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PRELIMINARY REPORT ON GERIDO LAKE AREA, NEW QUEBEC

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PRELIMINARY REPORT
ON
GÉRIDO LAKE AREA
NEW QUEBEC

BY

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Robert Bergeron

I N T R O D U C T I O N

Gérido Lake area, the geological survey of which was made by the writer in 1953, is situated in New Quebec, southwest of Ungava bay, about 60 miles from Fort Chimo, and a little more than 800 miles north of Quebec city. Comprising 160 square miles, it is bounded by latitudes $58^{\circ}00'$ and $58^{\circ}15'$ and by longitudes $69^{\circ}45'$ and $70^{\circ}00'$.

Geologically, the area lies in the eastern half of the Labrador trough, where sedimentary and volcanic formations have been invaded by concordant bodies of basic intrusive rocks.

The lakes of the area are numerous, and almost all afford excellent landing places for hydroplanes. Gérido lake, to which the area owes its name, crosses, from north to south, the whole area mapped during the summer of 1953, and its entire surface is suitable for landing.

It is of great advantage to use Fort Chimo as a central base of operations. An air base, built during the war of 1939-45, though now unused, is situated on the west bank of Koksoak river, about eight miles upstream from the village of Fort Chimo. One of the runways is still usable. There is a hydroplane base on Stewart lake, four miles north of the air base, and a road connects one place with the other.

T O P O G R A P H Y

The region is broken, with a maximum relief of nearly 1,000 feet. The topographic features closely reflect the geologic pattern. Sills of gabbro form long ridges alternating with steep valleys that are underlain by sedimentary rocks. These gabbro ridges are always very steep on one side, in places almost vertical.

The volcanic rocks give rise to a less rough topography, and form slightly dissected plateaus, which are the highest parts of the area. These plateaus are cut by narrow valleys underlain by sedimentary beds which, as a result of folding, lie between the volcanic formations.

GENERAL GEOLOGY

The consolidated rocks of the area, which outcrop over more than 60 per cent of the surface not covered by lakes, are probably of late Precambrian age. They comprise a series of sedimentary and volcanic formations intruded by sills of gabbro.

Table of Formations

Pleistocene	Moraines, erratics	
Great unconformity		
Late Precambrian	Intrusive rocks	Mottled gabbro Gabbro
	Intrusive contact	
	Volcanic rocks	Pillow lavas Breccias Massive lavas
	Sedimentary rocks	Schist, slate, shale, sandstone, quartzite, ferruginous schist, chert, dolomite

Late Precambrian

Sedimentary and Volcanic Rocks

Though both sedimentary and volcanic rocks constitute this group, the latter are the most abundant in the area under study. They occupy the southeast and southwest parts; to the east of Gériido lake, a

band crosses, from the northwest to the southeast, the ground east of Gérido lake, whereas another occupies a basin in the central part of the area, west of Gérido lake. This basin has steep sides marked by several gossans, and forms a prominent topographic feature. The sedimentary rocks crop out at the base of most of the gabbro cliffs. These sedimentary rock outcrops rarely exceed 10 to 20 feet in thickness. Only in a few places was the writer able to find sedimentary layers lying on the gabbro.

Volcanic Rocks

On the preliminary map which accompanies this report, the pillow and the massive lavas have been indicated separately. The ellipsoidal lavas are of intermediate composition and are green, dark green or dark grey in colour. They are very fine grained, and it is impossible to identify their minerals, with the exception of the chlorites and the feldspars.

Generally, the pillows are not deformed. They are slender and elongated, with thin, glassy edges. The spaces between the pillows are filled with white or pale grey chert. Some of these lavas are porphyritic. They show aggregates of feldspar crystals altered to creamy white. No amygdaloidal lava was observed.

Breccias are common between bands of pillow lavas. They consist of angular fragments up to six inches in length and are like the pillow lavas in composition. The matrix usually has the same composition as the fragments, but it is silicified in several places. Some of the fragments are thin-bedded tuff.

The massive lavas are also of intermediate composition. Their grain is fine to medium. Crystals of altered feldspars, augite, amphibole and chlorite can be recognized in these rocks, which are generally grey in colour. Incompletely formed pillows are found in some places. The massive lavas are almost always cut by joints running in different directions, but following a regular pattern. Commonly, the rock is cut into triangular columns, but in several places five- and six-sided columns were observed. These rocks weather to reddish tints. Some rocks of similar appearance, but of much coarser grain, were also mapped with the massive lavas. It is possible that certain of these rocks are sills, but no intrusive contacts were found, and they are considered, for the most part, to be massive flows. Similar bands were found in the middle of the pillow lavas and it was thus possible to observe the gradation from a massive rock of coarse grain to a pillow lava. In other places, however, the coarse-grained rocks have a narrow chilled edge where they are in contact with the pillow lavas.

South of Faucon lake, there is a narrow volcanic band completely isolated from the principal zones of volcanic rocks. This band consists of a finely banded tuff and a reddish agglomerate.

Sedimentary Rocks

Chlorite schists, black schists and slates, and dark grey shales are the most widespread and abundant sedimentary rocks. They all

contain, however, some interbedded sandstone and quartzite. At the contacts between the gabbros and the sedimentary beds, from one to ten feet of thin-bedded quartzite is usually present. In the places where the quartzite is absent, the schists at the contacts are strongly silicified and, in some places, sericitized. Where quartzites and sandstones are interbedded with the schists, the strike of the schistosity is usually parallel to the bedding, but the dips are different.

Some ferruginous schists accompanied by dolomites are found on the east side of the point between G rigo lake and Sandy bay. These rocks contain some lenses of ankerite.

One bed of conglomerate was found to the east of the northern half of Alain lake. It consists of rounded fragments of dolomite included in massive beds of chert, three to four feet thick. Cross-bedded sandstones overlie this conglomerate.

Triangular symbols, in the northwest quarter of the accompanying preliminary map, indicate places where piles of angular blocks of schists have been lifted up by the frost. These blocks reveal the nature and probably the attitude of the underlying rock.

Gabbro

All intrusive rocks of the area occur in the form of sills, which are injected by preference between and parallel to the sedimentary beds. This parallelism remains true even in the places where the thickness of the sedimentary bands is variable. It is probable, however, that down their dip the sills cut the sedimentary beds. Ordinarily, these rocks are massive, but they exhibit a slight schistosity in some places.

Most of these intrusions are of basic composition. They are mainly composed of amphiboles and feldspars altered to clinozoisite. Disseminated pyrite and pyrrhotite are visible in almost all the gabbro. In places, disseminated chalcopryite is also present. Certain sills contain from 5 to 10 per cent blue or violet quartz.

Near the contacts with the sedimentary rocks, the gabbros are very fine grained and black. As the distance increases from these contacts, the grains become coarser and the rock takes on a dark grey or dark green colour. One characteristic of these rocks, however, is the great variability in the grain sizes.

In the central portion of the sills, the rock is rather dioritic in character. It contains about 60 per cent white or pale grey plagioclase. Hornblende is the principal ferromagnesian mineral, and there is only a little quartz.

The thickness of the sills varies between 100 and 450 feet. However, some of the thickest sills may be multiple intrusions.

Mottled Gabbro

This gabbro is the most striking rock of the area. Almost everywhere it occupies a well defined stratigraphic position; it was in-

truded at the lower contact of the lava flows. It is a black, massive rock, has a very coarse grain (many crystals are more than an inch long), and is mottled all over with irregular patches which are aggregates of altered feldspar crystals. These feldspars are almost completely altered to clinzoisite in which there no longer remains any trace of cleavage. The minerals that can be recognized in the matrix are feldspars, biotite, and hornblende. In several places, this same rock is not mottled, in which cases it contains 60 to 70 per cent dark blue or violet labradorite.

This mottled gabbro has an economic importance, as it is the only gabbro in which replacement by massive pyrrhotite and pyrite has been found. The origin of this alteration is still doubtful. It is possible that the alteration is hydrothermal.

Pleistocene

Throughout the area there is evident proof of the passage of a continental glacier and of later valley glaciers. Light moraine deposits cover a large part of the territory, principally the highest ground.

The presence of a large number of erratic blocks of chert, dolomite and iron formation which crop out some miles west of the area shows that the continental glacier crossed the territory in a northeasterly direction.

The valley glaciers moved north, leaving numerous striae and grooves on the sides of the valleys. Terminal moraines are found on the bottoms of the larger valleys, forming low east-west ridges composed of sand and clay.

S T R U C T U R E

Folding

The north-northwest strike of the formations is remarkably uniform throughout the area. The intrusive masses invaded the sedimentary and volcanic beds before the latter were deformed. All the rocks were folded in a series of elongated synclines and anticlines whose axes strike north-northwest. The plunge along the axes of these structures varies between 10 and 45 degrees.

The dips are predominantly east. It is evident that in some places the beds have been overturned, as is shown by the attitude of some of the lava pillows.

Zones of Shearing and Faulting

Readjustments which followed folding of the sedimentary rocks and the sills are confined mainly to the sedimentary bands between the sills of gabbro. The zones of shearing are usually faults, and the two are indicated by the same symbol on the map accompanying this report.

Only two major faults were observed in the area. The first passes a short distance to the west of Black lake and continues toward the north and south beyond the north and east boundaries of the map-area. Shearing is very intense throughout the length of this fault and, at the north end of Black lake, the west limb of the syncline formed by the volcanic rocks disappears. The second fault occurs east of Gérido lake, where a repetition of formations is seen.

In the gabbro masses there are many joints, the best defined of which is the group oriented parallel to the axes of folding. Numerous zones of minor shearing are parallel to this group. At the top of the sills there are many quartz veins, most of which are oriented parallel to the strike of the sills. This shearing in the gabbro is often sufficiently intense to produce highly chloritic rocks.

ECONOMIC GEOLOGY

Following the work of prospecting parties, several claims were staked in the area during the summer of 1953. The presence of mineralized zones in the eastern part of the Labrador trough, south of Ungava bay, has been known for several years but the zones investigated during the summer of 1953 are more interesting than all those previously found.

The sheared zones in the sedimentary rocks are usually mineralized. In many places they contain lenses several hundred feet long and from 10 to 40 feet wide of massive sulphides in which may be identified pyrite, pyrrhotite and chalcopyrite. Samples taken at random in the richest portions of these lenses assayed 7 to 8 per cent copper, as well as small amounts of nickel, zinc and lead, and gave gold assays of 0.03 to 0.06 ounce per ton.

The gabbro and volcanic rocks very often contain disseminated pyrite, pyrrhotite, and chalcopyrite. These zones of mineralization are especially numerous near the contacts with the sedimentary rocks. The assay of a sample of gabbro of this type gave the following results: 2.04 per cent copper, 0.11 per cent zinc, 0.06 per cent nickel, 0.004 ounce of gold per ton, and 0.102 ounce of silver per ton. Another sample gave these results: 0.75 per cent copper, and 0.063 ounce of gold per ton. It is not known in what form the gold is present, or what its origin might be. Small veinlets of chalcopyrite were also found in the gabbro near the sheared zones. The lavas at the contacts with gabbros or sedimentary rocks contain considerable disseminated pyrrhotite.

The mottled gabbros offer an interesting type of alteration. Their feldspars are commonly replaced by sulphides, of which pyrrhotite is the most abundant. In places, more than 30 per cent of the gabbro is replaced by sulphides. Although several samples have yielded 6 to 7 per cent copper, the mineralization is very erratic. Analyses have revealed the presence of a small content of nickel in these rocks.

Generally the quartz veins that cut the gabbro, and those found at the contacts between the different formations, are barren. In

some places traces of chalcopyrite were found in them. One vein contains crystals of galena.

Up to the present, little work has been done in this area, but the mineral indications are so numerous that undoubtedly a vigorous exploration would be amply justified.

