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PRELIMINARY REPORT ON SICOTTE AREA, GATINEAU AND LABELLE COUNTIES

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Énergie et Ressources naturelles
Québec

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PRELIMINARY REPORT

ON SICOTTE AREA

LABELLE AND GATINEAU COUNTIES

Province of Quebec, Canada

DEPARTMENT OF LABOUR, MINES AND MARITIME FISHERIES

Honourable Edgar Rochette, Minister L.-A. Richard, Deputy-Minister

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BUREAU OF MINES

A.-O. Dufresne, Director

DIVISION OF GEOLOGICAL SURVEYS

I.W. Jones, Chief

PRELIMINARY REPORT

ON

SICOTTE AREA

LABELLE AND GATINEAU COUNTIES

by

E.Aubert de la Rüe

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1941

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SICOTTE AREA

LABELLE AND GATINEAU COUNTIES

by E.Aubert de la Rüe

GENERAL STATEMENT

During the summer of 1940, the writer mapped the geology of an area which adjoins on the northwest the Nomininguе-Mont-Laurier area (1) he had studied in 1939. It lies between 46°30' and 46°43' north latitude, and 75°30' and 76°28' west longitude, in the northern part of the Laurentian hills, 180 miles northwest of Montreal, and includes the whole of Pope and Sicotte townships, a large part of Robertson, Aumond, Egan, and Lytton, and a narrow strip of each of Gravel, Major, Baskatong, and Mitchell townships — 415 square miles in all. The area is easily accessible by the Canadian Pacific Railway's Montreal-Mont-Laurier line, and by road from Montreal, Buckingham, and Hull. It is traversed lengthwise by the recently completed Mont-Laurier-Senneterre highway.

The area is fairly rugged, but in general the altitudes are not great. The valley bottoms and lower-lying lands are between 600 and 700 feet above sea level, while the hill-tops, which are well rounded, barely exceed 1,000 feet in elevation. In Pope township alone are there notably greater elevations, and Montagne du Diable (Devill's mountain or Mount Sir Wilfrid), a steep ridge running east-west and 2,500 feet high, rises well above the entire region. It is the highest peak in the Laurentians within a radius of 50 miles.

Lakes are fairly numerous, but less so than in many other parts of the Laurentians, and they are all of small size. With the exception of Philomène bay and baie des Sables — two arms of the vast artificially enlarged lake known as Baskatong reservoir, which lies immediately north of the area — Pope lake (lac des Sables) is the largest body of water in the area, and it is only four miles long and less than one mile wide. Three important rivers flow southward through the region. These are, from east to west, the Lièvre, whose course is quiet except at Mont-Laurier; the Gatineau, which is interrupted by falls and rapids, and flows in a steep-walled valley; and the Désert, a tributary of the Gatineau, which makes innumerable meanders in a wide, fertile valley.

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(1) Quebec Bureau of Mines, P.R. No. 141, 1940.

The village of Mont-Laurier, chief centre of the district is just outside the map-sheet, one mile from its eastern boundary. The largest settlement within the area is Ferme Neuve, on Lièvre river, 12 miles above Mont-Laurier. Montcerf, Bois Franc, and Grand Remous in the west are the other chief settlements. The total population of the map-area is about 5,000, segregated mostly in the east, south, and west, the north and centre, that is to say the greater part of Pope and Sicotte townships, is entirely unsettled.

Farming and cattle raising support a portion of the people, but the chief resource of the district, which is still heavily wooded, is the lumbering industry.

GENERAL GEOLOGY

The area is underlain by metamorphic and intrusive rocks of Precambrian age. In the valleys and low-lying sections, outcrops are of very limited extent, the bedrock generally being concealed beneath a relatively thick blanket of superficial, recent deposits of glacial, fluviatile, and lacustrine origin. Where the topographical relief is more pronounced, exposures are more frequent and, in many places, are fairly extensive.

Grenville Series

The oldest formations, which underlie at least one-half of the map-area, are correlated with the Grenville series. This series is of relatively little importance in the townships of Pope and Sicotte, but it is well exposed more to the south, in Robertson and Aumond. West of the Gatineau it is strongly predominant.

The Grenville series is derived principally from old sediments which, as the result of intense metamorphic action, are now represented by gneiss, amphibolite, quartzite, and crystalline limestone. It is quite possible, however, that certain of the amphibolites were originally basic lavas. There is no definite order of succession of these several members of the series, indeed, some rather extensive outcrops — especially those just below the Mercier dam — show frequent alternation and repetition of beds of gneiss, quartzite, and limestone.

Of the several members making up the Grenville series, the paragneisses have the greatest extent. Of these gneisses, some are highly micaceous or amphibolitic, others contain an abundance of garnet, and still others contain sillimanite and graphite. Many of the fine grained types are very high in pyrite and decompose easily (rusty-weathering gneisses). Others show "lit-par-lit" injections of granitic material which accentuate their banding, and in part at least such gneisses should be classed as migmatites. All types are met with, from clearly recognizable paragneisses to those so greatly altered by the action of the magma which has intruded them that it is difficult to distinguish them from the gneisses derived from intrusive rocks (orthogneisses) which, in places, occur side by side with them.

In the field it is possible, in general, to recognize the migmatites by the very numerous and greatly distorted drag-folds which frequently, but not always, are developed in these rocks. Migmatites are to be seen at many localities, but they have their greatest development in the valley of the Gatineau, in the townships of Bicotte and Lytton.

Table of Formations

Recent and Pleistocene		Fluviatile and lacustrine deposits (gravel, sand, silt, clay) Glacial and fluvio-glacial deposits (moraines, eskers, coarse and fine gravel)
Great Unconformity		
Precambrian	Intrusive Series	Gabbro Fine grained pink granite (Guénette type) Pink syenite Quartz syenite and granite (generally porphyritic) Granite (light-coloured and aplitic types most common) Grey banded orthogneiss
	Grenville Series	Migmatites, paragneiss, amphibolite, quartzite, crystalline limestone, pyroxenite

Amphibolites are common, although they do not ordinarily form large masses. They are usually closely associated with the paragneisses, and also form important inclusions in some of the granites. A darkish rock of quite distinctive type, found near the boundary between Aumond and Robertson townships and forming good-sized outcrops north and east of Castor lake, may also be grouped with the amphibolites. It seems to have been formed from limestones, doubtless very impure ones, and is composed chiefly of amphibole and sphene (the latter remarkably abundant in some specimens) along with orthoclase, plagioclase, quartz, biotite, calcite, etc.

Quartzites form a number of steep-sided hills in Egan township between Bois Franc and Gatineau river, as well as in the southeast corner of the map-area, in Robertson township. The largest body of quartzite is that which forms the whole summit of Montagne du Diable (Mount Sir Wilfrid) in Pope township.

Crystalline limestones, which in many places are really dolomites, have an extensive development, chiefly in the western part of the area. In the eastern part, there are outcrops of these rocks northwest of Ferme Neuve and west of Mont-Laurier. The new Mont-Laurier-Senneterre highway cuts through several bands of limestone, some of which are many miles long. For example, the road crosses limestones in ranges IX, X, and XIII of Robertson township; in range VIII of Aumond township; in ranges I to VI of Sicotte township; and in ranges I to V of Lytton township. The road which follows the left bank of the Gatineau from Grand Remous to Sainte-Famille-d'Aumond crosses many outcrops of limestone, and there are exposures also along the Grand Remous-Bois Franc road. As occurrences which are easily accessible may be noted those along the valley of Désert river.

Pyroxenites, composed chiefly of diopside, are always intimately associated with the limestones, in which they occur as segregations. They offer a special interest in that they may be the host-rock of various useful minerals.

Intrusive Series

Igneous rocks underlie the major portion of Pope and Sicotte townships and also form large outcrops in Robertson and Aumond. In that part of the map-area lying west of the Gatineau, their distribution is of considerably less importance.

The intrusive rocks observed have been divided into six groups, of which the order of succession cannot be determined with certainty because their mutual relations and contacts are but rarely exposed.

In the field, certain intrusive rocks seem to form distinct units but in reality this may be simply an effect of magmatic segregation and of the conditions under which they were emplaced. Indeed, it is logical to assume that several, at least, of the intrusive series shown in the table of formations are merely facies of the Morin series, to which are ascribed many of the granitic and other rocks of the Laurentians which have intruded the Grenville and certains series of old granitic gneisses.

Banded grey orthogneisses, some with a pinkish cast, of rather fine grain and saccharoidal texture, form small outcrops at several localities, especially in Pope township, as at the south-east end of Howard lake and at Ferme Neuve, just north of the village.

The principal granitic series underlies most of Pope township and extends west into Sicotte. Smaller granitic masses may be seen elsewhere, especially in Robertson and Aumond townships. Neglecting slight differences in the rocks of one locality from those of another, most of the granites here considered are rather light-coloured and aplitic. They have a gneissic structure, which, however, is not everywhere very noticeable, because of the rarity of dark-coloured minerals. These gneissic granites are all calc-alkaline in composition, and generally they are pale grey or pink in colour. The quartz grains are frequently pale bluish and opalescent, especially in the rock in the vicinity of baie des Sables. In many localities, inclusions of amphibolite, some of large size, are common in the granite.

An important intrusion of porphyritic quartz-syenite underlies the centre of Sicotte township. To the west, it does not quite extend to the valley of the Gatineau, which is incised in the Grenville, and it is separated from baie des Sables on the east by an area of granite.

This quartz syenite is similar to that in the Nominingue-Mont-Laurier map-area, and like it should be considered as the equivalent of the Pine Hill syenite (of the Lachute map-area), which is one of the younger members of the Morin series (1).

Typically, the rock is grey, highly gneissic, rich in mica and amphibole, with large crystals of grey or pink feldspar (microcline). It always contains quartz, and in places in such amount that the rock grades into a true granite. The more highly gneissic varieties are relatively poor in feldspar phenocrysts and rich in dark coloured minerals. The two types commonly occur side by side in ranges I, II, and III of Sicotte township.

In many places, the syenite is cut by numerous dykes of more acid composition. Some are pegmatite, almost always poor in mica, while others are light-coloured pegmatitic granite grading into aplite. Fine-grained pink biotite-granite closely related to this syenite is also to be seen.

Another body of quartz-syenite, smaller and of slightly different appearance from that of Sicotte township, occurs west of Pope lake, in Pope and Robertson townships. Dykes of grey micro-syenite were noted at several places in its vicinity.

The south-central part of the map-area contains a body of pink syenite, shown on the map by a special symbol because the rock differs noticeably from those already mentioned. The Mont-Laurier-Maniwaki highway crosses the middle of this body, and the Mont-Laurier-Sonneterre road passes near its north boundary. In general, this fine- to medium-grained, pink biotite-syenite, usually without quartz, is not gneissic, except at a few localities around the border of the intrusion.

(1) Osborne, F.Fitz, Lachute Area; Que.Bur.Mines,-Ann.Rept.,Part C, 1936.

Fine-grained pink granite, already mentioned as occurring at several localities as dykes closely associated with the porphyritic syenite of Sicotte township, also forms numerous outcrops elsewhere, especially in the western part of the map-area. Some have the form of clearly defined dykes, from several tens to several hundreds of feet wide; others, of greater size, are bosses which stand out as well-marked heights, as may be seen in ranges III, IV, and V, of Lytton township.

The slightly gneissic pink granite, which is often marked by the presence of small specks of purple fluorite and by a netwrok of joints, is very similar to that quarried near Guénette, in Campbell township, ten miles east of Mont-Laurier.

The most basic rocks encountered are gneissic gabbros, some containing hypersthene and almost all of them micaceous. The two principal bodies of gabbro, each of which is about three miles wide, are in Pope and Robertson townships. The first encircles a large part of Antlers lake, and the second extends south of the Mont-Laurier-Senneterre highway in Robertson township. Minor intrusions of gabbro occur farther west, near the road leading to Senneterre, in Sicotte and Lytton townships.

It is not easy to determine the relative age of these gabbros and the other intrusives encountered. In many places in the Laurentian mountains, gabbro accompanies anorthosite and should therefore be considered as an early facies of the Morin series, older than the granites and syenites of this series. But, possibly, there are some gabbros younger than the anorthosite (a rock which is completely lacking in the area studied), and this may be the case with those of the map-area. The body of gabbro at Antlers lake is surrounded by granite, and certainly seems the younger. As no contact can be seen, however, and as the structure of the district is very complex, such an age relationship cannot be confirmed.

Pleistocene

The Pleistocene glaciers have left clear evidence of their passage across the area. Striae on rock surfaces show that the direction of ice movement varied between S.7°E. and S.12°E. Eskers, with a general trend N.NW.-S.SE, are numerous. The most typical may be seen in Pope, Robertson, and Sicotte townships; one in Sicotte township may be traced for a distance of more than seven miles.

MINERAL DEPOSITS

There is no mineral production in the area. Prospecting, however, has demonstrated the presence of certain useful minerals, particularly molybdenite and mica, occurrences of both of which have been the object of some development work. The principal showings of mineralization that have been found are described briefly below (1).

(1) Numbers within brackets correspond with those on the accompanying map indicating the location of the mineral occurrences described.

Metals

The showings of molybdenite examined are all related to rocks of the Grenville series, especially to the rusty weathering gneisses and to the pyroxenites.

The phlogopite-bearing pyroxenite on lot 56, range I, of Aumond township contains considerable pyrrhotite which in places includes small flakes of molybdenite. In the same township, indications of the latter mineral were observed in pyroxenite on lot 44, range VI, near Castor lake (1). Molybdenite is also reported on lot 48, range III, Egan township, but the writer did not examine this occurrence.

The mixed outcrops of gneiss, limestone, and quartzite on the west bank of the Gatineau (2) — just downstream from the Mercier dam in the southeast corner of Mitchell township — are cut by veins of calcite and quartz, rich in pyrite and pyrrhotite. Some flakes and small pockets of molybdenite are common in these veins and in the host-rock near the vein walls.

The locality that shows the most encouraging indications of a workable molybdenite deposit is one mile north of Montcerf, on lot 69, range IV of Egan township (3). Some work was done there 25 years ago, and again as recently as 1938. This work has revealed pockets and veins of molybdenite in rusty-weathering gneiss and pyroxenite. Flakes of molybdenite two to five inches in diameter are common. In the surface rock, they are strongly altered to molybdite.

Veins and pockets of massive pyrrhotite are fairly common in the rocks of the Grenville series, chiefly in the pyroxenites, and prospectors have thought that the mineral might carry nickel. However, samples taken by the writer and analyzed in the laboratories of the Bureau of Mines contained no trace of nickel.

Prospecting for gold has been carried on at two places in the valley of the Gatineau, but with no success. One of these is on lot 10, range I, Lytton township, at Grand Remous (4), where a vein of quartz cuts a pink granite which contains numerous inclusions of quartzite; the other is on lot 44, range I of Aumond township (5), where quartz veins cut paragneisses and pyritiferous quartzites. A small prospect may also be seen near Bois Franc on lot 56, range B, Egan township, where the paragneisses contain some veins of pyrite. Assays of samples taken by the writer from the three localities mentioned showed that the gold content of the quartz and pyrite is negligible.

Non-metallic Minerals

Apatite.- Greenish-blue crystals of apatite, usually of small size, sometimes accompany phlogopite (amber mica) in the pyroxenites.

Asbestos.- A very limited amount of work was done in 1938 on an asbestos prospect on lot 38, range I, Aumond township. The material is of very inferior quality, occurring as brittle fibres two to three inches long in veins one inch wide along joints in pyroxenite.

Crystalline Limestone.- As already noted, crystalline limestone is widely distributed within the map-area. Ordinarily, it contains a considerable percentage of magnesium carbonate, and much of the rock has the composition of dolomite. As a rule, these magnesian limestones contain abundant foreign minerals, notably diopside, phlogopite, graphite, pyrrhotite, feldspar, and quartz, and they are therefore very impure. It is possible that, somewhere in the large expanse of Grenville limestone in the region, search would reveal some occurrences of sufficient purity to render the rock suitable for certain industrial uses. Beds of limestone were formerly quarried in several places to produce lime for local needs. No lime-kilns are in operation at present, but two — one on either side of the Gatineau, at Grand Remous — were in service two years ago. One of these is on lot 12, range I of Sicotte, the other on lot 2, range I of Lytton. At and near Montcerf, in Egan township, there are a number of abandoned lime kilns, notably on lots 62 and 69 of range IV, lot 60 of range V, and lot 47 of range C; and there are others on lot 54, range IX of Robertson township; at Chute Rouge (lot 6, range V, Lytton); and near lac des Journalistes, not far from Ferme Neuve on lot 7A, range II of Gravel.

Fluorite.- Small masses of purple fluorite are to be seen quite frequently in certain of the aplitic and pegmatitic granites. This mineral occurs especially as a characteristic accessory constituent of several pink granite intrusives of the Guénette type, particularly in the townships of Aumond, Lytton, and Mitchell. The fluorite is an original constituent of the rock; none was seen in vein form.

Garnet, often accompanied by sillimanite, is abundant in many of the paragneisses; in particular, in the zone of gneiss in the southeast corner of the map-area. Garnet also occurs in important quantity between Pope and Howard lakes (Pope township), and at chute du Brulé on the Gatineau.

Graphite is somewhat common as small disseminated flakes in the crystalline limestones and in some of the rusty-weathering gneisses of the Grenville series. However, no interesting concentration of this mineral was observed.

Phlogopite (magnesia mica, amber mica) is the mineral for which, up to the present, prospecting has been most active. A certain amount of surface work has been done on deposits in upwards of a dozen localities, and some twenty years ago there was a small production from properties in Aumond, Egan, and Lytton townships. The phlogopite fills pockets and vein-like fissures in pyroxenite. Which rock is closely related to the Grenville limestone.

Though the known occurrences of mica are fairly numerous, and it is not to be doubted that further prospecting would reveal others, they seem for the most part to be of small size. Ordinarily, the mica sheets are between three and six inches in diameter, rarely up to twelve inches. In general, the sheets are crumpled and break easily in a direction perpendicular to the cleavage.

The principal localities at which phlogopite deposits have been worked are indicated on the map. They are as follows: Robertson, lot 28, range X (7); Aumond, lots 35 (8) and 56 (9), range I; Lytton, lot 40, range II (13); lot 55, range III (10); lot 5, range IV (15); lots 21 and 22, range IV (12); and lots 9 (14) and 54 (11), range V; Egan, lot 51, range IV (16); and lot 61, range V (17).

Quartz.- On lot 3, range VIII of Baskatong township, a knoll composed mainly of white, saccharoidal quartz and known locally as "Montagne Blanche" rises from the west shore of Philomène bay where this opens into Baskatong lake (18). The knoll is 800 feet long (N.E.-S.W.), 120 to 160 feet wide, and it rises about 120 feet above the level of the lake. It is flanked by pink gneissic granite which grades to aplite. Most probably, this huge mass of quartz represents a band of quartzite which was enclosed in the granitic magma and which suffered complete recrystallization by metamorphism. As a result, impurities that may have been present in the original quartzite were expelled and almost pure quartz left. Samples taken by the writer at 100-foot intervals along the length of the outcrop and analyzed in the laboratories of the Bureau of Mines showed a silica content between 99.67 per cent and 99.95 per cent. Iron oxide (Fe_2O_3) is present in negligible amount, the maximum observed being 0.07 per cent.

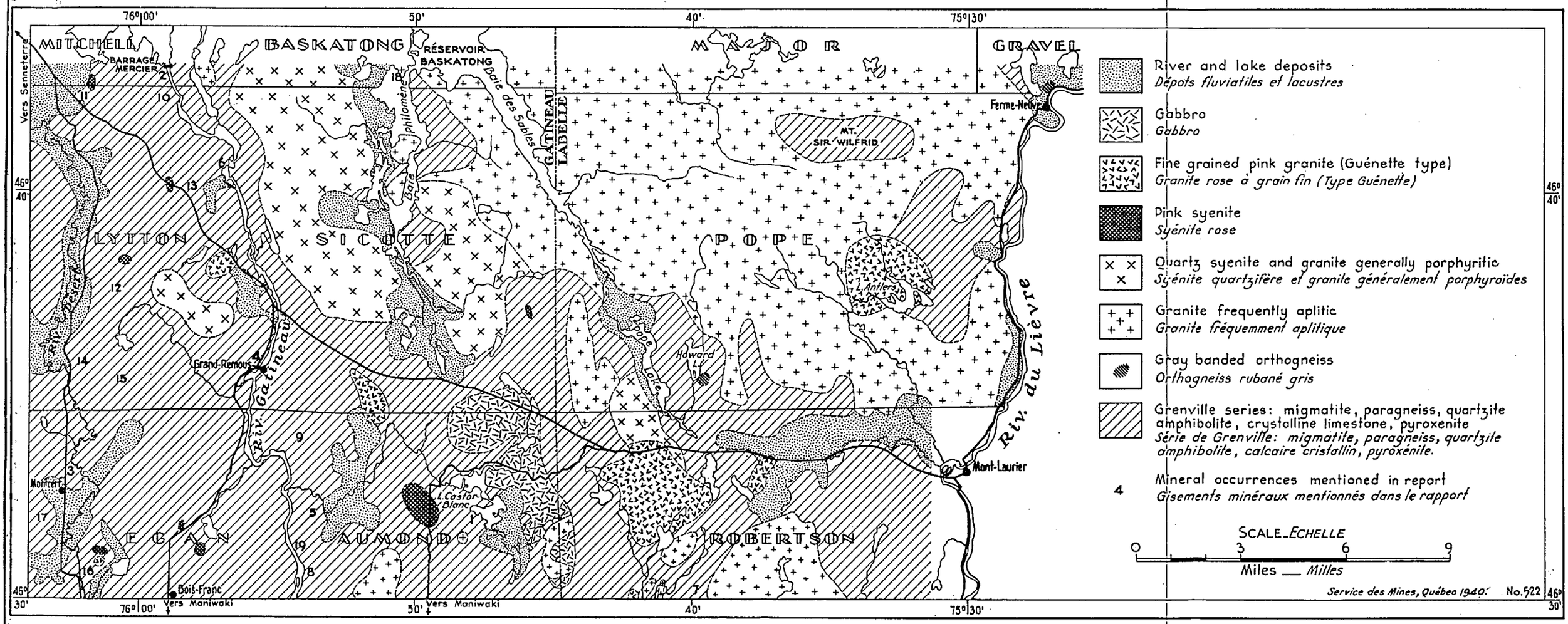
Talc.- Veins of pale grey compact talc, lamellar and translucent, occur in limestone along the left bank of the Gatineau, on lot 38, range I of Aumond (19). Prospecting has revealed the presence of several such veins, two to three inches thick, but although the talc is of excellent quality it is not present in sufficient quantity to render the occurrence of economic interest.

Ornamental and Building Stones

In 1927, at the time the Baskatong reservoir was under construction, two quarries were opened in the map-area. The larger of these, on lot 3, range I of Baskatong township, furnished Grenville limestone which was used in the construction of the Mercier and Lacroix dams; the other, on lot 37, range IV, Sicotte township, in highly granitized gneiss, supplied stone for the embankments on Philomène bay. Both quarries have long been abandoned, and at the present time there are no operating quarries in the map-area.

There is, however, no lack, of excellent buildings stone. Amongst the most decorative may be mentioned the fine-grained pink granite of the Guénette type which forms several intrusive bodies within the area. There is also the porphyritic syenite (augen gneiss) of Sicotte township and the medium-grained pink syenite which outcrops a little to the south of it and extends over into Aumond township.

A band of variously-coloured marbles (6) is exposed for 450 feet along the west bank of the Gatineau just below chute du Chat, on lot 43, range I of Lytton. These marbles represent Grenville limestone which has been subjected to intense dynamic action. They are of very fine grain and are capable of taking a good polish. Yellow, pink, white, and grey varieties occur. Some are uniform in colour; others are spotted or veined.



RÉGION DE SICOTTE
COMTÉS DE LABELLE ET GATINEAU
(PRÉLIMINAIRE)

SICOTTE AREA
LABELLE AND GATINEAU COUNTIES
(PRELIMINARY)