

# RP 340(A)

PRELIMINARY REPORT ON BERAUD - MAZERAC AREA, ROUYN-NORANDA AND ABITIBI-EAST ELECTORAL DISTRICTS

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PRELIMINARY REPORT

ON

BÉRAUD-MAZÉRAÇ AREA

ROUYN-NORANDA AND ABITIBI-EAST ELECTORAL DISTRICTS

BY

PETER V. FREEMAN



QUEBEC  
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ERRATUM

At pages 1, 5, 6 and 8, read Vaudaran lake  
instead of Béraud lake

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PRELIMINARY REPORTONBÉRAUD-MAZÉRAÇ AREAROUYN-NORANDA and ABITIBI-EAST ELECTORAL DISTRICT

by

Peter V. Freeman

INTRODUCTION

The Béraud-Mazérac area, mapped during the summers of 1954 and 1955, is bounded by latitudes  $47^{\circ}45'$  and  $48^{\circ}00'$  and by longitudes  $78^{\circ}00'$  and  $78^{\circ}30'$ . The northern limit is approximately the boundary between Rouyn-Noranda and Abitibi-East electoral districts. The map-area, which covers 400 square miles, includes Béraud and Desroberts townships, about two-thirds of Mazérac and Landanet, parts of Darlens and Chabert, and narrow strips of Montanier, Surimau, Fournière, Laubanie and Jourdan townships. The northeastern half abuts on the east against the Sabourin map-area (1, 2).

The centre of the map-area is about 20 miles south-southwest of Malartic and 30 miles southwest of Val-d'Or. The area is easily reached by motorcar from these towns via Cadillac, whence a road runs south for 38 miles to the Rapid 7 hydroelectric station of Ottawa river in range V, Landanet township. Nearly all parts of the area are accessible by lumber roads maintained by the Canadian International Paper Company, Limited. The northeastern part may also be reached by canoe by Lemoine Lake from the highway No. 59 bridge-crossing, five miles west of Val-d'Or. Most of the southern section can be reached by canoe from Ottawa river and its flooded bays. A new road has been completed into Chabert township from the Rapid 7 hydroelectric station.

The northeastern part of the area drains northward through Lemoine lake into the Harricanaw - James Bay drainage system, the remainder southward into the Ottawa - St. Lawrence system.

The area is largely rocky upland with a general elevation of 1,300 feet above sea-level. A few isolated hills east of Béraud lake are higher than 1,500 feet. A wide valley, floored by fluvio-glacial material, sand, and lacustrine clays, runs in a southwesterly direction from the northeastern corner of the area through Rapid 7. Most of the other valleys have a mantle of lacustrine clays.

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(1) Denis, Bertrand T., Sabourin Map-Area, Témiscamingue County; Que. Bur. Mines, Ann. Rept., 1934, Pt. C., Map No. 315, (1935).

(2) Dawson, K.R., Preliminary Map. Lac Sabourin, Abitibi and Témiscamingue Counties, Quebec; Geol. Surv. Canada, Paper 48-2 (1948).

GENERAL GEOLOGY

All the consolidated rocks, which are Precambrian, outcrop as mounds or as ridges or ranges of hills, which trend northeast in the eastern and western parts of the area and east-west in the central part.

The rocks are altered sedimentaries and volcanics intruded by syenitic and granitic rocks, most of which are gneissic, and these are cut by pegmatite and aplite. Dykes of diabase and gabbro cut all the rocks.

Table of Formations

CENOZOIC	Recent and Pleistocene	Peat, talus, alluvium Wind-blown sand Fluvioglacial deposits, varved clays
Great unconformity		
LATE PRECAMBRIAN		Diabase and gabbro
Intrusive contact		
EARLY PRECAMBRIAN	Intrusive Rocks	Granite pegmatite and aplite Oligoclase-microcline granite
		Intrusive contact
		Hornblende syenite, diorite aplite
		Intrusive contact
	Pontiac Group	Biotite schist, biotite-staurolite schist, hornblende schist Coarse-grained amphibole rock and metasomatic rocks

## Pontiac Group

### Biotite Schist and Related Rocks

The oldest rocks, which have been assigned to the Pontiac group by Wilson (1), include biotite schist, biotite-staurolite schist, and hornblende schist.

Outcrops of the schists are numerous throughout the map-area, except in its southwest quarter. The schists now crop out as lenticles or curved masses of more irregular shape between the intrusive rocks. In many places small masses of the schist are included within the igneous rocks, and locally lit-par-lit injection gneisses have been formed. Some of the layering in the granitic rocks may be inherited from the structure of schists that were injected by and have reacted with granite magma.

The biotite schists are grey and weather into slabs. Thin biotite-rich and quartz-rich layers alternate to give the rocks a laminated appearance. The schistosity is, at most localities, parallel to the layering, which is presumed to be original bedding. The major constituents are quartz and biotite in approximately equal amounts, with some oligoclase, muscovite, and hornblende. Staurolite is found as porphyroblasts in some layers and is, in places, abundant enough to justify a subdivision on the map of biotite-staurolite schist. Cordierite is found rarely. Minor minerals are pyrite, magnetite, sphene, and apatite.

At a few places thin layers of hornblende schist occur in the biotite schist. A fairly wide zone of these hornblende rocks is found in the west half of range IX, Béraud township, north of the road to Darlens river, but generally the bands are too narrow to be shown on the accompanying map.

### Amphibole Rock and Metasomatic Rocks

North of Lemoine lake, two layers of coarse-grained amphibole rock occur in and are parallel to the schistosity of the Pontiac schist. A few thin bands occur between Clair and Mourier lakes, south of Ferguson lakes, and south of Rapid 6 in the granites. Green hornblende is the principal mineral, but locally patches of andesine form blebs in the rock. Under the microscope some diopside can be seen. Sphene is very abundant, and makes up six per cent of some thin-sections. Pyrrhotite, epidote, and carbonate are other accessories.

What probably are altered basic volcanic or intrusive rocks occur in two widely separated localities. Directly south of Lemoine lake, a small mass of a light greenish-yellow weathering rock with a faintly soapy feel

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(1) Wilson, M.E., Timiskaming County, Quebec; Geol. Surv. Can., Mem. 103, (1918).

forms a low hill. In thin-section the rock shows a felted mass of tremolite crystals with much colourless chlorite and possibly serpentine, as well as small flecks of talc and scattered opaque minerals. On the east shore of Newcombe bay, Ottawa river, a dark grey rock with a conspicuous network of white zoisite veinlets forms a small body which is bounded on the west by a highly schistose rock composed of quartz, graphite, and sericite. In thin-section the dark rock consists of hornblende with "sieve" structure, quartz, prehnite, zoisite, and opaque minerals.

### Hornblende Syenite and Related Rocks

#### Syenite and Diorite

South and east of Mourier lake, hornblende syenites crop out in an area about six miles long and three miles wide. The rock, which has a very striking appearance, is a coarse-grained aggregate of dark green hornblende and pink feldspars. In places it is gneissic. Dykes of pink pegmatite and granite cut these rocks. Biotite is locally abundant, and the microscope shows that some of the biotite is secondary after hornblende. Augite forms remnants. In some thin-sections microcline forms more than half of the total feldspar, in others the amount of microcline is small, so that the rock grades into diorite. The plagioclase, which is andesine, is commonly largely altered to sericite. Quartz is five per cent or less of the rock, and epidote, sphene, apatite, allanite, magnetite, and pyrite are accessories.

Along the southwestern and northeastern margins of the mass near Mourier and Lemoine lakes the rock is porphyritic and contains inclusions of biotite schist. The feldspar phenocrysts are conspicuously zoned, the cores of the crystals being rich in sericite and epidote. A small body of porphyry occurs north of Quessy lake and west of the Rapid 7 road. Farther west, a similar porphyry, much intruded by pegmatite, forms a northeast-trending body straddling Ottawa river at the Darlens-Béraud township line. Biotite is dominant over hornblende in this occurrence, and forms as much as 90 per cent of the dark minerals. Farther south, small inclusions of the porphyry are found in the pegmatites.

In places, a fine-grained diorite aplite intrudes the syenite, especially in ranges IV, V, and X, Desroberts township. Locally it forms sheets parallel to the gneissic structure of the syenites. Small platy inclusions of a rock composed mainly of hornblende are locally abundant, and they are oriented so the greater dimensions are parallel to the gneissic structure of the aplite. In places large blocks of syenite are found in the aplite. The aplite consists mainly of plagioclase, quartz, hornblende, and colourless monoclinic pyroxene, with small amounts of microcline, epidote, and sphene.

### Granite and Granite Pegmatite and Aplite

#### Granite

White, greyish-white, or pinkish granite forms stocks and sills. In many localities it is cut by pegmatite dykes and sills that are believed to be related to it. In most exposures the granite is gneissic and is medium-grained, but massive, fine-grained, and coarse-grained facies occur. Although the rock is in most localities equigranular, a porphyritic facies, with feldspar and quartz as phenocrysts, is common, particularly where the granite is in contact with schists of the Pontiac group.

Most of the granite has oligoclase as the dominant feldspar, but, in places, microcline is abundant. The passage from the oligoclase-rich to the microcline-rich variety takes place in a short distance and the two varieties are so mingled that it is inexpedient to separate them in mapping a large area.

The microscope shows 15 per cent or more of quartz with from three to twenty per cent dark mineral, which is largely biotite. Muscovite may be associated with biotite. Secondary and accessory minerals are epidote, allanite, chlorite, garnet, sphene, apatite, sericite, zoisite, and magnetite.

### Granite Pegmatite and Aplite

Pegmatites and aplites of diverse textures are peculiarly abundant in the area. Not only do they form sills and dykes in the schists of the Pontiac group and in the syenitic and granitic intrusives, but also they crop out in large areas. The pegmatites are believed to be related in origin to the granite, and this belief is substantiated by the occurrence of pegmatitic granites which are similar in texture to the granites but coarser in grain. Microcline-perthite is the dominant feldspar of the granite pegmatite, whereas oligoclase is dominant in most of the granite. Pegmatites with abundant graphic intergrowths of quartz and microcline occur as do also pegmatites in which the quartz is in vein-like masses or lenticles.

Many of the pegmatites are massive, some are layered, and some have a streaked and plicated appearance. Alternating layers of pegmatite and aplite or the concentration of mica, garnet, or tourmaline in layers gives a banded appearance to some exposures. Locally, closely spaced, east-west striking shear planes give the pegmatites a gneissic aspect.

Microcline-perthite forms about 60 per cent of the pegmatites and aplites and is accompanied by quartz. The varietal and accessory minerals - albite, biotite, garnet, tourmaline, magnetite, and apatite - occur in different combinations not only in different masses but also within one mass. Muscovite is common and forms lens-shaped aggregates composed of crystals commonly less than a centimeter in diameter. Near Quessy lake, the yellow-green muscovite of the aggregates is fine-grained. In some places, plates of muscovite two inches across occur. In some masses biotite is more abundant and in larger crystals than muscovite. Garnet is abundant in the eastern, particularly southeastern, part of the map-area where it tends to occur principally within the aplitic parts of the intrusives. Tourmaline crystals form clusters in some pegmatites or layers in some aplites in the northern part of the area, particularly near Béraud lake. Rounded grains or octahedra of magnetite are common in pegmatite of Chabert and Landanet townships and in the body northwest of Clair lake. Apatite occurs in the pegmatite and aplite south of and near Béraud lake.

### Diabase and Gabbro

Several dykes of diabase or gabbro are known in the area. The largest dyke, 100 to 200 feet thick, was traced for three miles in ranges VII, VIII, and IX, Desroberts township. It strikes approximately N. 70°E. Parts of the dyke show a megascopically visible ophitic intergrowth of augite and labradorite, and parts are fine-grained.



Another dyke, about 100 feet thick, occurs on the east side of Mourier lake in range VIII, Desroberts township.

A thin, dark, fine-grained diabase dyke cuts the granite in range X, Chabert township, a mile and a half west of Ottawa river. It strikes N. 15°E.

### Pleistocene and Recent

Glacial striae on the rock surfaces show that, at least at a late stage, the continental ice moved from south to S. 20°W. across the area. During the retreat of the ice, debris was left on the surface and was largely reworked by water.

The most spectacular ice contact deposit is the ridge of boulders, pebbles, and sand that forms the axis of the covered area that extends southwest across the map-area. The ridge is flanked by sand deposits, and both ridge and sand have kettle holes, some of which have lakes or muskegs. The sand deposits on the southeast side of the ridge have been modified by winds, which were apparently largely from the southeast for dunes are crescentic in plan and convex to the southeast.

Varved clays floor many of the valleys and other depressions. At some localities they are seen to underlie sand.

### STRUCTURE

The influence of structure on the topography is clearly seen on the aerial photos of the region. In the eastern half of the map-area the trend of formations is northeast, and in the western half it is east-west or northwest.

The clearly defined northeast trend of the grain of the topography in the eastern part of the area is a result of the sill-like habit of the granite and pegmatite bodies in biotite schist. There are many local departures from this northeast trend caused by plunging anticlines and synclines.

In the western part of the area the structures are not clearly defined, and the granite and pegmatite forms mostly irregular intrusions without well defined trend. The schists of the Pontiac group that form a wide belt in the north part of the area strike more or less east-west, but they are considerably disturbed south of Béraud lake, and the formations swing to the south due to what may be a large cross fold with an axis trending southwesterly from the southwest tip of Mourier lake through Moose and Quessy lakes, and into range IV, Darlens township. The distribution of formations suggests a syncline plunging 75° northeast.

No faults with more than slight displacement were recognized in the field. A fault on the western side of the hornblende syenite in ranges V and VI, Desroberts township, is suggested by the abrupt change in the geology and by a linear topographic depression. Although other prominent linear depressions are seen in many parts of the area, there is no reliable geological evidence to consider them traces of faults.

Joints striking north, northeast, or northwest are common in all the rocks. In the pegmatite horizontal jointing is common.

The schists of the Pontiac group have a schistosity parallel to layering, which is believed to be relic bedding. Where the strikes of these structures are east-west, the dips are commonly north. However, near some intrusive rocks, a second schistosity inclined to the original is found.

## ECONOMIC GEOLOGY

### General Statement

The map-area is noteworthy for the extensive outcrops of granite pegmatite and might be expected to have deposits of minerals commonly associated with pegmatite. The examination of pegmatite shows the occurrences of some economic minerals, and the principal localities are shown on the accompanying map. Certain generalizations appear to be valid: beryl occurs in pegmatites that show conspicuous segregation, whereas radioactive minerals seem prone to be more abundant in schists or associated pegmatites characterized by coarse biotite, particularly if it is rusty.

Pyrrhotite is found in the hornblendic rocks to a greater extent than in other rocks. Chalcopyrite was found in boulders.

Spodumene, a mineral to be expected in some pegmatites, has been reported from the area, but no occurrence of it could be found.

### Radioactive Minerals

The discovery of a radioactive mineral, probably uranium-bearing, in a small biotite-rich shear zone in biotite schist and granite gneiss at mile-post 23 on the Cadillac-Rapid 7 road in range VII, Béraud township, stimulated prospecting in the area, and a large part of Béraud township was staked during 1953.

A sample of coarse biotite schist in contact with pegmatite from a locality 3,000 feet west and 500 feet south of mile-post 9 on the Béraud-Desroberts township boundary, has 0.022%  $U_3O_8$  equivalent. Readings higher than normal were obtained with the Geiger counter half a mile south of this locality. Many other schist-pegmatite contacts were tested, but all gave no evidence for appreciable concentrations of radioactive minerals.

### Copper

Veinlets of bornite and chalcopyrite were found in several boulders of pegmatite a mile north of à la Truite lake, southwest of Clair lake. Boulder prospecting of the region is warranted.

### Pyrrhotite

Pyrrhotite occurs in coarse amphibole-rich rocks north of Lemoine lake (locality 7), in the hornblende schist southwest of Mourier lake,

north and northeast of Newcombe bay, (locality 8), and in the schist on the Rapid 7 road at the bridge on the creek leading to Ferguson lakes (locality 9). Most of the hornblende schist contains small amounts of pyrrhotite. Many boulders of basic volcanic rock directly east of Quessy lake and in other parts of the area contain considerable pyrrhotite.

### Molybdenum

Small flakes of molybdenite were found in a biotite granodiorite inclusion in pegmatite on the road south of Béraud lake in range IX, Béraud township (locality 6).

### Beryl

Scattered crystals of beryl associated with segregations of quartz in pegmatites were found in five places (localities 1-5):

- (1) on a small island in Mourier lake;
- (2) in a pegmatite a mile and a half east of Mourier lake in range VIII, Desroberts township;
- (3) on a small island just south of Crrrière bay in range IX, Jourdan township;
- (4) in a pegmatite in range IX, Chabert township;
- (5) in quartz vugs in Pontiac schist near pegmatite on the Rapid 7 road east of Ferguson lakes.

### Apatite

Apatite makes up about 15 per cent of rock from near the contact of pegmatite and hornblende schist on the east shore of Newcombe bay (locality 12). The extent of the apatite-bearing rock was not determined because of a cover of talus and moss.

The presence of apatite in pegmatite south of Béraud lake was mentioned in an earlier section of the report.

### Feldspar

A dyke, 40 feet thick, consisting largely of potassic feldspar occurs on the north shore of the west bay of Decelles lake in range V, Mazérac township (locality 13).

### Graphite

A few hundred feet west of the apatite occurrence on Newcombe bay (locality 12), a leached, iron-stained, graphitic schist crops out at water

level. It is 10 feet thick, dips 70° east, and was traced along the shore in a northerly direction for about 600 feet. The schist consists of quartz, graphite and sericite.

### Gravel

Many mounds of gravel are found along the large ridge of gravel and many of the hills in the north-central part of Béraud township have gravel deposits on their south flanks. Gravel is also found along the Carrière Bay road and at various other localities. It has been used by the Canadian International Paper Company for road-dressing.