the youngest rocks in the map-area. They are medium to coarse grained, dark green on fresh surfaces and rusty brown to buff on weathered surfaces. They consist mainly of hypersthene and serpentine, but the ratio varies considerably; one rock was even found to be almost entirely serpentine. The usual accessory minerals are magnetite and amphibole. In general the rocks are massive.

STRUCTURAL GEOLOGY

The structural geology of the Tuk River area is complex and the rocks have been intricately folded. No large faults were recognized.

Folds

Fold structures in the area were difficult to work out owing to the absence of marker beds, scarcity of exposures in certain parts, and the complexity of the folding. However, several

anticlines and synclines have been determined, and their axes are shown on the accompanying geologic map. Although their trends are highly variable, two main directions are apparent: east-west in the central part of the area, and north-south in the northeast corner. This indicates that the area was affected by at least two distinct periods of folding, with the result that the large folds are rather discontinuous. Both open and closed folds are present.

Major folds are most clearly defined in the northeast corner of the map-area, where the metabasalt and metagabbro amphibolites are tightly folded along north-south axes. Almost all the limbs dip 50°-60° to the west; all but one of these folds are overturned to the east.

Foliation and Lineation

Although most of the rocks in the map-area are well foliated, some are massive. The massive rocks are: leucogranite, tourmaline granite, granite pegmatite, ultrabasic rocks, and some of the anorthositic gabbro and amphibolites.

In some outcrops lineation is well developed. Two types of lineation were recorded: orientation of mineral grains and the axes of small folds.

ECONOMIC GEOLOGY

No claims have been staked in the area during recent years. There is field evidence that parts of it have been prospected, but it appears that the work was reconnaissance in nature and that no significant concentrations of minerals were found.

During the field work no important rusty-weathering zones were seen; however, small amounts of disseminated pyrite and chalcopyrite were noted in some of the amphibolites. It appears that these rocks, which are most abundant in the northeast corner of the map-area, are the most favorable for sulfide mineralization.

REFERENCES

Bérard, Jean (1964a) - Geology of Upper Outardes River Area, Chicoutimi County; Quebec Dept. Nat. Res., P.R. No. 512 (with map No. 1547).

Bérard, Jean (1964b) - Geology of Matonipi Lake Area, Saguenay County; Quebec Dept. Nat. Res., P.R. No. 521 (with map No. 1543).