RP 361(A)

PRELIMINARY REPORT ON MARIN - PICQUET AREA, ABITIBI-EAST ELECTORAL DISTRICT

Documents complémentaires

Additional Files

Licence

License

Énergie et Ressources naturelles
Québec

P. R. No. 361

PROVINCE OF QUEBEC, CANADA

DEPARTMENT OF MINES

HON. W. M. COTTINGHAM, MINISTER A.-O. DUFRESNE, DEPUTY MINISTER

GEOLOGICAL SURVEYS BRANCH

PRELIMINARY REPORT

ON

MARIN-PICQUET AREA

ABITIBI-EAST ELECTORAL DISTRICT

BY

JEROME H. REMICK

QUEBEC
1958

P. R. No. 361

M-D-4542

PRELIMINARY REPORT

ON

MARIN-PICQUET AREA

ABITIBI-EAST ELECTORAL DISTRICT

by

Jerome H. Remick

INTRODUCTION

The Marin-Picquet area is bounded to the south and north respectively by latitudes 49°09' and 49°30', and to the east and west by longitudes 75°30' and 75° 45'. It comprises an area of approximately 270 square miles in Abitibi-East electoral district, about 70 miles southwest of Chibougamau. It includes almost all of Marin and Picquet townships, about one-third of La Ronde township, and small portions of Du Guesclin, Royal, Belmont, and Urban townships.

The surrounding areas were mapped at a scale of 4 miles to the inch by Retty and Norman (1938). The area to the south was mapped at one mile to one inch by Milner (1943), that to the east by Deland (1955), and that to the north by Shaw (1940). Also the Geological Survey of Canada has recently issued an aeromagnetic map of an area immediately to the North (1957).

Several aviation companies located near Chibougamau provide transportation into the area, the flight distance being about 65 miles. Numerous lakes are accessible to float planes. The new Chibougamau-Beattyville-Senneterre line of the Canadian National Railway is 8 miles north of the northwest corner of the area. Lessard lake, in the northwest corner of the area, is accessible by railway from Chibougamau, or Senneterre, to Opawica lake and thence by canoe south and east for about 20 miles on Opawica and Lichen lakes, Travel within the area to Germain lake, by way of Germain river, involves a few short, well-cut portages. The water level is too low for travel by canoe along much of Brosseau river. Portages around the longer rapids on Yondotega river were cut in 1957, making travel by canoe possible between Brosseau and Yondotega lakes.

All surveyed township lines, except the north-south line separating Marin and Picquet townships from Du Guesclin and Royal townships can be followed more or less easily. The north-south line referred to, cut in 1927, is now completely overgrown and practically impossible to follow.

PHYSICAL FEATURES

The land surface is generally flat and covered by numerous small swamps and thickly wooded areas. Hills of hornblende schist and meta-gabbro rise 10 to 150 feet above the general level just south of Germain river and northeast of Turcotte lake. Hills of granite parallel the west shore of Father lake, rising 50 to 150 feet

above it. Several hills of granite, 100 to 200 feet above the general level, are present near Yondotega lake. A fire tower is located on the highest of these.

Surface waters drain northward to Germain lake and than westward by way of Germain river, Lessard and Lichen lakes, and the Waswanipi-Nottaway system to James bay.

GENERAL GEOLOGY

The consolidated rocks of the area are Precambrian in age. About four-fifths of the area is underlain mainly by biotite granite, in part gneissic. Two belts of hornblende schist strike roughly eastward across the northern part of the area. Small bodies of meta-anorthosite and hornblende schist occur in the northeast corner of the area. Gneissic hornblende diorite lies along the south boundary, and a stock-like mass of hornblende diorite outcrops toward the northwest corner. A few dykes of diabase appear in the northwest corner and, also, about a mile south of Germain lake.

Recrystallized Volcanic Rocks

Hornblende Schist

Hornblende schist outcrops in two belts, each about 1/2-mile wide, trending roughly eastward across the northern half of the area. It occurs also in two small areas in the northeast. Most of the outcrops form rounded hills which rise 10 to more than 150 feet above the surrounding, and relatively flat, terrain underlain by granite.

The rock consists of hornblende needles and feldspar grains aligned parallel to the schistosity. Both fresh and weathered surfaces of the rock are bluish-black, and generally show lenticular banding. The weathered surface has a grey tinge where much feldspar is present.

The lenticular banding results from metamorphic differentiation of hornblende and feldspar into separate layers, and from later injections of quartz, epidote, sulphide minerals, and granite parallel to the schistosity. The banding is accented by differential weathering. The bands are paper-thin to 3/4-inch wide, and an inch to several feet long. Those rich in quartz, granite, or epidote are the most resistant.

Bluish bands are rich in hornblende; white bands in feldspar, granite, or quartz; and light green bands or lenses in epidote, commonly accompanied by sulphides and quartz. Greenish-grey bands contain unaltered lava, and rusty brown bands contain some sulphide minerals.

The schistosity is bent around some of the lenses, particularly the light green ones, characterized by epidote, quartz, some hornblende schist, and sulphides.

In many of the outcrops, disseminated pyrite and, in places, chalcopyrite occur close to quartz veins or veins rich in quartz and epidote.

The fresh surface shows interlayered, paper-thin folio of white feldspar and bluish-black hornblende needles, or a mixture of aligned hornblende needles and

Table of Formations

Pleistocene and Recent		Boulders, gravel, sand, silt
Precambrian	Unaltered basic intrusive rocks.	Diabase
	Intrusive Contact	
	Acidic intrusive rocks.	Biotite-augite syenite
		Pegmatite Biotite granite
		Gneissic hornblende granite Gneissic hornblende-biotite granite Gneissic biotite granite
	Intrusive Contact	
	Intermediate intrusive rocks.	Gneissic hornblende diorite, gabbro Hornblende diorite
	Intrusive contact	
	Altered basic intrusive rocks	Meta-anorthosite Meta-gabbro
	Intrusive Contact	
	Recrystallized volcanic rocks	Hornblende schist

feldspar grains. Layering is not pronounced enough to warrant calling this rock a gneiss.

The hornblende schist in the southern belt is characterized by a slightly coarser grain and, in places, "lit-par-lit" injections of granitic material. The western end of the northern belt may be marked by the highly granitized, hydrid diorite occurring on the islands and adjacent shoreline of Lessard lake.

Outcrops of hornblende schist on the north shore of Germain lake show a few pillow structures, and nearby outcrops are green in contrast to the usual bluish-black. Keewatin-type features such as pillows were not observed at other localities of hornblende schist. Nevertheless, the pillows and the greenish colour just mentioned suggest that the hornblende schist is the recrystallized equivalent of Keewatin-type volcanic rocks. This belief is supported by Deland's indentification (1955) of Keewatin-type volcanics about a mile east of the northeast corner of the present area.

Altered Basic Intrusive Rocks

Meta-gabbro

Meta-gabbro occupies an elongated, 1/2-mile-wide zone just south of the central part of Germain river. A small amount of meta-gabbro occurs with the hornblende schist in the northeast corner of the map-area, and in the large hill northwest of Turcotte lake. These latter occurrences are too small to be shown on the accompanying map.

The meta-gabbro is medium-grained, massive to slightly schistose, and consists of about equal amounts of hornblende and feldspar, the hornblende predominating here and there. Its weathered surface is rough and fractured, with hornblende standing out in relief. Neither fresh nor weathered surfaces show lenticular banding.

Meta-anorthosite

Meta-anorthosite underlies rounded hills in the northeast corner of the area, and in the southeast corner of the Lewis lake area to the north (Shaw, 1940).

The rock is massive, coarse-grained, and very rough on the weathered surface. It consists of varying proportions of hornblende and plagioclase. The hornblende content is generally about 15 per cent, but there are small patches that consist predominantly of this mineral. The hornblende is green, up to 1 1/4 inches long, and stands out above 1/8 inch on the weathered surface. Plagioclase is present in rectangular to somewhat rounded grains 1/4 to 3/4 inch in length. The fresh plagioclase is very light grey, and shows both polysynthetic twinning striations and good cleavage. Many of the plagioclase grains are partly or completely surrounded by hornblende.

The meta-anorthosite contains small inclusions of hornblende schist, and is cut by several small dykes of gneissic biotite granite.

Intermediate Intrusive Rocks

Hornblende Diorite

Massive to slightly schistose, medium-grained, hornblende diorite outcrops north of La Ronde river, northeast of Lessard lake, and along a portion of the central north-south survey line in La Ronde township. Most of the outcrops are on hills.

The rock is massive, for the most part, and consists of hornblende and feldspar in varying amounts. Generally, about 25 per cent hornblende is present. Small portions of the rock contain up to about 70 per cent hornblende; the term "gabbro" is more applicable to these portions. The weathered surface is generally very rough, with the more resistant hornblende standing out noticeably.

The hornblende diorite differs from the gneissic hornblende diorite, which outcrops near the south boundary of the area, in that the grains of hornblende are smaller, show little to no alignment, and occur in clusters rather than as single, relatively long grains. The quantity of hornblende is commonly variable over a few feet, whereas that in the gneissic hornblende diorite is constant.

Gneissic Hornblende Diorite

Gneissic hornblende diorite outcrops near the south boundary of the area. A few outcrops of similar rock were observed along the south shore of Germain river about one mile west of Germain lake, and also south of the lake. Most exposures in the southern part of the area are on hills.

The rock is equigranular and medium-grained, It consists of 25 to 35 per cent hornblende, and plagioclase feldspar. Accessory minerals include biotite, chlorite, epidote, and magnetite.

Hornblende occurs in separate, prismatic grains averaging 1/4 inch in length. No lenticular masses of hornblende grains were noted. The gneissic structure is a result of alignment of prismatic grains of hornblende. Lineation of hornblende is not pronounced.

Some of the plagioclase feldspar is in rectangular grains with good cleavage and polysynthetic twinning striations. However, most of the original plagioclase has been altered to aggregates of smaller plagioclase grains.

A few flakes of biotite are present in some of the outcrops, The biotite, segregated from the hornblende, is probably primary. Chlorite is present in varying amounts as an alteration product of hornblende. Epidote fills fractures in many outcrops. Magnetite is widely disseminated.

The fresh surface is mottled black and white. Feldspar is generally white but in places is slightly pinkish. The weathered surface is commonly dark and somewhat rough owing to the resistance of hornblende to weathering. Some weathered surfaces are dark rusty brown.

Gabbro

A few outcrops of gabbro occur with the gneissic hornblende diorite southwest of Podeur lake at the south boundary of the area, and on the northwest shore of Germain lake.

The rock is massive, medium-grained, and consists of about 85 per cent hornblende and 15 per cent plagioclase. The weathered surface is rough and black; the fresh surface shows white, rectangular grains of plagioclase embedded in a mass of black, prismatic grains of hornblende.

Acidic Intrusive Rocks

Acidic intrusive rocks occupy about four-fifths of the area. Gneissic biotite granite with minor amounts of gneissic hornblende-biotite granite, and gneissic hornblende granite with inclusions of hornblende schist underlie much of the northern half of the area. Rather massive biotite granite, free from inclusions of hornblende schist, underlies the southern half of the area. A small mass of biotite-augite syenite outcrops northwest of Germain lake. Differences in mineral content, structure, and grain size are the main factors used in the field to distinguish between the various types of acidic intrusive rocks.

Gneissic Granite

The gneissic biotite granite of this area is similar to that found to the northeast (Remick, 1957). The rock is grey, medium-grained, and consists of 20 to 30 per cent quartz, 10 to 15 per cent biotite, and white feldspar (mainly plagioclase). Epidote and rare sphene are the chief accessory minerals.

Gneissic structure is clearly shown by biotite arranged either in discrete grains or in paper-thin, lenticular folia. "Booklets" of biotite, rather than thin folia, occur in the granite along the shores of Germain and Lessard lakes and along Germain river. The "booklets" are between 1/8 and 1/4 of an inch in diameter and leave slit-shaped cavities on the weathered surface.

Gneissic hornblende-biotite granite and gneissic hornblende granite generally occur together, interlayered with gneissic biotite granite, between the two belts of hornblende schist. Some hornblende granite occurs as "lit-par-lit" injections in the southerly belt of hornblende schist, southwest and northeast of Brosseau lake. Layers of gneissic hornblende granite are of limited extent and generally only a few feet to a few tens of feet thick. These granites contain up to 20 per cent hornblende. The hornblende content may have been derived from the adjacent hornblende schist.

The content of hornblende and biotite can be approximated where the biotite has been partly dissolved by weathering, leaving slight linear depressions. The weathered surface is generally rough, as differential weathering has left quartz protruding beyond other minerals.

Biotite Granite

The biotite granite of the southern half of the area is grey, fine- to medium-grained, relatively fresh, and generally massive. It consists of 1 to 8 per

cent biotite and 20 to 25 per cent quartz, along with potash and plagioclase feldspar. Accessory magnetite, sphene, and epidote are commonly present. Porphyroblastic grains of potash feldspar, ranging in size from 1/8 to 2 inches in length, occur in varying proportions in some of the outcrops.

The biotite granite may easily be distinguished from the gneissic biotite granite to the north by: 1) its massive character and granitic texture; 2) a smaller amount and grain size of biotite; 3) the presence of octahedra of magnetite; 4) the presence of porphyroblastic grains of potash feldspar; 5) the general association with pegmatitic masses; and, 6) the absence of other rock types, especially hornblende schist.

Biotite content is generally 1 to 4 per cent in the finer-grained granite, and 5 to about 8 per cent in the medium-grained granite. Both tiny flakes and 1/8-inch "augens" of biotite are present in the medium-grained granite, whereas only a few tiny flakes of biotite are present in the finer-grained rocks. In both types of granite the flakes of biotite are smaller than the grains of other minerals present.

Plagioclase feldspar occurs in rectangular grains showing good cleavage and polysynthetic twinning striations.

Quartz commonly fills the spaces between the grains of feldspar. It occurs as grains about 1/8 inch in diameter in the medium-grained rocks.

Potash feldspar generally occurs in grains averaging 1/8 inch long. However, west of Yondotega lake and around Pierrefond lake, grains 1/2 to 2 inches long are common. These large grains are restricted to the medium-grained granite and are accompanied by a higher content of biotite. The finer-grained granite generally has a few potash feldspar grains 1/8 inch, or less, in length. The potash feldspar grains are rectangular and show good cleavage and carlsbad twin halves. They stand out on the weathered surface, and at first glance give the rock a porphyritic appearance. The potash feldspar grains are porphyroblastic, as they contain abundant inclusions of all the minerals contained in the rock. The content of potash feldspar in the medium-grained granite is 10 to 15 per cent.

Magnetite is a characteristic accessory mineral. It is in small, well-formed octahedra, and ranges in amount from a few grains to 0.5 per cent. The magnetite content of the finer-grained, biotite-poor granite is greater than that of the coarser-grained, biotite-rich granite. Sphene is generally present in the medium-grained rocks; it forms perfectly developed, light brown crystals. It is not commonly found in the finer-grained rocks. Epidote occurs in small amounts near biotite in the medium-grained rocks.

Veins and masses of quartz-potash feldspar pegmatite are characteristic of almost every outcrop. Quartz veins, except at Father lake, are rare. Pyrite is extremely rare in these veins.

The weathered surface of the finer-grained rock is relatively smooth. The medium-grained granite, with its large potash feldspar grains and greater quantity of biotite, has a rougher weathered surface.

Alteration in the presence of quartz, pink feldspar, and epidote has, in places, imparted a light pink to a strong, salmon pink colour to the rock. This is especially noticeable in the outcrops along the shoreline of Father lake. A small

island of highly fractured granite in Father lake shows extreme alteration of this type. The feldspars here are deep salmon pink. Specular hematite fills fractures, and there are a few grains of purple fluorite, in the most severely altered rocks.

The finer-grained granite cuts the medium-grained granite in the southeast corner of Father lake and at the forest rangers cabin on the west shore of Giardini lake. It is possible that the medium-grained granite is an earlier phase derived from the same source as the finer-grained phase.

Pegmatite

Small veins and masses of quartz-potash feldspar pegmatite are generally associated with the biotite granite. Several larger pegmatite dykes were noted on both sides of the falls at the north end of Lessard lake, in the hornblende diorite.

Biotite-augite Syenite

Biotite-augite syenite outcrops on relatively high hills in much of the area directly northwest of Germain lake.

It is a fine- to medium-grained rock consisting of 10 to 25 per cent biotite and black augite in varying proportions, pink and white feldspar, a small amount of quartz, and accessory pyrite and magnetite. The colour is generally pink on fresh surfaces, but, in some of the rock, both fresh and weathered surfaces are yellowish-brown. The weathered surface is smooth for the most part.

Thin, lenticular folia of biotite produce a gneissic structure in some of the rock. Much of the rock is massive.

Unaltered Basic Intrusive Rocks

Fine-grained Diabase

Two small outcrops of fine- to medium-grained diabase cut the granite about 1 mile south of Germain lake. The weathered surface is rusty brown and feels like a fine sand paper. The rock is dark grey, massive, and contains accessory pyrite.

A small dyke of black, aphanitic rock with a conchoidal fracture cuts the granite in the same vicinity. It is probably a chilled facies of the larger outcrops of diabase.

Medium-grained Diabase

Two outcrops of medium- to coarse-grained diabase cut the granite in the northwest corner of the area. The rock is fresh, massive, and consists of black pyroxene (about 30 per cent) and plagioclase laths. Accessory amounts of epidote, pyrite, and magnetite-ilmenite are also present.

The rock has a distinct diabasic texture, with clusters of pyroxene partly enclosing plagioclase laths. Some of the plagioclase is very light pink; the

weathered rock surface is rusty brown; exfoliation has rounded the outcrops. This rock is similar to diabase found to the northeast (Remick, 1957).

Unconsolidated Aggregate

Glacial sediments of Pleistocene age, consisting mostly of silt, sand, gravel, and boulders, cover much of the area. Eskers, drumlins, kettle lakes, sand plains, and ground moraine are the main depositional features. Striae and polished rock surfaces are the main erosional glacial features.

A thick blanket of ground moraine covers the southern fifth of the area, and a sand plain, deeply cut by small streams, occupies the southeast corner. The sediments in this latter area are sorted, consisting of sand with a few rounded boulders underlain by clayey silt. Father river has cut down through the sand and now flows on a floor of grey, clayey silt.

A discontinuous, southwest-trending esker, with kettle lakes on its south side, continues from the area to the east (Deland, 1955) across the southeast corner of the present area to and beyond the boundary at Podeur lake. A wide, esker-like ridge runs southwest from a little north of Brosseau lake to the south end of Lorene lake. Southwest-trending, drumlin-like hills are present in the northwestern part of the area.

Glacial striae and prominent grooves in the hornblende diorite at the falls on Lessard lake trend N.36°E. The glacial striae and grooves in the granite on the east shore of Germain lake trend N.40°E.

Most of the large, angular boulders noted were within a few hundred to perhaps a thousand feet of exposures of similar rock types.

STRUCTURAL GEOLOGY

Schistosity, Foliation

The schistosity and the lenticular banding in the hornblende schist strike east to slightly south of east, paralleling the trend of the belts shown on the accompanying map. The dips are steep to vertical.

Gneissosity in the gneissic biotite granite, and in the northern part of the biotite granite, strikes slightly south of east in the western part of the area, east-west in the central part, and slightly north of east in the eastern part.

Gneissosity in the hornblende diorite is slightly north of east, paralleling the contact with the biotite granite.

Drag Fold

Small drag folds are common in the zone of hornblende schist in the northeast corner of the area. Axial planes strike from N.20°E. to N.35°E., or normal to the schistosity in these rocks. Veins of quartz and feldspar, injected parallel to the schistosity of the hornblende schist, make the drag folds more evident.

Faulting

It is quite possible that a fault lies between the zone of hornblende schist in the northeast corner and the acidic rocks to the west. This is suggested by the abrupt termination of the schistosity of the hornblende schist near, and nearly normal to, the contact with the acidic rocks.

Jointing

Three sets of joints occur in the biotite granite: one is nearly horizontal; two, nearly vertical, strike north or east approximately. Joints trending north-northeast parallel the rocky shore of Father lake. Two nearly vertical sets of joints, with north or east strikes, are present in a few outcrops of gneissic biotite granite.

ECONOMIC GEOLOGY

Mineralization in Hornblende Schist

Pyrite occurs in the hornblende schist as disseminated cubes or as small lenses associated, in places, with vein quartz. A small amount of chalcopyrite was noted in a few of the granular, quartz-epidote lenses in the western part of the southern belt of hornblende schist. Rare, rusty-weathered surfaces in the hornblende schist point to the presence of some sulphides.

Mineralization in Gneissic Biotite Granite

The granite on the east shore, and southeast, of Germain lake is cut by quartz veins. A few cubes of pyrite were noted here.

Mineralization in Biotite Granite

Alteration of some of the biotite on the shores of Father lake has given this rock a light to deep salmon pink colour. The alteration is most intense on a small island at the eastern boundary of the area. Several fractures here are filled with specular hematite, along with a few grains of purple fluorite.

A little molybdenite was noted associated with granite-filled fractures in a large, angular boulder of coarse-grained amphibolite. The boulder is on a relatively high hill between Yondotega and Giardini lakes.

REFERENCES

Deland, A.N. (1955) - Preliminary Report on Du Guesclin-Royal Area, Abitibi-East County; Que. Dept. Mines, P.R. No. 318.

Milner, R.L. (1943) - Geological Report on Barry Lake Area, Abitibi County and Abitibi Territory; Que. Dept. Mines, G.R. 14.

Remick, J.H. (1957) - Preliminary Report on Guercheville-Lapparent Area, Abitibi-East Electoral District; Que. Dept. Mines, P.R. 343.

Retty, J.A. and Norman, G.W.H. (1938) - Chibougamau Sheet (West Half) Abitibi Territory, Quebec; Geol. Surv. Canada, Map 398A.

Shaw, G. (1940) - Lewis Lake, Abitibi Territory, Quebec; Geol. Surv. Canada, Map 555A.

Geological Survey of Canada, (1957) - Opawica Lake- Lewis Lake Area, Abitibi County, Advance Edition, Sheet $32\frac{G}{12}$ (aeromagnetic map 517G).