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Preliminary report on lower Romaine river area, Saguenay county

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**Énergie et Ressources
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Québec

Province of Quebec Canada

DEPARTMENT OF MINES AND MARITIME FISHERIES

BUREAU OF MINES

Division of Geological Surveys

PRELIMINARY REPORT

ON

LOWER ROMAINE RIVER AREA

SAGUENAY COUNTY

by

J.A. Retty

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1942

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LOWER ROMAINE RIVER AREA

SAGUENAY COUNTY

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INTRODUCTION

This report presents in brief the results of a rapid geological reconnaissance of the lower Romaine River basin, made by the writer for the Quebec Bureau of Mines during the field season of 1941.

The area is on the north shore of the gulf of St-Lawrence, some 400 miles below Quebec city and directly north of the central part of the island of Anticosti. A weekly boat service between Quebec and Hâvre St-Pierre is maintained during the navigation season by the Clarke Steamship Company. Hâvre St-Pierre is the point of departure for the mouth of Romaine river, situated nine miles west of the village. This village is the only settlement within the area; it has a population of 1,500. It is the seat of a bishopric, and institutional buildings include a hospital, a convent, and a normal school. The chief occupation of the inhabitants is fishing.

The area mapped is of irregular outline, its boundaries being controlled in great part by the possibility of travel along watercourses. The Romaine valley was examined to a point 60 miles west-northwest of the Gulf of St. Lawrence. The lower portions of the First East branch and the Second East branch were also examined, together with the group of lakes west of Romaine river, which are drained

by Puyjalon river, a tributary of the Romaine. The meridian of west longitude $63^{\circ}00'$ crosses the eastern part of the area, and the parallel of north latitude $51^{\circ}00'$ crosses the northern part. The irregular stretch of country examined comprises approximately 1,000 square miles.

PHYSICAL FEATURES

In the immediate vicinity of the Gulf of St. Lawrence, the area is flat and consists of marine terraces which extend northward along the river valleys. Occasional monadnocks rise above the general level of these lowlands, particularly in the vicinity of their boundary with the uplands.

By far the greater part of the area consists of uplands. In this portion, the surface is very rugged. It has been deeply incised by turbulent streams forming V-shaped valleys, and presents a closely corrugated surface. The hills of anorthosite are more rugged than those of paragneiss and granite, because, in addition to the long north-south ridges, they are broken by east-west depressions and thus present the appearance of a series of roughly rounded domes. Elevations in the northern part of the area rise to as much as 800 feet above the level of the surrounding country, or 1,500 feet above sea-level. Bed-rock is well exposed.

A considerable number of lakes, some large, many small, and many swift-running streams, occupy the surface of the uplands. Travel between lakes and along the streams is very difficult because of the rugged character of the topography.

GLACIATION

The effects of glaciation are slight. Few erratics and few glacial striae were observed. There is an absence of low, rounded hills, such as are characteristic of glaciated regions. No moraines

and no thick glacial deposits were seen. The marine invasion probably obliterated these features in the lowlands.

GENERAL GEOLOGY

The area is underlain almost entirely by rocks of Precambrian age. A small patch of Palaeozoic strata is present along the southern margin, bordering on the Gulf of St. Lawrence, but this was not examined by the writer.

The Precambrian rocks consist of a greatly metamorphosed series of ancient sediments, now represented by paragneisses of the Grenville type. These have been invaded by various batholithic and hypabyssal intrusives.

Table of Formations

Pleistocene and Recent		Clay, sand, gravel
Precambrian	Keweenawan ?	Diabase
		Lamprophyre
		Gabbro, meta-gabbro
		Porphyritic granite, hornblende granite, pegmatite
	Morin Series	Anorthosite dykes
		Anorthosite, anorthositic gabbro
	Grenville Series	Quartzite, quartz-biotite gneiss, quartz-hornblende gneiss, garnetiferous gneiss, amphibolite, garnetiferous graphite schist, injection gneiss

Grenville Series

Rocks of the Grenville series are represented by quartzites, quartz-biotite gneiss, quartz-hornblende gneiss, garnetiferous gneiss, and small patches of amphibolite and garnetiferous graphite schist. These paragneisses occur abundantly along Romaine river between the First East branch and the Second East branch. Numerous outcrops are also found on Forget lake and in the adjoining area to the east. High ridges formed of these rocks flank both sides of the First East branch from a point two miles north of the stream forming the outlet of Cimon lake to the first widening of the First East branch (Boucher lake). They are well-banded and usually fine-grained rocks, the bands being due to a slight variation in composition of the beds. At only one point was a comparatively unmetamorphosed bed observed. This is at the outlet of Cimon lake, where the rock is a finely banded greywacke.

There is little granitization within these gneisses, except close to their contact with the granitic rocks, where a slight development of magnetite is found.

Injection gneisses, which have been mapped with the Grenville series, are exposed along Romaine river below the First East branch. They are the usual lit-par-lit type, consisting to the extent of 35 to 50 per cent of granite, which has been introduced along the planes of foliation in the gneisses.

Morin Series

Anorthosite

The southwest part of the area is underlain by a large mass of anorthosite. Anorthosite occurs also along Romaine river at the northern margin of the sheet, and again in a mass of small extent at the mouth of the river.

The rock varies in colour from white, to grey, to pink, to violet. It is usually massive, and in places strong jointing has been developed. Ilmenite is a quite common constituent of the rock, and in places its alignment produces a marked banding. In some localities, the rock is exceptionally rich in ilmenite, containing as much as 20 per cent of the mineral. A minor amount of pyrite is also present. This ilmenite-rich anorthosite is distinctly grained. It weathers rust-coloured and disintegrates very easily. Several large bands of this type occur within the main, or southwestern, mass.

At many points, a peculiar type of weathering was noted. It produces a series of rudely circular holes, or tubes, as much as two inches across and four inches deep. This is probably due to a rapid disintegration of the rock around grains of pyrite.

Zones rich in biotite are present along the margin of the main mass. The contact zone is narrow and slightly foliated. Although the contact was not delineated in detail, the main anorthosite mass appears to be of oval shape, the major axis striking northeast.

Whether or not the southern and the northern mass are parts of a single unit can only be determined by additional mapping.

Ilmenite, in addition to being disseminated through the anorthosite, also occurs concentrated as comparatively large masses made up essentially of this mineral alone.

Labradorite of the 'precious' variety, showing play of colours, was observed only at one locality, near the south end of Allard lake.

In places, the anorthosite is cut by granite and pegmatite dykes.

Anorthositic Gabbro

A gabbroic facies of the anorthositic occurs at a few localities on the eastern margin of the main mass, near the north end. It is very limited in extent.

Anorthositic Dykes

At three localities, dykes of anorthositic were observed cutting the main mass of anorthositic. Two of these dykes, 10 in. and 12 in. wide, are on the east side of Allard lake. The third, four feet wide, is on the shore of Puyjalon lake. The dykes appear to be slightly more acidic than the main anorthositic mass.

Porphyritic Granite

Granite is widespread throughout the area. The predominant type is porphyritic and very coarse grained. It consists of pink (rarely red) phenocrysts of orthoclase, up to one and a half inches across, with interstitial quartz (which is in many places opalescent), albite, and biotite or hornblende. The rock is very variable in composition. Some varieties are poor in ferromagnesian minerals and approach an alaskite in composition. Others are quartz-poor and would be termed more properly hornblende syenite. The smaller bosses, where they intrude the paragneisses, are usually slightly foliated.

What appear to be inclusions of fine-grained pink granite were seen at several places within the porphyritic granite. It would thus appear that there are granites of two ages.

A large body of granite occurs in the northern part of the area, in the vicinity of Pauline, Forget, and Alphonse lakes. The rock is very variable in composition, and particularly so around Pauline lake. The most common type is a slightly foliated biotite or hornblende granite. An unusual

feature is that it contains irregularly distributed segregations and dykes of pegmatite which in places form 50 per cent of the mass. There are also included in the rock numerous remnants of paragneiss, some of which are large, some small. On Forget lake both the pegmatite and the inclusions of paragneiss disappear and the rock becomes a slightly foliated hornblende or biotite granite.

Pegmatite dykes are common within the granite and the paragneiss. They are less abundant within the anorthosite.

Gabbro, Meta-Gabbro

Gabbro occurs at several points east and northeast of Forget lake. In some places it assumes the form of sheets; in others it appears to be in irregular masses.

A large mass of a coarse rock which appears to be an altered gabbro is exposed along the First East branch, extending up the river for two and a half miles from a point half a mile north of the mouth of the river which drains Metivier lake. In addition to being greatly altered, the rock is sheared along the bed of the stream. Some exposures within the mass resemble ordinary gabbro. Others are very coarse, with crystals of femic minerals up to three-quarters of an inch across. The interstitial material is acidic. The rock has been tentatively classed as meta-gabbro.

These gabbroic rocks, like the granite, cut the paragneiss, but nowhere was the gabbro seen in contact with the granite. The greater degree of alteration and deformation in the gabbro, however, suggests that it is older than the granite.

Lamprophyre

One 18-inch dyke of lamprophyre was observed east of Forget lake. It cuts the paragneiss.

Flakes of brownish biotite are present in the rock and it appears to be a minette.

Diabase

Two dykes of fresh diabase, with well developed ophitic texture, were observed. One, slightly over a mile long, is on the east side of Romaine river, about five miles below the First East branch. The other is on the south side of Sauvage lake. Both are narrow and have not been indicated on the map accompanying this report.

STRUCTURE

The rocks of the area afford indisputable proof that the region has been subjected to tectonic disturbances on a large scale. The gneisses have the contorted attitudes common in these ancient rocks, but it is possible to work out regional trends and some definite structures within them.

Along the First East branch, the general trend of the bedding and gneissoid banding is north-south, with but minor deviations. On the east side of Forget lake, the paragneisses have been thrown into an asymmetrical anticline with axial plane dipping east. Farther east, the structure is a monocline dipping east.

There appears to be a strike-fault with some horizontal displacement extending northward along the First East branch from the mouth of the stream which drains Métivier lake. Time was not available for determining this with exactness, but the abrupt change in rock type, the lineal character of the watercourse, and the shearing within the gabbro along the stream, all suggest the presence here of a fault.

Along Romaine river below the Second East branch, the trend of the paragneisses varies from

north-northwest, through east, to southeast, with dips generally to the north and east. The trend of the foliation along Romaine river below the First East branch is generally north-south. The river follows in great part the direction of foliation in the gneisses, but at some points it cuts across it.

In the anorthosite, certain trends may be mapped from observation of the biotite-rich zones. They usually parallel the contact.

The foliation within the granite is north-south.

ECONOMIC GEOLOGY

Previous to the past field season, nothing was known of the geology of the Lower Romaine basin. The work carried out by the writer indicates that the area may have economic possibilities, inasmuch as ilmenite deposits of considerable size were found at many points within the anorthosite, and traces of chalcopyrite at many points within the paragneiss.

Ilmenite

The ilmenite occurs both as disseminated grains in the anorthosite and in black, glistening, medium-grained masses which are quite magnetic. With it are associated minor amounts of pyrite and pyrrhotite.

Deposits of massive ilmenite were found adjacent to the shores of Bat-le-Diable, Allard, Petit-Pas, and Puyjalon lakes. The largest are on the east side of Allard lake.

Copper

Chalcopyrite was discovered in place at six localities in the area, and was observed in float at one locality. In most of these occurrences, the host-rock is paragneiss.

1.- Alphonse Lake

At the outlet of Alphonse lake, a large remnant of amphibolite lies within alternating patches of granite and paragneiss. Just above the outlet, on the east side, the amphibolite is traversed by a quartz vein that carries a considerable amount of chalcopyrite. The vein is eight feet long and eleven inches wide, striking northwest into the lake. For a width of three inches on its northeast side, the vein consists of massive chalcopyrite. The remaining eight inches is quartz, with pyrite and chalcopyrite in minor amount. At the southeast end, the vein pinches out. To the northwest it continues into the lake. About three feet beyond the water's edge, the vein is cut by a three-foot granitic dyke. Whether it continues beyond the dyke could not be determined because of the depth of the water.

Specks of chalcopyrite were also found in the country rock in the vicinity of the vein.

2.- Romaine River

On the west shore of the outlet of the "Bassin des Murailles" (at the mouth of the First East branch), traces of chalcopyrite and pyrite associated with quartz occur in injection gneisses.

3.- Romaine River

Traces of chalcopyrite occur in quartz-hornblende gneiss on the east side of Romaine river, just north of a small creek which lies one mile below the mouth of the stream that flows from Alphonse lake.

4.- Romaine River

On the west shore of Romaine river, opposite the occurrence last described, traces of chalcopyrite were seen in what appears to be an amphibolite

5.- East of Forget Lake

Traces of chalcopyrite and pyrrhotite associated with quartz occur in paragneiss exposed along the portage between Forget lake and the First East branch.

6.- East of First East Branch

Traces of chalcopyrite occur in gabbro at a point three-quarters of a mile southeast of the mouth of the stream flowing from Cimon lake.

7.- Pauline Lake

Chalcopyrite in patches up to half an inch in diameter, associated with pyrite, occurs in a large, sub-angular boulder of garnetiferous amphibolite on the north side of the long East arm of Pauline lake, about a quarter of a mile from the east end.

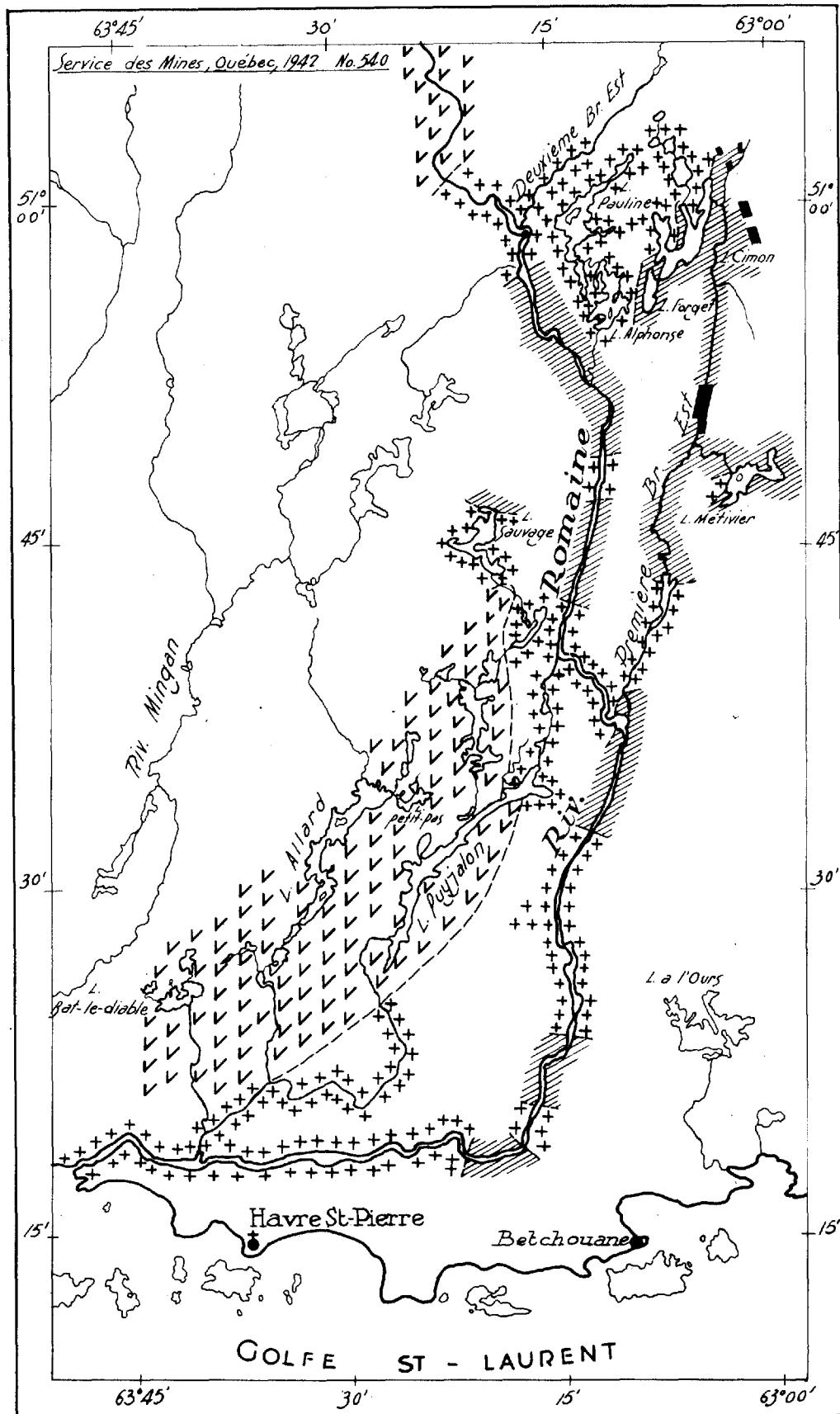
CONCLUSIONS

From has been said above, it will be evident that the anorthosite of the area is favourable to the occurrence of ilmenite. A very rapid examination of the country surrounding the lakes within the anorthosite mass has revealed the presence of ilmenite at many points, and, moreover, its occurrence in bodies which, on development, may prove to be of considerable size.

The occurrence of chalcopyrite at so many localities within the area also suggests interesting economic possibilities. In itself, the presence of this mineral proves that metallizing solutions have been introduced into the country rock, and it is quite possible that, in places, there may be found concentrations of chalcopyrite of commercial size and grade.

The northern area of paragneiss appears to be the most favourable host-rock for such metal-lizing solutions. These gneisses have not been gran-itized, they possess favourable structure, and quartz veins are of common occurrence within them.

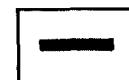
In brief, the geological criteria are such that the area appears to have excellent possibilities for the discovery of mineral deposits and, because of this, it should be thoroughly prospected.



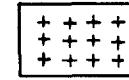
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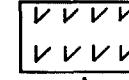
PRECAMBRIAN - PRÉCAMBRIEN



Gabbro, meta-gabbro.
Gabbro, métà-gabbro.



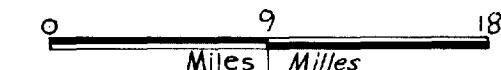
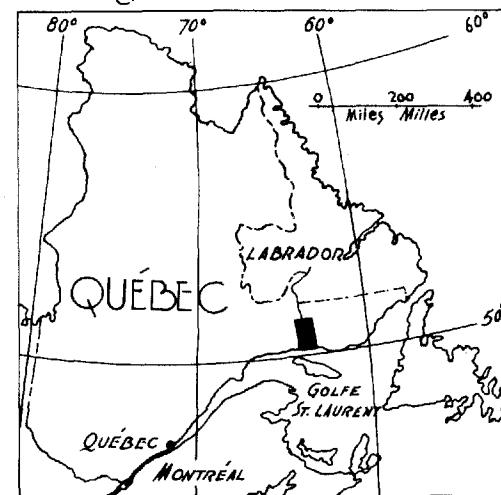
Mostly porphyritic granite; some granite gneiss, pegmatite.
En majeure partie; granite porphyrique un peu de gneiss granitique, pegmatite.



Anorthositic small marginal areas; of anorthositic gabbro.
Anorthositic; quelques étendues marginales de gabbro anorthositique.



Grenville type: quartzite, quartz-biotite gneiss, quartz-hornblende gneiss, garnetiferous gneiss, small areas of injection gneiss.
Série de Grenville: quartzite, gneiss quartzifère biotitique, gneiss quartzifère à hornblende, gneiss grenatitique, petites étendues de gneiss d'injection.



Geology by J.A. Reilly 1941 Géologie par J.A. Reilly 1941