

# RP 542(A)

PRELIMINARY REPORT, GEOLOGY OF MEMBRE - CHALIFOUX AREA, PONTIAC, ROUYN-NORANDA AND TEMISCAMINGUE COUNTIES

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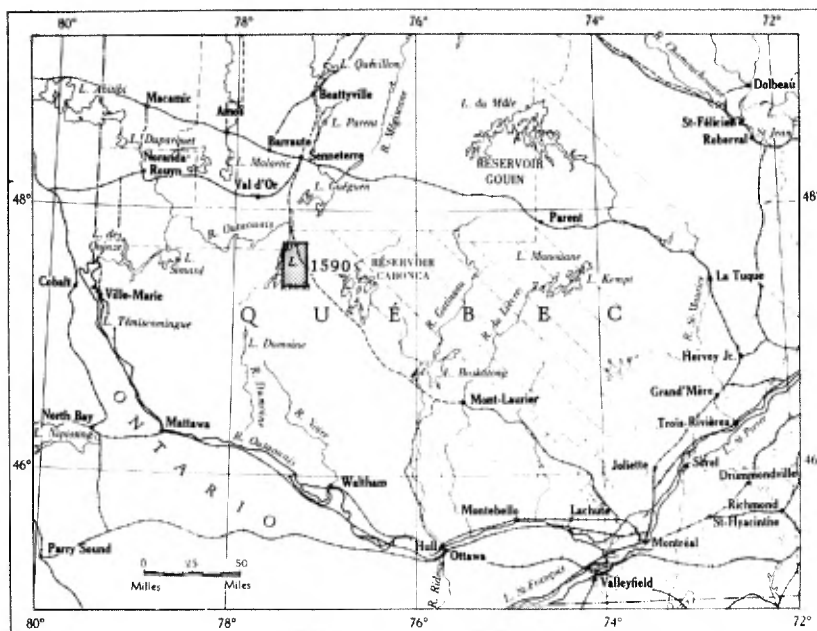
P.-E. AUGER, DEPUTY MINISTER

Geology  
of  
**MEMBRÉ-CHALIFOUX AREA**  
PONTIAC, ROUYN-NORANDA AND TÉMISCAMINGUE COUNTIES

PRELIMINARY REPORT

by

Jean-Y. Chagnon



QUÉBEC

1965



QUEBEC DEPARTMENT OF NATURAL RESOURCES

RENÉ LÉVESQUE, MINISTER

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GEOLOGICAL EXPLORATION SERVICE

H.W. MCGERRIGLE, CHIEF

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Preliminary Report

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MEMBRÉ-CHALIFOUX AREA

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INTRODUCTION

The Membré-Chalifoux area, mapped in 1964, covers an area of about 230 square miles. It is bounded by latitudes 47°26' and 47°45', and by longitudes 77°15' and 77°30'; its center is located about 60 miles southeast of Val-d'Or. The area, which is entirely in La Vérendrye Provincial Park, comprises parts of Membré, Chalifoux and Fréville townships in Pontiac county, part of Granet township in Rouyn-Noranda county and parts of Lajoie and Hamon townships in Témiscamingue county.

Provincial Highway 58, which joins Mont-Laurier and Val-d'Or, crosses the northeast sector of the area. A secondary highway, which joins Highway 58, gives access to the center of the area and arrives at Transparent lake by Bourque dam. A forest development road, property of the Canadian International Paper Co., cuts the northwest corner of the area and permits access to the southwest shore of Victoria lake. Two other forest development roads, presently under construction, will give access to the east shore of Victoria lake at two points: at Kawastaguta bay in the

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\* Translated from the French.

north and at the mouth of the Ottawa(Outaouais) in the south.

A network of lakes facilitates access to all parts of the area. Rapids and falls are few in number and are easily passed by well-kept portages.

Forest and water are the principal resources of the area. Forest exploitation is carried out in nearly all the region at the present time. Bourque dam impounds the waters of Dozois reservoir that drain into Victoria lake by the Ottawa.

The land surface is undulating, and the average local relief is about 200 feet. The altitude ranges between 1,065 feet at Victoria lake and 1,500 feet at the highest point, that is east of Anwatan lake. The topography commonly reflects the nature and structures of the underlying formations. In many places the bedrock is covered by a layer of glacial debris of varying thickness, depending on the relief.

The areas east, southeast and north of the area studied here were mapped by Gillies (1952), Wahl and Osborne (1950), Tiphane and Dawson (1950), and Lowther (1935).

### GENERAL GEOLOGY

All the consolidated rocks of the area are Precambrian in age and belong to the Grenville province. The oldest and most abundant rocks are biotite gneisses, commonly garnetiferous, and, in places, sillimanite-bearing. Significant quantities of pegmatite and granitic gneiss are intimately associated with the biotite gneiss. The "green rocks" (pyroxene and green plagioclase) are intercalated with the gneiss and seem to be concordant. Numerous sills and dikes of metagabbro, as well as pyroxenite and peridotite, crop out in the south part of the area.

In the northwest corner, the dominant rocks are muscovite granite and pegmatite. Inclusions of biotite schist, similar to the biotite schist of the Pontiac Group, and enclaves of metavolcanic rocks are found in the granite.

Diabase and gabbro dikes, trending north-northeast to northeast, cut all the formations.

Glacial deposits are numerous and consist of heterogeneous till, sand and gravel. Some eskers, with a general north-south trend, traverse the area.

## PRECAMBRIAN

### Pyroxene-hornblende-garnet Rock

This rock crops out in the south and southeast parts of the area in the form of lenticular masses which are generally of such small size that they could not be shown on the map. These masses, which seem to be sills and dikes, are not uniform in nature, and probably represent varied basic rocks.

The rock is fine to medium grained, generally massive and dark green or dark brown. It is largely composed of pyroxene and hornblende; these two minerals are present in quantities which vary from one location to another. Garnet constitutes an average of 10% of the rock, but may make up 20% here and there. Plagioclase and biotite are present in small amounts, but may be, in exceptional cases, the major constituents of the rock.

### Pyroxene Gneiss

Pyroxene gneiss crops out principally in the eastern half of the area, especially in the section east of the Ottawa. It occurs in the form of elliptical masses elongated in a direction parallel to the foliation of the enclosing rock, which is commonly biotite gneiss. These masses, some of which have a length of more than 2,000 feet and an average width of 1,500 feet, seem to be a series of sills.

The rock is medium or coarse grained, generally gneissic and light green. It is composed of plagioclase (60%) and pyroxene or hornblende (30%). Some varieties contain small amounts of biotite and garnet.

The pyroxene gneiss appears on the aeromagnetic map as strong anomalies.



Table of Formations

Pleistocene and Recent	Sand, gravel, clay, erratic blocks
P R E C A M B R I A N	Diabase, gabbro, porphyritic gabbro
	Mylonite, breccia, augen gneiss
	Pegmatite Muscovite granite
	Peridotite, pyroxenite, amphibolite, metagabbro
	Andesite converted to amphibolite
	Gray granitic gneiss Pink granitic gneiss
	Biotite schist Biotite gneiss Biotite-garnet gneiss Biotite-garnet-sillimanite gneiss Pyroxene gneiss Pyroxene-hornblende-garnet rock

### Biotite Gneiss

Biotite gneiss is the dominant rock of the area. It is fine to medium grained and gray to yellow-brown, and consists of biotite, quartz and feldspar in almost equal proportions; however, in certain varieties, feldspar is the principal constituent. Near the pyroxene gneiss, the rock contains small quantities of hornblende.

The gneissic structure is defined by the alignment of biotite and by the concentration of certain components, notably feldspar, into bands. Some of the rock is slightly schistose or massive.

### Biotite-garnet Gneiss

This gneiss appears, from its color and texture, to be biotite gneiss, but it contains more than 3% garnet. It occurs in small lenses within the biotite gneiss of which it is a variety. The contact between the two rocks is gradational and, in places, imperceptible. Some garnetiferous pegmatites are commonly associated with these garnetiferous zones. The crystals of red garnet have an average size of one-tenth of an inch, but some with a diameter of 1 inch occur.

### Biotite-garnet-sillimanite Gneiss

This rock resembles the biotite-garnet gneiss and occurs as short lenses or bands in the latter rock. It crops out principally in the south half of the area, south of Barker bay and on the east shore of the north part of Dozois reservoir, but it was also noted in the north half, at the intersection of highway 58 and Bourque Dam road, at a point  $1\frac{1}{2}$  miles southwest of MacLaurin lake, at a point 2 miles southeast of Bourque dam and near Big Turn bay on Victoria lake.

The sillimanite gneiss is probably more abundant than its distribution on the geologic map would indicate. Sillimanite occurs in groups of short rods intimately associated with garnet and biotite. Some sillimanite gneiss is rusty.

### Biotite Schist

Biotite schist crops out largely in the northwest corner of the area, west of Victoria lake, where it occurs as thin lenses in the granite. It is found also, in some places, intimately mixed with biotite gneiss, from which it differs very little.

The biotite schist is fine grained, pale or dark gray. The rock consists of practically equal portions of quartz, feldspar and biotite. It also contains some thin layers rich in quartz and feldspar. To the east of Victoria lake the rock contains numerous layers of granitic material generally with a coarser-grain size.

The biotite schist closely resembles, by its lithology and by its associated rocks, the Pontiac Group schist which crops out abundantly west of the area.

### Pink Granitic Gneiss

Pink granitic gneiss crops out principally in the southeast corner of the area, around Dozois lake. It forms thin lenses and small irregular masses in the biotite gneiss and is frequently associated with pink pegmatite. The principal constituents are pink potassic feldspar and quartz. The gneissic structure is defined by the elongation of grains and by the concentration of quartz into bands. This gneiss seems to be the medium-grained equivalent of pink pegmatite.

Little pink granitic gneiss is shown on the map because of the particular mode of emplacement of the rock. However, the gneiss is abundant.

### Gray Granitic Gneiss

The gray granitic gneiss is medium grained and crops out in divers places in the area in the form of lenses in the biotite gneiss. This gneiss is also generally associated with pegmatite. It is principally composed of plagioclase and quartz, with lesser quantities of biotite. The gneissic structure is determined by the alignment of the biotite and by the elongate form of the grains.

### Andesite Converted to Amphibolite

This metavolcanic rock crops out along the north boundary of the area on several small islands in Granet lake and at some places close to the west shore of Victoria lake. It is invaded by pegmatite and seems to be one or more large inclusions.

The rock is fine grained, massive and dark green. It consists principally of short prismatic crystals of pale green amphibole with some grains of feldspar, quartz, carbonate and pyrite. Structures resembling pillows may be distinguished, but these may also result from weathering along joint planes.

### Peridotite, Pyroxenite, Amphibolite and Metagabbro

Divers types of ultrabasic and basic rocks are included in this group. These rocks are not common and probably are a series of several separate intrusions.

Peridotite crops out especially near Victoria lake, notably south of Barker bay, but it also occurs northwest of Trask lake in a dike. It is a massive, very coarse-grained, dark brown rock with a rough weathered surface which forms rounded outcrops. It is composed principally of pyroxene and olivine and contains minor quantities of biotite and magnetite.

Pyroxenite occurs as minor sills and dikes in the biotite gneiss. It is medium to coarse grained and dark brown, and is largely composed of pyroxene with minor amounts of hornblende and plagioclase. This type of rock is not widespread.

Amphibolite is a medium-grained, dark brown to black rock. It is massive, although certain varieties display a parallel arrangement of elongate crystals. It consists of brown hornblende (50-80%), plagioclase (20-40%) and garnet. It occurs frequently in contact with pyroxene gneiss and it seems to form concordant lenses. However, some varieties occur separately and may represent altered pyroxenites.

A few outcrops of metagabbro occur. This is a medium-grained, dark green rock which contains pyroxene, hornblende and plagioclase. Some of this rock has a subophitic texture and resembles a metadiabase.

### Muscovite Granite

Muscovite granite crops out in the northwest part of the region close to Granet lake. This granite is intimately mixed with pegmatite and it is difficult to establish its exact distribution because outcrops in which the granite is more abundant than the pegmatite are rare.

The granite is massive, fine to medium grained and gray to pink, and is composed of plagioclase (50%), microcline (20%), quartz (20%) and muscovite. Concentrations of biotite occur, generally close to lenses of biotite schist. Accessory minerals are garnet, magnetite and apatite.

### Pegmatite

Pegmatite occurs especially in the northwest corner of the area close to Granet lake. It is found in that locality in the form of dikes or large irregular masses mixed with muscovite granite and biotite schist. The rock is generally massive, although at times gneissic, and varies in color from gray to pink depending on the composition. The pegmatite is coarse grained and, in places, the crystals are up to 8 inches in diameter. The principal constituents are quartz (25-35%), perthite (20%), plagioclase, oligoclase-andesine (30%), biotite and/or muscovite (5%). The accessory minerals are garnet, magnetite, tourmaline and beryl. On some islands in Granet lake tourmaline crystals 5 to 8 inches long occur in the pegmatite; biotite and muscovite in the same locality form books up to 6 inches in diameter. Some of the quartz and potassic feldspar occurs in micrographic intergrowth.

Pegmatite is abundant at many other places in the area, where it occurs as lenses, sills, lit-par-lit injections, and small dikes in the biotite gneiss and granitic gneisses. The color, texture and composition of these pegmatites are highly variable. Gray plagioclase pegmatite is abundant, whereas pink potassic feldspar pegmatite is less common.

The pegmatite associated with the pyroxene-hornblende-garnet rock and the pyroxene gneiss contains little or no quartz, and is composed principally of plagioclase and potassic feldspar with small quantities of pyroxene, amphibole and magnetite. Pink

to red garnet is very common in the pegmatite and euhedral crystals  $1\frac{1}{2}$  inches in diameter may be found. In the most strongly deformed zones or close to faults much of the pegmatite is converted to augen gneiss.

### Mylonite, Breccia and Augen Gneiss

These rocks occur on the shores of Victoria lake, in Kawastaguta bay, on the east bank of Ottawa river and of Anwatan lake, and at the southern extremity of Beschefer lake. They are found also within the biotite gneiss and pegmatite in divers places not indicated on the map.

These cataclastic rocks show all degrees of mechanical granulation from augen gneiss with mortar structure, to mylonite, and to pseudotachylite.

Mylonite is generally white on weathered surfaces and dark gray on fresh surfaces, whereas the pseudotachylite is dark gray to black. Pegmatite is commonly deformed into flaser gneiss.

These rocks are the deformed equivalents of biotite gneiss, granitic gneisses and pegmatite which are directly associated with faults and shear zones.

### Diabase, Gabbro and Porphyritic Gabbro

Several outcrops of diabase and gabbro were examined at various points in the area. These seem by their orientation to belong to four or five north-northeast and northeast trending dikes. The dikes range in thickness from several inches to 300 feet.

The rock is massive, dark green and generally medium grained with a subophitic or ophitic texture. The border of certain dikes is very fine grained, whereas the center of the thickest dike is coarse grained. These rocks are composed principally of pyroxene and calcic plagioclase. Pyrrhotite and magnetite are accessory minerals.

In the southeast part of the area, a dike of porphyritic gabbro crops out at two points on the shores of Dozois lake. The rock is medium grained, slightly gneissic and rusty brown to dark green. The gabbro is composed principally of pyroxene and

twinned plagioclase (labradorite). The phenocrysts, some of which are up to 8 inches long, have an average length of 2 inches.

### Pleistocene and Recent

Vast stretches of the area are covered by a layer of sand and gravel. Two eskers and remnants of a third cross the area in a N.20°E. direction. The one which cuts Transparent lake is the longest. Mounds of morainic material are abundant in the north part of the area west of highway 58. These consist of generally stratified and sorted sand and gravel.

The trend of glacial striae ranges between S.10°E. and S.15°W. Numerous erratic blocks of variable dimensions are scattered everywhere in the region.

### STRUCTURAL GEOLOGY

The layering and foliation of the biotite gneisses and schists serve to outline the important structural zones. However, the absence of distinct and continuous lithologic and structural units makes determination of structural zones very sketchy. In the east part of the area, the predominant strike of the foliation is N.15°E. West of Anwatan lake and Ottawa river, the trend ranges from east-west to northwest and, west of Victoria lake, it is generally east-west to north-south. The dips are moderate toward the southeast.

Linear elements, such as topographic depressions, elongate lakes, and rivers in many instances mark the location of faults. Victoria lake, Anwatan lake and the Ottawa occupy fault and shear zones. Mylonite, breccia, augen gneiss and various indications of intense shearing are noted in many places along the shores. The faults are indicated also by lithologic discordances, by the different structural orientations on either side of each fault, and by a marked displacement of the isomagnetic lines on the magnetic survey maps. However, it is impossible to evaluate the displacement along the faults because of the absence of distinct lithological elements.

Numerous shear zones are seen in the area, generally close to major faults. The dimensions of these zones range from 6 inches to several feet and their strike is generally parallel to the direction of the gneissic structure.

### ECONOMIC GEOLOGY

#### 1) Magnetite

An irregular mass of pegmatite on the east shore of Dozois lake, in the southeast part of the area, contains a considerable amount of magnetite. However, field observations indicate that the concentration of magnetite is not large or continuous enough to constitute a deposit.

#### 2) Nickel, copper, zinc and manganese

A mineralized zone on the south shore of Victoria lake, at the southern extremity of the area, contains minor amounts of pyrite, pyrrhotite, chalcopyrite, pentlandite and pyrolusite. This zone, 2 feet wide, is exposed in a north-south direction for at least 5 feet. The mineralization is associated with biotite gneiss and pegmatite. Peridotite and amphibolite occur close by.

A grab sample of this zone assayed 0.18% nickel, 0.05% copper, 0.02% zinc and 0.38% manganese.

The presence of ultrabasic rocks, peridotites and pyroxenites is significant, and detailed prospecting may disclose interesting concentrations of nickel and other economic minerals associated with these rocks in many places.

#### Work and Results of Geochemistry

Stream sediment samples were taken as part of a program aimed at establishing the desirability of carrying out geochemical work at the same time as surveying an area geologically.



The following work procedure was adopted: when a stream was crossed in the course of a traverse, two sediment samples were taken several feet from one another from the active zone of the bank. Divers pertinent observations, such as the dimension of the creek, speed of the current, etc., were recorded on prepared information slips. The samples were sent to the Department's Laboratory in Quebec to have their tenor of copper, zinc, lead and molybdenum determined. These values are shown on the map in the following way by use of a special color: . 20, 65, 30, 15. The dot represents the point where the sample was taken, and the numbers give the values in parts per million (p.p.m.) of the elements assayed in the copper, zinc, lead and molybdenum sequence. In cases where there is no analysis for one of the elements, it is indicated by a horizontal dash in the appropriate place.

#### BIBLIOGRAPHY

- GILLIES, N.B. (1952)                   Canimiti River Area, Pontiac County;  
Department of Mines, Quebec, G.R. 52.
- LAURIN, A.F. (1958)                   Beaumouchel-Houdet Area; Pontiac  
Electoral District; Department of  
Mines, Quebec, P.R. No. 367.
- LOWTHER, G.K. (1935)                   Villebon-Denain Map-area, Abitibi,  
Témiscamingue and Pontiac Counties;  
Bureau of Mines, Quebec Annual Report  
1935, Part C, pp. 41-52.
- TIPHANE, M.,  
and DAWSON, K.R. (1950)               Villebon Map-area, Quebec; Geol. Surv.  
Can., Map 998A.
- WAHL, W.G.,  
and OSBORNE, F.F. (1950)               Cawatose Map-area, Pontiac County;  
Department of Mines, Quebec, G.R. 44.

