RG 130(A)

GOUIN RESERVOIR BASIN, ABITIBI-EAST AND LAVIOLETTE COUNTIES

Documents complémentaires

Additional Files

Licence

License

Énergie et Ressources naturelles
Québec

QUEBEC DEPARTMENT OF NATURAL RESOURCES

RENÉ LÉVESQUE, Minister P.-E. AUGER, Deputy Minister

GEOLOGICAL EXPLORATION SERVICE

H.W. McGerrigle, Chief

GEOLOGICAL REPORT 130

GOUIN RESERVOIR BASIN

Abitibi-East and Laviolette Counties

A GEOLOGICAL OUTLINE

by

A.-F. Laurin

QUEBEC

1965

CONTENTS

MAP AND ILLUSTRATIONS

Map

No. 1575 - Gouin Reservoir Basin

Plates

I A - Anti-rapakivi texture in a rock of the charnockitic series.
B - Concordant band of garnetiferous hornblende gneiss in biotite gneiss.
C - Sand bluffs around Brochu lake.

II A - Falls just south of Nemio lake.
B - The Mégiscane canal diverting waters into Gouin dam.
C - Interstratified layers of dark hornblende gneiss and light biotite gneiss.

III - Saint-Maurice river downstream from Gouin dam.

IV - Gouin dam taken from Tower 67.

V - Westward view of Gouin reservoir from Tower 67.

VI A- Garnetiferous hornblende gneiss interlayered with biotitic gneiss and quartzite layers.

B- Fault plane in garnetiferous hornblende gneiss.

VII - Nepheline syenite north of Obedjiwan Indian reservation.

VIII A- A group from the Obedjiwan Indian reservation.

B- View of the Obedjiwan Indian reservation.

GOUIN RESERVOIR BASIN*

Abitibi-East and Laviolette Counties

(A Geological Outline)

by

A.-F. Laurin

INTRODUCTION

This report is based on a geological reconnaissance survey of the Gouin reservoir and is intended to provide a regional inventory and a general idea of the geology of the district. The field work, carried out in the summers of 1962 and 1963, extends mapping westward from the author's earlier work in the region, (Laurin; 1961 MS.). Observations were confined to the shores of the reservoir and several rivers flowing into it, and to the roads of the area. The scale of the accompanying map is 4 miles to the inch.

The area explored during these two summers is situated in Abitibi-East and Laviolette counties and covers more than 3,600 square miles. It is bordered by longitudes 74°00' and 75°30' and latitudes 48°00' and 49°00'. Part of its southern border adjoins the Suzor-Letondal area, mapped by Faessler in 1936. He examined the shores of all lakes and navigable waterways and traversed the intervening country at intervals of one and one-half to two miles. Faessler (1935) also carried out regional mapping in the Mégiscane River Headwaters area to the west. In addition, some of the work of Wilson (1910), Bancroft (1917), and Retty (1934) deals directly or indirectly with certain parts of the present region.

Access

Four gravel roads allow access to the reservoir. These are, from east to west: the Canadian International Paper Company road from La Tuque via La Croche to Gouin dam, covering a distance of 155 miles, of

---

* Translated from the French

which the first 10 miles are paved; the E.B. Eddy Company road from Parent to la baie de la Galette, a distance of 33 miles; the Oskélanéo-River road, stretching 123 miles from the village of Oskélanéo-River to join Highway 58 at Mile 97 and the road from Clova to Mégiscane where this road cuts the area's southwest corner, which is 30 miles from Clova and 144 miles from Highway 58. Oskélanéo-River and Clova are served by Canadian International Paper Company roads.

Other roads are found in the area. One reaches Cooper depot in the area's northeast corner. Construction of a branch of this road to Verreau bay to provide another access route to the reservoir has been planned by Canadian International Paper. The road to Jean-Pierre depot crosses the southeast corner and will soon be extended to meet the old Najoua road which reaches St. Maurice river 15 miles north of Sanmaur on the road joining the latter with Gouin dam or La Tuque. There are also several generally passable roads belonging to Canadian International Paper in the southwest corner of the area, as well as the Domtar Equipment road south of Oskélanéo-River. The latter follows an almost circular route to come out at Mile 29 on the railroad (measured from Parent), 5 miles east of Oskélanéo-River. This road is bumpy for the first eight miles, then is smooth for the rest of its length.

All the above-mentioned places, except Gouin dam, which may be reached from Sanmaur 50 miles away, are on the Canadian National Railway line. The following table shows the distances of the stations from Quebec. All but the first two lie within the map-area.

Table I

Sanmaur	204	miles	west	of	Quebec
Parent	253	"	"	"	"
Strachan	268	"	"	"	"
Greening	276	"	"	"	"
Oskélanéo-River	287	"	"	"	"
Clova	294	"	"	"	"
Coquart	300	"	"	"	"

The area is easily accessible by airplane. Small floatplanes may be hired at Sanmaur, Senneterre, La Tuque or Roberval.

Field work

The base-map was a 1-mile-to-1-inch enlargement of the Quebec Department of Lands and Forests 3 miles to 1 inch map. All outcrops on the shore lines of the different lakes of the reservoir and of the main rivers flowing into the reservoir were studied. Outcrops along roads of the

area were also examined. Additional topographic information was taken from air photos. Aeromagnetic maps were of help in tracing certain geological contacts on the map.

Acknowledgements

The author is grateful to the following men for the many occasions on which they willingly helped the party - Messrs. M. Descoteaux and J.M. Trudel of the Department of Lands and Forests; P. Beaudoin, Department of Natural Resources care-taker of Gouin dam; Claude Desjardins, Indian agent at Obedjiwan reserve, and C. Pilote, manager of the Hudson's Bay store. He is also indebted to employees of Canadian International Paper Company at La Tuque and Maniwaki for providing maps showing the road system of their forestry concessions.

Topography

The region forms part of the Laurentian highlands of the Canadian Shield. It is essentially a large undulous peneplane with a flat or lightly dissected surface broken in places by rocky hills which may project more than 500 feet above the general level of the land. In general appearance, the land takes the form of an east-west open trough with its axis sloping gently eastward. Its average elevation ranges from 1,200 to 1,500 feet. However, the south and northeast parts exceed 1,500 feet. The area is drained by four different river systems: the St. Maurice system drains 75% of the area; the Saguenay river system, flowing towards Lac St. Jean, drains the northeast corner of the area through lakes Buade and Poutrincourt, and the Ducharme river; the one in the northwest corner draining through Pascagama, Mégiscane, Bell and Nottaway rivers into James bay; and that in the south part of the area draining into the Ottawa via the Gatineau. It should be mentioned that in 1951-52 Shawinigan Engineering built a series of canals and embankments and diverted 263 square miles of the Mégiscane river drainage into the Gouin reservoir.

The Gouin dam, built in 1918, raised the water-level 60 feet. It was erected by the Provincial Government in order to regulate the flow of St. Maurice river. The reservoir covers the best part of twelve townships, and drains the water from more than twenty-six townships in Laviolette county. It is presently the largest artificial reservoir in Canada, and one of the largest in the world. It is made up of a series of lakes the largest of which are: baie de Kikendatch (la Loutre), Brochu, au Sable, la baie de la Galette, Marmette, McSweeney, baie du Sud, du Mâle, baie Mattawa, baie Saraana and baie Adolphe Poisson. These lakes are joined by a series of passes, which formerly must have been rapid-filled rivers. The shoreline of the reservoir is more than 3,000 miles long.

Flora and Fauna

The district contains practically no arable land. Although the bedrock is only rarely exposed, the soil cover is almost entirely composed of glacial sand, gravel, and boulders. Only a few recent alluvial deposits bordering lakes or between swamps may support farming.

However, the forest is well stocked. The principal tree species are spruce, tamarack and cedar. Fir is quite rare. Birch and poplar top many of the gravel ridges in pleasant contrast with the spruce which grow on the sides. Jack-pines are widespread in sandy terrain, but not common elsewhere; they form the first tree cover in areas burned by forest fires.

Game is not very common, although many moose were seen in swamps bordering the reservoir. The party also encountered several wolves, foxes and otters. Beaver are multiplying rapidly in the region, damming the streams and flooding many parts of the area.

Except for several small isolated lakes containing speckled trout, the reservoir waters abound with pickerel, pike, and several types of carp. Pickerel and pike are caught commercially.

GENERAL GEOLOGY

All the rocks of the area are Precambrian in age. They form two principal groups, a) metasedimentary rocks and b) fresh or metamorphosed igneous rocks.

The oldest rocks of the area are hornblende gneiss, biotite and hornblende gneiss, and biotite gneiss accompanied by a little amphibolite. All these rocks are more or less garnetiferous. Several beds of quartzite are interlayered with the gneisses, and a thin band of crystalline limestone occurs immediately south of the map border, about 13 miles south of Clova. Some of these rocks have been more or less injected by granitic material. Intrusive rocks in the area include metagabbro and ultrabasic rocks, pyroxene-bearing rocks ranging in composition from syenite to monzonite and occasionally to diorite. There are also several masses of biotite granite, clearly gneissic in places, and a body of nepheline syenite north of the Obedjiwan Indian reservation. Contacts between the different igneous bodies were not seen so their relative ages are uncertain; however, it is believed that the granite masses are the most recent, except the nepheline syenite. The majority of these rocks are cut by veinlets or dikes of pink or white pegmatite.

Glacial striations and many eskers show that the last glacial movement was almost directly southward.

Quartzite

Quartzite crops out north of Mount Gordon in Bureau township but it could not be mapped as a separate unit. Consequently, it is included with the biotite paragneiss with which it is interlayered. Several thin layers of quartzite were also noted in the pyroxene-bearing rocks and in the mixed gneiss, where it traces out ptygmatic folds.

Table of Formations

Pleistocene and Recent	Sand, boulders, gravel and till	
Precambrian	Dark-colored dikes	
	Nepheline syenite	
	Pink biotite granite, gray gneissic biotite granite, pink muscovite granite, pink syenite, pegmatite dikes and sills, aplite dikes	
	Pyroxene syenite, pyroxene monzonite, in places quartz-bearing, pyroxene diorite; these rocks may be garnetiferous and gneissic in places	
	Metagabbro and ultrabasic rocks	
	Grenville Series (not necessarily in stratigraphic order)	Mixed gneisses Biotite gneiss ± sillimanite, sphene, garnet Hornblende gneiss, amphibolite ± garnet Crystalline limestone Quartzite

The quartzite is a fine grained rock forming beds from several inches to several feet thick. Pale gray on fresh surface, it weathers drab or rusty. It is composed essentially of glassy quartz, some feldspar grains, and in places small pink garnets. In contact with the biotite paragneiss some quartzites contain flecks of graphite. Individual layers are generally characterized by slight variations in grain size and color.

Crystalline limestone

Although crystalline limestone was not observed within the area, it occurs about two miles south of the area, west of the Clova road and about 2,500 feet west of the Gatineau river in Douville township.

The crystalline limestone is bordered by garnetiferous biotite gneiss and granitic biotite gneiss injected by pink pegmatite. The two gneisses lie parallel to the limestone and appear to form a small anticline with the limestone in its axial zone. The main limestone bed is 6 to 7 feet thick over a length of 3/4 of a mile.

The crystalline limestone is white to dirty white or salmon pink. Its weathered surface is black to gray and fine grained. In contact with the garnetiferous biotite gneiss it grades into a greenish black diopside rock. The crystalline limestone contains silicate minerals principally diopside, scapolite, phlogopite, muscovite, and chondrodite.

Hornblende gneiss, amphibolite

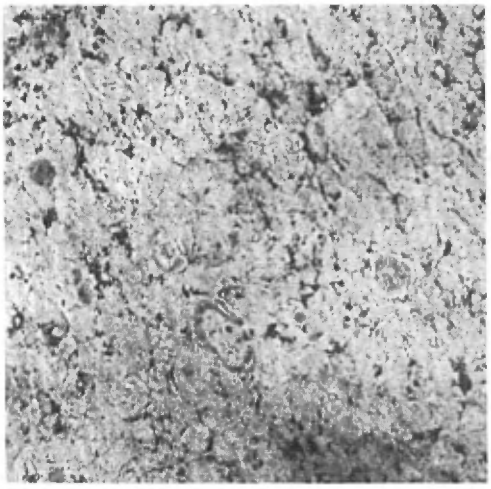
Hornblende gneiss and amphibolite make up only a small part of the bedrock. It outcrops mainly in the townships of Marmette, Myrand, Evanturel and Poisson.

The hornblende gneiss and garnetiferous hornblende gneiss generally occur as concordant layers in the biotite gneiss or parallel to the mixed gneisses. The layers vary from several inches to several hundreds of feet thick in the Baie du Sud and Baie de l'Est regions, and are thinner near baie Adolphe Poisson. Many of the thin bands are grouped with the surrounding rocks so that some of the mixed gneiss includes hornblende gneiss. However, many small pockets and lenticles, which were considered to be inclusions, are shown separately.

The hornblende gneisses are fine to medium grained and slightly or well foliated. In places they are strongly enough foliated to become hornblende schists; elsewhere they resemble weakly foliated coarse-grained diorite. In many cases the foliation is emphasized by a relatively large amount of dark green hornblende, a dirty white to greenish feldspar, and generally a red garnet. In some cases, especially in the border zones of some small metagabbro bodies, the hornblende gneiss resembles a garnetiferous amphibolite with more or less pronounced alignment of its hornblende needles.

In thin-section, grain size ranges from 0.2 to 3 mm.although certain garnet and hornblende porphyroblasts exceed 2 cm.in diameter. The rock is composed of 40 to 50% hornblende, 30 to 40% plagioclase (oligoclase-andesine), 2 to 10% red garnet and a little quartz and biotite. Main accessories are apatite, carbonate and magnetite.

Plate I



A - Anti-rapakivi texture in a rock of the charnockitic series. The grains are composed of a plagioclase core rimmed by either plagioclase with potassic feldspar or potassic feldspar alone. Photo shows massive rocks of the series.

B - Concordant band of garnetiferous hornblende gneiss in the mixed biotite gneiss. Photo taken on an island in Marmette lake.

C - Sand bluffs, a familiar landform around Brochu lake.

Plate II

A - Falls just south of Nemio lake flowing over well-banded garnetiferous biotite paragneiss, in Huguenin township.

B - The mégiscane canal, dug by Shawinigan Engineering to divert Megiscane river into the Gouin reservoir. Westward view.

C - Interstratified layers of dark hornblende gneiss and light biotite gneiss at the eastern entrance to the Mégiscane canal in Poisson township.

Plate III

View of Saint-Maurice river downstream from the Gouin dam. Note the surrounding peneplane. Photo taken from Fire Tower 67.

Plate IV

View of the Gouin dam taken from Tower 67; note the undulating surface of the surrounding peneplane.

Plate V

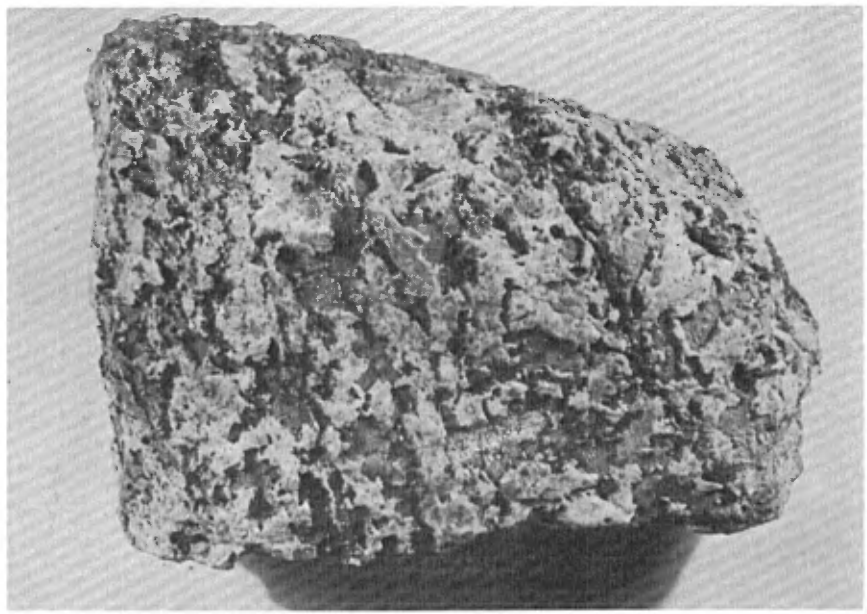
Westward view of the Gouin reservoir from Tower 67.

Plate VI

A - Garnetiferous hornblende gneiss interlayered with biotite gneiss and quartzite layers. Outcrop beside a small lake near camp Mégiscane in Poisson township.

B - Fault plane in garnetiferous hornblende gneiss showing displacement of a granitic dike. Outcrop on the east shore of Mâle lake in Lemay township.

Plate VII



Nepheline syenite from the area north of the Obedjiwan Indian reservation.
Note the miarolitic texture.

Plate VIII

A - A group from the Obedjiwan Indian reservation photographed on a holiday. Mgr. Sanschagrin, Bishop of Amos, is in the group.

B - View of the Obedjiwan Indian reservation.

Biotite gneiss

This category includes the following gneisses: biotite gneiss, sillimanite-biotite gneiss, kyanite-biotite gneiss, all of which may or may not contain garnet. These different rocks make up about 2% of the area's rocks. They are exposed throughout the area, and especially in Poisson, Buies, Huguenin, and Provancher townships. They are also found on the islands of baie du Sud, baie de l'Est,and baie de la Galette. Many outcrops of these rocks could not be shown separately and, therefore, they have been grouped with the mixed gneiss.

The paragneisses are strongly metamorphosed arenaceous and argillaceous rocks. They are generally fine or medium grained, and vary from light to dark gray depending on the amount of biotite or hornblende. In places they show rusty or tan surfaces from oxidation of disseminated pyrite and magnetite. Variation in the proportions of biotite and hornblende produces a characteristic banding. These gneisses in places contain two or more of the following minerals: sillimanite, garnet, graphite, kyanite, and molybdenite. However, they may contain only the garnet, and so be a garnetiferous biotite gneiss which is indistinguishable, even in thin-section, from certain garnetiferous igneous gneisses. If no garnet is present the paragneiss resembles a biotite granite.

Finely banded sillimanite-biotite paragneiss has been mapped in the railroad cut about 2 miles east of Coquart, in the southwest part of the area. Several outcrops of kyanite-biotite gneiss were observed on the shores of Tête lake. The kyanite forms conspicuous pale green tablets.

In thin-section, the paragneiss is seen to be composed essentially of 15 to 30% quartz, 40 to 60% plagioclase (oligoclase-andesine), 5 to 10% biotite, 2 to 15% garnet, and a little hornblende. The main accessory minerals are: sillimanite, kyanite, magnetite, sphene, and,on rare occasions, pyrite and acicular apatite. The sillimanite forms transparent fibrous grains up to 3/4 of an inch long.

Mixed gneiss

Mixed gneiss underlies more than 40% of the area. The group unites an assemblage of both sedimentary and igneous origin which was intimately mixed by the metamorphism. It is generally composed of layers of biotite gneiss, with or without garnet, alternating with amphibolites, gray or pink granite, and in some places with pyroxene-bearing rocks. These layers are very long and thin, and,in many places, are highly folded and crenulated, but, in general, are concordant with the orthogneiss.

The mixed gneisses occur throughout the area, except in its southeast corner.

They are gray or pinkish, and generally black on the weathered surface. They are medium or even coarse grained and generally strongly foliated, and almost all contain pink or gray granitic material. The layering of these rocks results from textural differences or in variations in mineral proportions or the quantity of material injected into the original rock. Microscopic study generally shows the rocks to have the same composition as biotite or hornblende gneiss, and to contain the same accessory minerals except sillimanite and kyanite.

Metagabbro and ultrabasic rocks

Several large masses and sills, and many small lenticular masses of metagabbro occur within the area, especially in the townships of Faucher, Poisson, Evanturel, Myrand, Delâge, Toussaint, and McSweeney.

The metagabbro is a dark gray massive rock with a brown weathered surface. It varies from fine to coarse grained, with a subophitic texture in some outcrops. This rock is mainly composed of mafic aggregates, containing angular fragments of hornblende, hypersthene, augite and biotite, surrounded by a matrix of fine laths of plagioclase and garnet. Some samples show a coronitic alteration around a core containing olivine.

A mass of metagabbro with an anorthositic border is exposed on the shores of Oskélanéo lake south of the railway. This rock passes from brown to dirty grayish white and contains much more feldspar than mafic minerals, but still shows a subophitic texture on the surface.

Two ultrabasic masses have been mapped: the most important, on the large island on Nevers lake in Nevers township; the other smaller mass, in the northeast part of Verreau bay in Verreau township. These rocks range from fine to coarse grained, and have a light green to dark green color on fresh surfaces; they weather dark green to rusty brown, probably because of oxidation of their iron. Occasional samples show a characteristic nodular texture.

The ultrabasic rocks are composed of olivine, altered on fractures, colorless tremolite, a little carbonate, large anhedral poikiloblastic porphyroblasts of diopside-augite, and several opaque minerals such as magnetite, and possibly chromite. The rock also contains traces of nickel.

Pyroxene-bearing rocks

In this group are classified pyroxene-bearing rocks varying in composition from syenite to monzonite and diorite. These rocks crop out mainly in the southeast corner of the area between la baie Kikendatch (la Loutre) and a point south of the village of Oskélanéo. Highly altered

outcrops of this rock were observed on the islands in the north part of Chapman lake, and some small isolated masses were found here and there through the area.

The pyroxene quartz monzonites are generally fine or medium grained, and, in places, very fine grained. They have an even gneissosity so that in places, such as on each side of Gouin dam, they are difficult to distinguish from some types of paragneiss. Fresh surfaces vary from dark to olive-green, and even apple-green in fine-grained facies. Outcrops appear brownish to light rusty beige and, in freshly stripped exposures, dirty gray white. The discolored weathered surface is everywhere less than 1/32 inch.

The rock is composed of 40 to 50% plagioclase (oligoclase-andesine), in places antiperthitic, 20 to 30% generally perthitic orthoclase or microcline, 5 to 10% hypersthene, 2 to 5% augite, up to 2% hornblende, up to 2% biotite, and 5 to 10% quartz. Iron oxide, zircon, and apatite are the main accessories.

The pyroxene syenite and diorite are coarse grained and generally massive, although they may show a weak lineation. They have the same physical characteristics as the monzonite, but generally weather more deeply as the thin white crust fades out. Some samples show differential weathering of the plagioclase, with a grayish white rim surrounding the plagioclase core. The size of these assemblages varies from 1/4 to 3/4 of an inch.

The mode of occurrence of these rocks, the presence of small masses in the surrounding rocks, and their common granular texture suggest an igneous origin.

Biotite granite

Four main masses of pink biotite granite occur in the area. Including their generally gneissic border facies, they underlie about 15% of the area.

The biotite granite is generally fine to medium grained and massive but shows a weak foliation in some parts of the area.

They contain numerous pegmatite injections, probably related to the granite, and a large number of lenses or discontinuous bands of more or less digested amphibolite and paragneiss. The granite is pink on both fresh and weathered surfaces. It is composed essentially of pink potash feldspar, white plagioclase and quartz. Biotite, rarely exceeding 5%, is the common mafic mineral. It forms small flakes generally black but in places altered to green chlorite. Accessory minerals are magnetite, chlorite,

sphene, zircon, apatite, allanite and some hornblende. The allanite is generally rimmed by a reddish halo.

The granites are generally surrounded by a border facies of granitic gneiss, similar in composition to the massive granite, but their color is seen to change from pink to pinkish gray as one moves away from the main granite. Their foliation, formed by orientation of the biotite or in places by quartz streaks, is generally parallel to that of the surrounding gneiss. The gneissic granite contains slightly more biotite and hornblende than the massive granite. In the granitic gneiss, as in the mixed gneiss, many outcrops contain pegmatitic facies, some with magnetite octahedra up to 1/2 inch in size.

Pink muscovite granite

A fine- to medium-grained, pink, gneissic muscovite granite crops out on the eastern slope of the large island in Marmette lake, McSweeney township. It is composed of clear quartz, pink and, in places, white feldspar, silver muscovite and black biotite. A close banding results from alignment and segregation of muscovite flakes and quartz and feldspar grains.

Pink syenite

A body of pink syenite about 4 miles long is exposed on the shore of Marmette lake in the northeast corner of the area. This rock is distinguished from the alkaline syenite, described later, and the pyroxene syenite, described above, by its color and almost complete lack of schistosity.

The pink syenite is a medium-grained massive rock composed of microcline feldspar, a little plagioclase, a few rare quartz grains, biotite, partly chloritized in places, and some hornblende. The main accessories are sphene, iron oxide, and epidote.

The syenite is cut by several thin dikes of pink aplite and pegmatite.

Nepheline syenite

Nepheline syenite outcrops in two separate masses north of Obedjiwan lake in Toussaint township. The first mass, almost circular, has a diameter of about 5 miles, while the second, a smaller one, is lenticular in shape and is located 1 1/2 miles north of the first.

The larger mass is medium to coarse grained with a miarolitic texture and a more or less gneissic, in some places even schistose, structure. It is cut: a) by small dikes of very fine-grained material identical in composition, 6 inches to 1 foot wide; b) by very coarse-grained feldspathic dikes and lenses varying in color from cream to white; c) by small dikes of pure nepheline 5 to 6 inches long by 6 inches to 2 feet wide, and, d) by cancrinite lenses.

The second mass is very crystalline, coarse grained, even pegmatitic, and contains nepheline crystals attaining as much as 1 inch in diameter.

Very easily weathered, this rock disintegrates rapidly and its weathered surface takes a spongy aspect, nepheline altering much more quickly than feldspar. However, the weathered surface of the facies bordering the main mass on its south and southeast sides does not show pits, and has a much greater resemblance to the weathered surface of the coarse-grained pyroxene monzonites. Under the microscope, the author found nepheline grains in these peripheral rocks.

Nepheline, which makes up about 50% of the rock, varies in color from bluish gray on weathered surface to pinkish brown or even dark smoky black on fresh surface. Gray or white sodic plagioclase (20%), perthitic microcline (20%), a few flakes of biotite, and hydro-nepheline (natrolite) owing to the brick-red color of certain weathered grains of nepheline, were also noted. The plagioclase is slightly clouded, and in certain places, decomposition has begun to set in. The author also observed grains of sodalite, apatite, carbonate and crystals of ilmenite and magnetite in white pegmatite dikes 12 to 15 feet long by 1 inch to 2 feet wide.

The most interesting materials cutting the syenite are small, almost pure, nepheline dikes, and lenses containing cancrinite. The nepheline appears in dike-form 5 to 6 feet long by 6 inches to 2 feet wide, generally pinkish to blackish on weathered surface. Most of these have a center hollowed out through erosion and have smooth walls. Occasionally, brown-weathering crystals of carbonate are present in the nepheline and biotite books are found along the walls of the nepheline. Cancrinite appears as veinlets or lenses 2 to 4 inches wide by 1 to 3 feet long, is coarse grained, massive and lemon-yellow to pinkish on fresh surface. The weathered surface is very dark yellow.

Dark-colored dikes

Several dark-colored dikes cut the gneissic rocks, and appear to be the youngest rocks of the area. Some of the dikes are quite massive; others are foliated. They are generally too small to be shown on the accompanying map.

One dike, 1.5 feet thick, crops out in the canal built by Shawinigan Engineering in Poisson township. The rock is dark and fine grained and contains inclusions of the mixed gneiss into which it was injected. Microscopic examination of the rock shows it to be an amphibolite composed of the following minerals listed in order of abundance: hornblende, biotite flakes, plagioclase, quartz, small grains of sphene, and some small scattered grains of iron oxide.

Pleistocene

The bedrock is almost completely buried by a thick mantle of glacial deposits. Much of the drift forms ridges, hills and chains, either alone or in irregular groups, which are, in some instances, 25 feet high and, in places, reach 70 to 80 feet in height. Clay is rare, except in recent deposits along the banks of some rivers.

In places, the glacial deposits form excellent material for construction of roads and for railroad fill.

Several glacial striae and channels seem to indicate that the last glacial movements varied between S.15°W. and S.5°E.

STRUCTURAL GEOLOGY

The area is divided into two parts, with different structural trends to their schistosity.

In the western part of the area the schistosity strikes north-south, except where it is deformed by granitic or gabbroic masses. In the eastern part of the area it strikes northeast, generally parallel to the Grenville "B" trend of Osborne and Morin (1962). The schistosity in the eastern part of the area is more uniform than in the west. The two structural trends merge gradually in an irregular zone in the center of the area.

Folds

The distribution of formations and bedding attitudes suggest intense folding of the paragneisses, especially in Poisson township. However, the attitude of the fold axes could not be measured. Moreover, with present information, it is rarely possible to distinguish whether the folds are anticlines or synclines.

Shear zones and faults

Two large-scale faults are shown on the accompanying map, and many other small slip fractures were noted in the area.

One of the two large faults is situated in Chapman township; the other, in Faucher township. The first fault is accompanied by abrupt changes in rock composition and structural direction. Biotite paragneiss, in a form suggesting a syncline, crops out on the west side of the fault, whereas the other side is underlain by pink biotite granite. The fault strikes within several degrees of north-south. It is accompanied by a long negative magnetic anomaly visible on the aeromagnetic map.

The second fault is situated in Faucher, Buies, and Douville townships. It strikes N.45°E. and has been traced for a distance of about 20 miles. It seems to separate a mass of pyroxene rocks from mixed gneiss, and, as with the first fault, is accompanied by an elongate negative anomaly.

ECONOMIC GEOLOGY

Ilmenite veins were noted in the nepheline syenite mass immediately north of the Obedjiwan Indian reservation. These veins occur principally in pegmatite dikes. Some of the dikes have a length of 20 to 25 feet and a maximum width of 2 feet. Other veinlets of ilmenite have been noted in the syenite. Crystals of magnetite also occur with the ilmenite in several places. Analyses* of two ilmenite samples, one from each side of the nepheline syenite mass, give the following results:

	L84-62	L7-63
Iron	38.01%	38.27%
Titanium	29.44%	28.04%

One semi-quantitative analysis of sample L84-62 gives the following results:

10%	-	50%	iron, titanium
0.5%	-	2%	manganese
0.1%	-	1%	potassium, magnesium, silica
0.05%	-	0.5%	aluminum, vanadium
0.01%	-	0.1%	chrome, sodium
0.005%	-	0.05%	tin
0.001%	-	0.01%	barium, nickel, strontium

Magnetite disseminated through a rock resembling a metagabbro or garnetiferous hornblende gneiss was observed in the northeast corner of the baie du Sud, on the west shore, on several small islands, and on the east shore of baie de l'Est. Moreover, over the baie de l'Est occurrence a magnetic anomaly accompanies the mineralized outcrops for a distance of 3 miles. Analyses of two samples from this zone give the following results:

Sample No.	Fe	Ti
L-34-63	21.20%	3.63%
L-46-63	19.35%	1.27%

These two samples and a third taken in the eastern section of baie de l'Est contain traces of nickel.

Traces of magnetite were noted in the rocks about 10 miles southwest of Clova on the Clova-Suzie depot road.

---

* Analyses by the Laboratory of the Department of Natural Resources.

About 18 miles north of Clova, on the road to Adolphe Poisson bay, molybdenite flakes occur in the biotite paragneiss. Molybdenite has been noted in many other places, but it was everywhere dispersed.

The presence of nepheline should be mentioned before ending discussion of the economic possibilities of the area. Some syenites contain more than 50% nepheline.

REFERENCES

BANCROFT, J.A. (1917) - Geology and mineral resources along the National Transcontinental Railway, in the Province of Quebec; geological reconnaissance between Hervey Junction and Doucet and along the Canadian Northern Railway from Ste. Thècle to Rivière à Pierre: Que. Dept. Col., Rept. Min. Oper., 1916, pp.128-168.

FAESSLER, C. (1935) - Mégiscane river headwaters area: Q.B.M. Ann. Rept. for 1935, part C. pp. 27-38.

FAESSLER, C. (1937) - Suzor-Letondal map-area. Parts of the counties of Laviolette. St. Maurice and Abitibi: Q.B.M., Ann. Rept. for 1936, part B, pp. 23-36.

LAURIN, A.-F. (1961, MS.) - Summary study of the geology of the headwaters of the Trenche, Windigo and Wabano rivers, Laviolette and Roberval counties: MS. in files of Dept. of Nat. Res., Quebec.

OSBORNE, F.F., and MORIN, M. (1962) - Tectonics of part of the Grenville Subprovince in Quebec. The Tectonics of the Canadian Shield: The Royal Society of Canada, Special publication, No. 4. University of Toronto Press, pp. 118-143.

RETTY, J.A. (1934) - Upper Gatineau region and vicinity: Q.B.M., Ann. Rept. for 1933, part D, pp. 129-138.

WILSON, W.J. (1910) - Geological reconnaissance along the line of the National Transcontinental Railway in Western Quebec: G.S.C. Memoir 4.

ALPHABETICAL INDEX