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PRELIMINARY REPORT ON GERIDO LAKE AREA (EAST HALF), NEW QUEBEC

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GEOLOGICAL SURVEYS BRANCH

PRELIMINARY REPORT

ON

GÉRIDO LAKE AREA (EAST HALF)

NEW QUEBEC

BY

PIERRE SAUVÉ



QUÉBEC

1955

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INTRODUCTION

The East Half of Gériido Lake area, mapped during the summer of 1954, is in New Quebec, about 60 miles southwest of Ungava bay and 50 miles west of the village of Fort Chimo. It is bounded by latitudes 58°00' and 58°15' and longitudes 69°30' and 69°45', and comprises 160 square miles.

The area is best reached by seaplane from a base at Stuart lake, about four miles north of the Chimo air-strip. Fort Chimo is accessible by aircraft, or by boat during the summer navigation season, and is the central base for operations in the region.

Geologically, the area lies in the eastern part of the "Labrador trough", and is underlain by an assemblage of folded sedimentary and volcanic rocks intruded by mafic sills, all of Precambrian age.

The highest hills in the area rise slightly more than 1,050 feet above sea-level, and the lowest elevation is near 400 feet.

The region consists of northwest trending, alternating valleys and ridges, whose distribution is closely controlled by the nature and structure of the underlying rocks. High ridges are generally underlain by thick sills or lavas, low ridges by thin sills or occasionally iron formation. Shales and phyllites occur in the valleys and low areas.

GENERAL GEOLOGY

Table of Formations

Pleistocene		Till, sand, gravel.
Great unconformity		
Precambrian	Intrusive rocks	Gabbro, diorite, quartzfeldspar-rich rock, mottled gabbro.
	Volcanic rocks	Pillow lavas, massive lavas.
	Sedimentary rocks	Shale, phyllite, slate, schist, iron formation, ferruginous shale, sandstone, quartzite.

Precambrian

Sedimentary Rocks

The sedimentary rocks are among the oldest rocks in the area. They are predominantly shales and their somewhat metamorphosed equivalents. They crop out abundantly, mainly as northwest trending belts, throughout the map-area, especially in the central part.

The shales are dominantly grey or green, but black varieties occur in places. They are generally very thinly bedded, with laminations of a millimeter or so being common. In many places the shales are metamorphosed to grey or green phyllites, slates, and fine-grained schists. Biotite becomes noticeable in the sedimentary rocks of the eastern part of the map-area.

Iron formation outcrops at many places in the central and northern parts of the area, forming long, narrow belts. It consists of an assemblage of ferruginous sediments which differ considerably in lithology. A very fine-grained, dark-grey or black, strongly magnetic rock is a common member of the iron formation. It may grade into a normal shale which has many visible grains of magnetite. Jasper bands are present in the magnetic shales, but they constitute a very minor part of the whole iron formation. Thin, black or bluish-black bands, very rich in magnetite, are in places associated with the jasper bands, but they are not abundant. An iron carbonate member is generally present; it commonly consists of small carbonate nodules in a siliceous groundmass.

Pyrite-rich shales are associated with the iron formation, but they have not generally been mapped as iron formation. Some shales near the iron formation contain a very small percentage of magnetite.

Although the exposures of iron formation may belong to a single continuous band, it is more likely that they form a number of long, thin lenses lying within a restricted stratigraphic interval.

It is difficult to estimate the true thickness of the iron formation because of intense folding and the gradational character of its contacts with the shales. It seems unlikely, however, that its thickness far exceeds 300 feet and it may be much less.

In places the shales contain interbeds of sandstone or quartzite. The sandstone layers are from a few inches to more than 20 feet thick. In some of the thicker beds the rock is very coarse-grained and even grades into fine conglomerate. A band of coarse sandstone and fine conglomerate outcrops to the northeast of Bowen lake, and another is present in the southwest corner of the area, west of C rido lake.

On the accompanying preliminary map, all the sedimentary rocks, with the exception of the iron formation, are grouped together.

Volcanic Rocks

Volcanic rocks are exposed as two northwest trending belts, one in the southeast part of the area, the other in the southwest. The two belts may well belong to a single band of volcanic rocks which would lie stratigraphically above the sedimentary rocks of the area.

The volcanic rocks are probably basic in composition. Both massive and pillow lavas are found, but they are not separated on the accompanying map because they are irregularly intermixed. Near the southeast corner of the area, however, massive lavas greatly predominate in the lower part of the volcanic band, whereas ellipsoidal lavas become abundant in the upper part.

The grain size of the massive lavas seldom exceeds two millimeters. The fresh surface of the rock is generally greyish-green. Many individual flows are between 20 and 50 feet in thickness, but a few are approximately 300 feet thick. The base or the top of a massive flow may be ellipsoidal. Brecciated and scoriaceous flow tops are fairly common. Columnar jointing is observed in a few places. The massive flows are generally distinguishable from sills by the presence of ellipsoidal lavas and scoriaceous material at their contacts. However, as it is sometimes difficult or impossible to make the distinction, it is possible that some undetected sills are present in the volcanic belts.

The ellipsoidal lavas are almost aphanitic in grain size. Most pillows are between one foot and four feet in length, but some are much longer. The selvage zones of the pillows are generally from one-half to three-quarters of an inch wide. Tabular cavities, many of which have been filled with chert or quartz, are plentiful in the ellipsoidal lavas. They are from two inches to two feet long and average roughly half an inch thick. As they occur either entirely or more abundantly in the upper half of the individual pillows they are reliable indicator of the direction of flow tops. Wherever observed they trend parallel to the strike of the flows and may be used for measuring this direction.

A few of the lavas contain feldspar phenocrysts. Clusters of altered feldspar crystals, identical to the clots in the mottled gabbro, occur in both massive and ellipsoidal lavas. These aggregates do not generally make up more than two or three per cent of the rock. They were found only in the lowermost part of the volcanic band.

Gabbro and Diorite

Sills of gabbro and diorite have intruded the sedimentary rocks. (The term "diorite" is here applied to rocks containing more than 50 per cent feldspar). The gabbro varies much in grain size, from aphanitic at the chilled borders to very coarse - in places up to 10 centimeters - in subordinate pegmatitic facies. Most common grain size is between two and five millimeters. These rocks also vary much in composition and colour; shades of grey or greenish-grey are most common, but some are almost black.

Carbonatization and silicification have been intense in a few of the gabbro sills. Carbonatization seems most common in thin sills near the iron formation, but is also found in sheared gabbro near the axial planes of folds. At the bottom of some of the thick sills, a green serpentinous mineral is present in the rock here and there. At such places the weathered surface of the rock generally has a characteristic reddish-brown or bright-green tint.

Associated with the gabbro, and mapped with it, is a massive rock of very variable composition that is rich in feldspar or quartz or in both. No sharp contact between this rock and typical gabbro was seen, but there is a rapid gradation between the two, with a quartz-rich, commonly altered gabbro serving as a transition facies. This quartz-feldspar-rich rock is found extensively along both shores of Cameron lake, along and close to the west shore of De Romer lake, and along the southwestern edge of the wide belt of gabbro to the southwest of St. Pierre lake. In general, it lies immediately above a thick gabbro sill, but here and there some sedimentary rocks intervene.

In a few places the thick gabbro sills display a very good banding, but this layering is not equally well developed throughout the same sill. Where observed, the layering parallels the attitude of the sill. Also, inclusions, granophyric patches and feldspathic streaks are often well aligned, likewise parallel to the attitude of the sill.

Small apophyses of gabbro have been injected into the sedimentary rocks at the contacts of the sills, but this phenomenon is rarely observed. In a few places the sills cut very slightly across the bedding. The sedimentary rocks are occasionally brecciated and drag-folded at their contacts with the gabbro, apparently as a result of the intrusion.

Most of the sills range in thickness between 40 and 3,000 feet, but some are as thin as 4 feet. The thicker sills were apparently formed by multiple intrusions as indicated by fine-grained zones in the middle of the sills with these zones sometimes separating different types of gabbro. The occurrence of long, thin, apparently discontinuous bands of shale within the sills further supports this hypothesis. Single sills would then be commonly of the order of 300 to 500 feet thick.

The gabbro sills are undoubtedly younger than the sedimentary rocks, but the age relationship between the volcanic and intrusive rocks is more difficult to ascertain. The sills were emplaced prior to the major folding of the sedimentary and volcanic rocks. This is evidenced throughout the area by the very close conformity of the sills to the complex fold structures in the bedded rocks. Furthermore, at the noses of folds the intensity of the folding in the shales adjacent to the sills has been considerably affected by the presence of these more competent bodies. At such places the gabbro itself is often strongly sheared, fractured, and cut by quartz veins, indicating deformation after emplacement. It was noted, also, that the sills generally maintain a constant thickness around the noses of folds.

Mottled Gabbro

A prominent and interesting facies of the gabbro sills is the rock termed "mottled, or blotchy, gabbro". This gabbro is characterized by aggregates of altered feldspar crystals which in places constitute 50 per cent or more of the rock. The clots commonly range from one to three centimeters in diameter, but ones as much as six centimeters wide are not rare.

This type of gabbro seems to be a localized altered facies of one particular sill which, within this area at least, lies along the base of the layer of volcanic rocks. Generally, the lower part of the sill is mainly normal gabbro with only a few feldspar clusters, but progressing upwards in the sill there is a rapid increase in the content of clots.

Pleistocene

A thin mantle of till, left by the Pleistocene ice-sheets and later valley glaciers, partially covers the area. The overburden is very thin or entirely lacking on the ridges, but it largely covers the valley floors.

The shapes of "roches moutonnées" indicate that the ice-sheet moved across the area in a northeasterly direction. Furthermore, glacial deposits nearly everywhere are scarce on the southwest sides of ridges and abundant on northeast facing slopes.

STRUCTURE

Folding

The rocks of the area have been intensely folded along southeasterly trending axes, with resultant repetition of formation. Most of the major folds plunge to the southeast, but locally plunges may be to the northwest. Plunges seldom exceed 30°.

Overturning is not rare, especially in tightly folded sedimentary formations; the overturning is mainly toward the west, but in a few places the beds are slightly overturned to the east. The dips of the overturned beds are generally steeper than 70°, except in the northeastern part of the area where locally they are as low as 50°.

Shearing and Faulting

There are a considerable number of shear zones and faults, especially near the western border of the area. A few of the more prominent of these are shown on the accompanying map. The more important shear zones are roughly parallel to the strike of the formations.

There are also a few cross-faults, but the horizontal displacement along them is very small. Some of them may be detected on aerial photographs by the presence of linears that extend across two or three consecutive ridges.

ECONOMIC GEOLOGY

Iron

Magnetite is fairly abundant in some parts of the iron formation; in a few places it occurs in crystals about one millimeters in diameter. No secondary enrichment in the iron formation was noted.

Magnetite, sometimes in very coarse crystals, occurs also in some of the pegmatitic or coarse-grained facies of the gabbro, but its distribution is erratic. Concentrations of magnetite are, however, found in certain bands of the layered sills.

Copper and Nickel

Very small amounts of pyrrhotite, chalcopyrite, and more rarely pyrite are found disseminated in many of the gabbro sills, but one small sample yielded on analysis 0.88 per cent copper and 0.08 per cent nickel.

Chalcopyrite is also visible in the shales beneath the lavas and blotchy gabbro in the eastern part of the area. Unfortunately, outcrops of this shale band are too scarce to give any idea of the extent and possible value of the mineralization.
