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PRELIMINARY REPORT ON CONDE AREA, ROBERVAL COUNTY

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H. W. McGERRIGLE, CHIEF

PRELIMINARY REPORT

ON

CONDÉ AREA

ROBERVAL COUNTY

BY

F.-W. BENOIT

QUEBEC
1961

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INTRODUCTION

The Condé area was mapped during the summer of 1960. Its centre is about 20 miles northwest of Normandin and Albanel, two villages on the road encircling Lake St-Jean. The area, which comprises about 400 square miles, is bounded by longitudes 72°30' and 73°00' and by latitudes 49°00' and 49°15'. It includes Condé and Bourbon townships and parts of the townships of Lauberivière, Dosquet, Hubert, Damville, Hémon, Chomedey, Ramezay, Girard and Beaudet, all in Roberval county.

Almost every part of the area is easily reached by road from Albanel and Normandin. In addition, secondary roads give access to lumber roads in the east and west parts. The village of Girardville straddles the southern border of the area, two miles west of the southeast corner.

The area lies within the Lake St-Jean drainage basin. Drainage is effected entirely by Mistassini river and its tributaries, namely, Mikosas, Ouiasiemska and Samaque rivers. These rivers are generally very shallow, with numerous rapids. Ouiasiemska river is the most difficult to negotiate, whereas the others are navigable during periods of high water.

Most of the area is wooded, with spruce, balsam fir, grey pine, birch and aspen as the principal forest products.

Some farming has been carried out near Girardville and along Mistassini river, bordering the Lake St-Jean lowland. Several of these lots, however, have been abandoned, and settlement of the area seems to have been handicapped by poor soil and unfavourable weather.

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* Translated from the French.

GENERAL GEOLOGY

Generally, outcrops are sparse and the cover of overburden quite thick. Nevertheless, continuous exposures several miles long were mapped in the eastern part of the area. The consolidated rocks are all Precambrian in age, and are believed to belong to the Grenville sub-province.

Most of the bedrock is made up of plagioclase gneiss, granitic gneiss and hornblende-biotite gneiss. These fairly well-bedded and interstratified rocks form assemblages of varying thicknesses. In addition, they enclose numerous lenses of hornblende-biotite gneiss and hornblende gneiss, or of crystalline limestone, quartzite and garnetiferous gneiss, or of both of these two assemblages. These lenses represent "islands" of sedimentary rock, which have shown a greater resistance to metamorphism than the other sedimentary members. Granitic orthogneiss appears in the form of concordant bands or injections. In places, a zone of injection gneiss marks the contact between orthogneiss and paragneiss.

The intrusive rocks include granitic orthogneiss, in places displaying an augen structure, as well as porphyritic, gneissic or augen charnockites, small bodies of granite, pink granites containing less than 3 per cent ferromagnesian minerals, meta-gabbros, ultrabasic rocks and diorite dykes. Pegmatites are numerous, and veins and small masses of pure quartz have been observed in places.

TABLE OF FORMATIONS

Quaternary	Pleistocene and Recent		Sand, gravel, till etc.
Precambrian	Grenville(?)	Intrusive Rocks	Pegmatite and quartz veins Massive granite Granitic augen gneiss Pink granite Porphyritic, gneissic or augen-charnockites Diorite Meta-gabbro and ultrabasic rocks Granitic orthogneiss, injection gneiss
		Metasedimentary Rocks	Injected paragneiss Plagioclase gneiss, hornblende-biotite gneiss Garnetiferous gneiss, hornblende gneiss, quartzite, crystalline limestone and scapolite-bearing rock

METASEDIMENTARY ROCKS

Crystalline limestone and scapolite-bearing rocks

Crystalline limestone forms continuous beds of uniform thickness intercalated in the paragneissic rocks, mainly in the plagioclase paragneiss and the garnetiferous paragneiss. The crystalline limestone, composed almost entirely of carbonate, is coarser grained than the scapolite-bearing rock. In exposures alongside Mikosas river, one mile east of Montreal lake, beds of carbonate and scapolite, up to 3 feet thick, alternate with beds of quartzite and plagioclase paragneiss. This association is characterized by a crenulated weathered surface. In places, thin (¼ inch to 1 inch) discontinuous beds of pyroxenite are intercalated in the crystalline limestone.

Quartzite

The quartzite of the district is a medium- to coarse-grained rock, containing up to 90 per cent quartz. It has a light

grey fresh surface and a dark grey weathered surface. Beds of this quartzite up to 50 feet thick are separated by thinner and impure beds containing such minerals as feldspar, biotite and garnet.

Other metasedimentary rocks

Plagioclase gneiss and hornblende-biotite gneiss occur in beds from 1/16 of an inch to a few feet thick. The grain size may vary from fine to medium from one bed to another, but generally remains uniform along the same bed. The composition of the gneiss may change in any direction. The colour of these rocks varies from light grey to dark grey or even black, depending upon the proportion of ferromagnesian minerals. The granitic hornblende-biotite gneiss may, in places, be cream or pink in colour.

Plagioclase gneiss

The plagioclase gneiss is composed of 25 to 60 per cent plagioclase, 3 to 50 per cent ferromagnesian minerals, a small amount of potassic feldspar (0 to 20 per cent) and quartz (0 to 20 per cent). It is distinguished from the granitic hornblende-biotite gneiss mainly on the basis of the white colour of its plagioclase.

Hornblende-biotite gneiss

The hornblende-biotite gneiss is divisible into two groups, based on the percentage of ferromagnesian minerals. The first group has the composition of a granitic gneiss and is made up mainly of alkali feldspar, with a small amount of quartz (1 to 20 per cent), as well as hornblende and biotite (1 to 10 per cent).

The second type of hornblende-biotite gneiss is composed of 10 to 80 per cent hornblende and biotite, along with potash feldspar, plagioclase and quartz. It is much less abundant than the plagioclase gneiss or the granitic hornblende-biotite gneiss.

Garnetiferous paragneiss

Beds of garnetiferous gneiss were observed in association with other metasedimentary rocks. These gneisses have almost the same composition and appearance as the paragneisses described above, and are distinguished only by the presence of garnet. Some beds of garnetiferous paragneiss in the vicinity of the crystalline limestone may contain up to 50 per cent garnet.

Hornblende gneiss or amphibolite

Lenses of a very hornblende-rich rock have been observed, mainly among the injected paragneisses. Other amphibolites border the bodies of meta-gabbro and appear as lenses or beds in the charnockitic rocks.

All of these rocks are similar in appearance. They are fine to medium grained and display a foliation resulting from the parallel orientation of the amphibole grains. The rocks adjacent to these amphibolites vary in appearance and probably differ in origin.

Injected paragneiss

The plagioclase gneiss, hornblende-biotite gneiss, garnetiferous gneiss and even the hornblende gneiss are injected or impregnated in many places with granitic material. The amount of injected material varies considerably from place to place, but is generally less than 20 per cent.

The lit-par-lit and other irregular injections are made up of quartzofeldspathic material. In general, their contacts with the enclosing rocks are sharp. On the other hand, the impregnated rocks have the appearance of a granitic orthogneiss, and contacts with the adjacent rocks are gradational and diffuse.

The injected paragneiss and the impregnated paragneiss predominate in the western and eastern parts of the area, respectively. The impregnated paragneiss is particularly common to the zone of most widespread granitic orthogneiss intrusion.

Intrusive Rocks

Granitic orthogneiss

Granitic orthogneiss is exposed almost everywhere in the area. Sills and dykes of this rock underlie about one-third of the western half. In other places, the orthogneiss injects and impregnates the paragneisses. The formation of the injection gneisses is believed to be related to the granitic orthogneiss injections.

The granitic orthogneiss is generally pink on the fresh surface, with a cream-coloured weathered surface. It contains potash feldspar (30 to 60 per cent), plagioclase (10 to 30 per cent), quartz (5 to 20 per cent) and ferromagnesian minerals, mainly hornblende (5 to 20 per cent).

The foliation of the rock, which is due to the parallel orientation of the ferromagnesian minerals, is generally discontinuous and often quite vague. The grain size varies from medium to coarse.

The granitic orthogneiss differs from the granitic hornblende-biotite gneiss in its weak foliation and predominance of hornblende over biotite.

Injection gneiss marks the transition between the granitic orthogneiss and the injected paragneiss at many places. This well foliated rock is composed of bands rich in hornblende and biotite alternating with injected bands of orthogneiss.

Meta-gabbro and ultrabasic rock

The meta-gabbro has a brownish-grey weathered surface, in places spotted with black, which still exhibits the original ophitic texture of the rock. It is medium grained and massive, and is made up of plagioclase laths in a granular matrix of mafic minerals. The mafic grains appear to be composed of bronze-coloured pyroxene cores, surrounded by black amphibole or aggregates of tiny amphibole grains. Small flakes of biotite and, in some places, minute garnets have also been noted.

In a few localities, an ultrabasic rock is associated with the basic meta-gabbro. This massive and very fine-grained rock is made up almost entirely of mafic minerals.

Diorite

Dykes or irregularly-shaped masses of a fine-grained grey to dark grey diorite cut the other rocks in a few outcrops in the eastern half of the area. The diorite in places contains phenocrysts of pyroxene or biotite along its borders.

Charnockitic rocks

Most of the charnockitic rocks outcrop in the central, north-central and southeastern parts of the area, as well as near the western boundary. These rocks vary in appearance and have a composition grading from that of a diorite to that of a syenite. A very mafic facies has also been noted in places. Porphyritic and gneissic types, as well as varieties displaying an augen structure, have been placed in this group on the basis of their mineralogical composition and, to a certain extent, on their greenish-grey to grey colour.

The intrusive character of the bodies of charnockite is indicated by the injections, sills and dykes which cut or impregnate the surrounding rocks. Migmatites (or transition zones between the charnockites and the adjacent rocks) have been observed at several places. The pegmatites of the area are younger than these charnockitic rocks, as are the dykes (3 to 20 feet thick) of pink granitic orthogneiss found in the northwest part of the area.

The charnockites contain perthite, plagioclase, hypersthene, augite, biotite and metallic oxides. Quartz is generally rare or absent. Almost all of these rocks are fine to medium grained and granular. The typical greenish-grey to grey colour may vary from place to place, and it is not unusual to observe zones of pink

rock in the greenish charnockites. For example. the rocks exposed near Girardville, in the southeastern part of the area, are grey to pinkish grey with, in places, a light greenish tinge.

The porphyritic charnockites contain phenocrysts of perthite along with the usual minerals. In the gneissic variety, a parallel orientation of the mafic minerals causes an irregular foliation. The charnockitic augen gneiss is made up of lenses of varying size and is generally found near masses of porphyritic or gneissic rock. "Eyes" of feldspar, in a matrix of finer-grained material, characterize this augen gneiss. The fact that quartz is present in only small amounts, if at all, serves to distinguish it from the pink augen gneiss.

Pink granite

The pink granite is composed of potash feldspar (40 to 75 per cent), plagioclase (10 to 40 per cent), quartz (5 to 20 per cent) and less than 3 per cent ferromagnesian minerals. It is medium to coarse grained, and generally displays a pink fresh surface and a cream-coloured weathered surface.

This rock outcrops mainly in the injected paragneiss, where it takes the form of sills or dykes 1/8 of an inch to 6 inches thick.

Granitic augen gneiss

The granitic augen gneiss is similar in colour and composition to the granitic orthogneiss. It is distinguished, however, by the presence of "eyes" of potash feldspar up to 2 inches long set in a finer-grained matrix. This augen gneiss underlies an area of several square miles near the eastern boundary, and a few lenses are widely scattered in the eastern part of the area.

Massive granite

The massive granite is a homogeneous rock made up of potash feldspar (40 to 60 per cent), plagioclase (30 to 50 per cent), quartz (3 to 15 per cent) and ferromagnesian minerals (5 to 10 per cent).

This granite is definitely igneous in origin. Although pink on the fresh surface and cream on the weathered surface, like the pink granite described above, it differs from the latter in its higher proportion of ferromagnesian minerals, and from the granitic orthogneiss in its massive structure and homogeneous appearance.

Only a few outcrops of this massive granite were noted; all are in the eastern half of the area.

Pegmatite and quartz veins

Pegmatites are found throughout the area. Generally, they are made up of potash feldspar, plagioclase and a small amount of ferromagnesian minerals, mainly hornblende and biotite. Some of the pegmatites in range III, Beaudet township, contain metallic oxides. Sulphides were noted in pegmatite near Ste-Anne lake.

Veins, lenses or pockets of quartz, up to 3 feet, are fairly abundant at certain localities within the area. The quartz is in the form of large milky-white crystals.

Veinlets of amphibole and pyroxene

Dark green veinlets, from 1/32 of an inch to 2 inches in width, were observed at several places. They are made up mainly of amphiboles, with a small amount of pyroxene. Disseminated epidote is commonly noted in the rocks adjacent to these veinlets.

STRUCTURE

The foliated rocks of the area trend generally north. Dips are usually towards the east, but there are westerly dips. The foliation curves to follow the contours of the intrusive masses. Other slight deviations from the general structural pattern are of uncertain origin.

In this area, the folds could not be followed over long distances, owing to the scarcity of outcrop and the high degree of metamorphism of the rocks.

Faults

No indications of major faults were observed. Nevertheless, the emplacement of the bodies of charnockitic rock in the centre of the area appears to line up with a prominent escarpment in the region to the south. Small fractures and shear zones indicate the presence of numerous minor faults.

Joints

The directions of the straight valleys that parallel the main joint systems have been traced out on the accompanying map. These joint systems trend northwest and northeast.

ECONOMIC GEOLOGY

Lyndvue Mines, Ltd., and Baraca Mines, Ltd., have abandoned the claims that they held in Beaudet township on, respectively, lots 38-43 and 57, range III, and lots 46-51, range II.

The mineralization, consisting of ilmenite and columbium-bearing rutile, appears to be confined to narrow discontinuous pegmatite dykes. The metallic oxides have been segregated into patches, up to 5 inches across, irregularly distributed through the dykes. Granular pink or blue apatite was noted in the pegmatite in one place. Test pits and trenches were dug, geophysical surveys were run and some diamond drilling was done on these claims.

About 1953, some work was done on a vermiculite prospect in lots 41 and 42, range III, Beaudet township. The vermiculite, in crystals up to 1 inch long, is found in veins or irregular masses less than 1 foot across in the altered and decomposed surfaces of injected paragneiss and granitic orthogneiss.

Bornite, chalcocite and malachite were observed in a pegmatite dyke at Ste-Anne lake, near the centre of the area.

Deposits of sand and gravel are numerous, and many have been worked for use in road maintenance and the construction of lumber roads.

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