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

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PRELIMINARY REPORT

ON

LEOPARD LAKE AREA ( EAST HALF )

NEW QUEBEC

BY

PIERRE SAUVÉ



QUEBEC  
1956

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INTRODUCTION

The East Half of Leopard Lake area, mapped during the summer of 1955, is in New Quebec, about 70 miles southwest of Ungava bay and 55 miles southwest of the village of Fort Chimo. It comprises 160 square miles bounded by longitudes 69°30' and 69°45' and by latitudes 57°45' and 58°00'.

Fort Chimo, located on Koksoak river about 30 miles upstream from Ungava bay, is accessible by aircraft, or by boat during the short navigation season. The map-area is easily reached by seaplane from a base at Stewart lake, about 50 miles east-northeast of the centre of the area and 3 miles north of the Chimo airport. A road links Stewart lake and the airstrip. The southern part of the area may also be reached by canoe from Koksoak river which flows by within 3 miles of its southeast corner. However, this route involves long portages and is not very practical.

The map-area lies immediately south of the Gerido Lake area (East Half) which was mapped by the writer in the summer of 1954, (1).

Topographically, the northern part of the area is characterized by northwest-trending valleys and ridges, but going southward there is a gradual change into much more rolling country. The highest hills are in the eastern part of the area and rise slightly more than 1,100 feet above sea-level.

Geologically, the area is in the middle part of the "Labrador geosyncline" and is underlain by Precambrian sedimentary and basic volcanic rocks injected by gabbro sills. This assemblage has been folded and mildly metamorphosed.

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(1) Sauvé, Pierre, Preliminary Report on Gerido Lake Area (East Half),  
New Quebec, Que. Dept. Mines, P.R. No. 309, (1955).

GENERAL GEOLOGY

Table of Formations

Recent and Pleistocene		Till, sand gravel
Great unconformity		
Precambrian	Intrusive rocks	Metagabbro, associated quartz-feldspar-rich metagabbro, granophyre  Mottled (blotchy) gabbro ("leopard rock")
	Volcanic rocks	Massive and ellipsoidal lavas
	Sedimentary rocks	Argillites, shales, slates, phyllites, sandstones, conglomerates, iron formation, dolomite.

Sedimentary Rocks

The sedimentary rocks are distributed throughout the area, mainly as northwest-trending bands of various widths. They are predominantly argillites, shales, slates, phyllites and sandstones, with subordinate amounts of conglomerates, dolomite, ferruginous shales and iron formation.

The argillaceous rocks are generally greenish grey to bluish grey to black, laminated rocks. They are composed mainly of muscovite, chlorite, quartz, and albite. The laminae, where not obscured by cleavage, vary in thickness from less than a millimeter to about two inches, but the finer laminae are more abundant. In places these rocks occur alone, but elsewhere they are interbedded with sandstone layers.

The sandstones are generally well bedded, very light grey to dark grey rocks. Their grain size varies from very fine to very coarse, but fine- and medium-grained sandstones are the most abundant. Graded bedding is occasionally found; cross-bedding is rare in most varieties and is developed only on a very small scale. Sandstones are abundant in the southwestern corner of the map-area where they form the bulk of the rock. Here, the sandstones are very fine-grained, impure, dark greenish grey to dark grey, and

commonly contain concretions. They generally occur in layers seldom more than 4 feet thick, fairly regularly interbedded with fine bands of argillites. This lithology is in marked contrast with that of most other sandstones of the area which are commonly light to medium grey, much more quartzose, and not regularly interbedded with argillites. Quartzose sandstones are abundant in the northern part of the area, half a mile west of Cameron lake.

A small outcrop of dolomite is present in a valley, half a mile west of Rasle lake. It is massive to well bedded and has a light brownish weathered surface. A few loose blocks of dolomite are also found for some distance along the strike which is northwesterly.

Ferruginous shales and bands of iron formation are found near the northeastern corner of the map-area, along the west shore of Rasle lake, and in the broad valley in the southwestern part of the area. In both composition and appearance they are quite variable. Nodular cherty carbonate rock, bands of fairly pure iron-carbonate, and magnetite-bearing shales are some of the most characteristic members.

In a few places, some peculiar structures are present near the upper contact of certain thick sills. A pseudo-conglomerate on the east shore of Cameron lake contains many fine-grained, quartzo-feldspathic masses rather widely scattered through a dark, fine-grained groundmass. Most of the masses are from 8 inches to 2 feet long and very well rounded, although a few are quite angular. Occasionally, a thin felsic stringer may join or cut through 2 or 3 of the masses. West of the south end of Cameron lake are found what appear to be twisted and curled fragments of quartzite in a contorted, apparently sedimentary groundmass. This occurrence is just above the ill-defined upper contact of a gabbro sill.

### Volcanic Rocks

Volcanic rocks are exposed mainly as two northwest-trending belts, ranging in width from half a mile to a mile and a half, that cross the eastern boundary of the map-area near latitude 57°50' and leave the area at its northwest corner. In addition, there is a very small tongue of lavas at the eastern border of the area near latitude 57°55'.

The two belts of volcanic rocks probably belong to a single band. These lavas are younger than the sedimentary rocks found in their vicinity, but their age relationship to the clastic rocks of the southwestern part of the map-area is uncertain. The relationship of the rocks of the small tongue of lavas to those of the main belts is unknown.

The volcanic rocks include both pillow lavas and massive flows. Most of the flows are between 10 and 150 feet thick. The grain size of the massive flows seldom exceeds 2 millimeters, although coarser-grained rock occurs in some thick flows. Some lavas have a glomerophyritic or mottled texture similar to that of the blotchy gabbro. The fresh surface of the lavas is from medium to dark greenish grey; the weathered surface is commonly light greenish grey or dark grey. Metamorphism has changed the original minerals into albite, clinozoisite and epidote, chlorite, actinolite, and

minor amounts of quartz, sphene, and calcite.

Most pillows are between 2 and 5 feet long. Scoriaceous material is found where three or more pillows meet but it forms only a small proportion of the rock. In a few places the coalescing of two or more different pillows was noted. Tabular cavities, from half an inch to two inches wide, are common in some flows of ellipsoidal lavas; as they are generally more abundant in the upper half of the individual pillows, they can be used as a "top and bottom" criterion. Varioles are abundant near the periphery of the pillows; individual varioles may be difficult to see because of their small size but a dark band with abundant coalescing varioles is easily seen just inside the chilled marginal zone.

Where outcrops are not too abundant, it may be impossible to distinguish, at the scale of the present mapping, between thick, massive flows and gabbro sills. For this reason, some sills may be present among the volcanic rocks although none was definitely recognized.

#### Intrusive Rocks

Sills of altered gabbro occur throughout most of the area except the southwestern part. They range in thickness from a few feet to possibly more than 3,000 feet, but very few are much thicker than 1,000 feet. The contacts of most of the sills are straight and well defined, although the upper contacts of some thick sills are very irregular and difficult to locate exactly.

The metagabbros generally vary in colour from grey, to bluish grey, to dark greenish grey. The grain size commonly ranges between two and four millimeters although it may be much coarser in the upper part of some thick sills. Irregular patches of very coarse-grained or "pegmatitic" gabbro occur in some sills and are especially abundant in the middle and upper parts of thick sheets.

The metagabbros consist mainly of albite, clinozoisite and epidote, actinolite, chlorite, quartz and sphene. In at least one sill the central part has not been totally altered during metamorphism and some pyroxene and calcic plagioclase remain. This sill is immediately beneath volcanic rocks on the west limb of the plunging syncline southeast of Cameron lake.

In the upper part of thick sills the rock may be rich in quartz and feldspar and may even grade into a granophyre. A quartz-feldspar-rich porphyritic facies is exposed on the shores of Cameron lake and on the east shore of Tremblay lake. Granophyre is especially well developed on the west shore of the long peninsula that juts into Cameron lake, about a mile and a half from the northern limit of the area.

Rarely, inclusions of sedimentary rocks are found near the borders of a gabbro sill. The gabbro in contact with these inclusions is aphanitic. A sill that outcrops about two miles southwest of Leopard lake contains abundant inclusions of a well laminated, partly folded rock made up of actinolite, altered plagioclase and quartz; they possibly represent

sedimentary inclusions that were intensely metamorphosed by the magma. Here the gabbro is not chilled at its contacts with the inclusions; instead, it is coarse-grained or "pegmatitic" in many places.

### Mottled Gabbro

The mottled or blotchy gabbro, also called "leopard rock" (1), is characterized by abundant, white, greenish white, or purplish patches. These spots represent former clots or aggregates of calcic plagioclase crystals that have been altered, during regional metamorphism, into clinozoisite and albite. The patches are set in a matrix of actinolite and chlorite, with minor clinozoisite and albite. The size of these aggregates is generally between  $\frac{1}{2}$  and  $1\frac{1}{2}$  inches; 3- or 4-inch aggregates are not rare, however, and a few were seen that exceed 8 inches in size.

This distinctive mottled gabbro is limited to certain sills. It may make up a small to a large part of a sheet but does not constitute a whole sill; in general, the base and the top of a sill are not mottled except for very scarce small patches, but there are exceptions to this. The mottled gabbro grades, by a gradual decrease in abundance of the glomeroporphyritic clots, into typical gabbro. The mottled facies may also be erratically distributed along the strike of a sill, especially where it is not abundant.

### Pleistocene and Recent

Much of the area is covered by till left by Pleistocene ice-sheets. The glaciers travelled in a north-northeast direction as attested by the following features: roches moutonnées; small boulder trains on the northeast of the parent outcrops; little or no till deposit on the southwest slopes of ridges but thick deposits on the northeast slopes; drumlin-like deposits. The drumlin-like deposits are formed of glacial debris and are greatly elongated in the direction of the ice-movement; however, they differ from typical drumlins by having a rocky ridge at their stoss (southwest) end.

There are a few, very short eskers running northeasterly, transverse to the trend of the rock formations. Commonly the eskers are well developed in valleys and on the slopes of ridges, but are absent along the crests of ridges. Some eskers, for short distances at least, take the form of twin, parallel ridges of unequal and variable height.

Silt has accumulated in some of the valleys. In the large valley in the southwestern part of the area these deposits are abundant and are well exposed in 20- or 30-foot banks along small streams. In some places a faint stratification is visible.

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(1) "Leopard rock" is a name given by prospectors in the field to mottled or blotchy gabbro, as well as to lavas that are similarly marked.

## STRUCTURE

### Folding

All the rocks of the area have been folded along northwest-trending axes. The folds are generally upright or their axial planes dip slightly to the west.

The general structure, from northeast to southwest, is the following. An anticlinorium is present east of Cameron lake and a syncline lies under the lake. The structure in the valley in which Gerido and Erickson lakes lie is anticlinal, but it may be complicated by a fault. The volcanic rocks southwest of this valley are in a complex syncline or synclinorium. West of Leopard lake, many sills dip at medium angles to the east and their tops also face east. The structure of the rocks underlying the large valley in the southwestern part of the map-area is unknown because of the scarcity of exposures.

### Shearing and Faulting

Transverse faults are abundant in the area but the displacement along them is generally small. A few longitudinal faults were found but because they are difficult to detect many more may be present. An important longitudinal fault is believed to lie along the chain of long narrow lakes a mile northeast of the Gerido lake-Erickson lake valley. This is evidenced by shear zones found along the strike in the region north of the map-area, as well as by the presence of lavas on the west side only of the Cameron lake syncline. Many longitudinal shear zones are also found in the lavas in the complex syncline southwest of the Gerido-Erickson valley. These shear zones generally dip steeply to the east.

## ECONOMIC GEOLOGY

Sulphide mineralized zones of interest were observed in a few places, particularly east and west of Gerido lake, north of the southern end of Anna lake, and south of Erickson lake. The strongest mineralization seen is associated with sills containing blotchy gabbro but is not necessarily in the blotchy part of the sills. The mineralization consists mainly of disseminated chalcopyrite and pyrrhotite. Some selected grab samples, assayed in the laboratories of the Quebec Department of Mines, yielded more than  $3\frac{1}{2}\%$  copper. Nickel is generally present in rather small amount; some samples contain more than  $\frac{1}{2}\%$  nickel. Very small amounts of zinc and silver are present in all mineralized samples sent to the laboratories for assay, and gold in a few of them.

In one place, along the northeastern shore of Cobalt lake, erythrite or cobalt bloom (identified by the laboratories of the Quebec Department of Mines) was found in small amount along fractures in gabbro.

A number of magnetic anomalies are present here and there throughout the map-area. Those in the largely drift-covered valley of the southwestern part of the area are probably due to underlying iron formation.