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PRELIMINARY REPORT ON FINGER LAKE AREA, NEW QUEBEC

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GEOLOGICAL SURVEYS BRANCH

PRELIMINARY REPORT

ON

FINGER LAKE AREA

NEW QUEBEC

BY

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INTRODUCTION

Finger lake area, mapped during the summer of 1957, is located approximately 70 miles northwest of Fort Chimo village, New Quebec, and 65 miles from the hydroplane base at Stewart lake. The area includes approximately 156 square miles bounded by longitudes 70°00' and 70°15', and latitudes 58°15' and 58°30'. It lies west of the Harveng Lake area (Bergeron, 1956), and north of the Bones Lake area (Bérard, 1957).

During the late spring and the summer the area can be reached easily through Leaf bay. Large hydroplanes can land practically anywhere on Finger lake, the three bays of which permit access to most of the area.

The Finger Lake area straddles the geological contact between the Archean granitic gneiss and an assemblage of Proterozoic sedimentary and volcanic rocks containing gabbro sills. The Proterozoic rocks rest unconformably on the granitic gneisses.

The area is rather hilly, especially near the eastern and western borders. To the east, the gabbroic sills form steep, north-trending ridges; to the west, the granitic rocks form numerous escarpments. In general, the central portion of the area is relatively flat, although there are a few topographic forms of tectonic origin. The drainage is northward from Finger lake into Leaf bay.

GENERAL GEOLOGY

Relationship between the Archean and Proterozoic Rocks

The sedimentary Proterozoic rocks rest unconformably upon the Archean granite gneiss. The regolith, or weathered zone above the gneisses, is exposed at a few places; it is partly cemented by chert. At other places, the regolith is missing and plano-convex chert lenses fill broad depressions above the gneisses. The chert is characterized by thin laminae or by minute cross-beds.

In some places, the Proterozoic sedimentary rocks have been thrust over the granite, as, for example, north of Finger lake.

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x Translated from French.

Table of Formations

RECENT and PLEISTOCENE	Moraine, esker, lacustrine terrace, marine terrace, and alluvial deposits	
PROTEROZOIC	Intrusive Rocks	Mottled gabbro Massive gabbro
	Volcanic Rocks	Massive lavas Pillow lavas
	Sedimentary Rocks	Phyllites Shales, slates Dolomite, argillite Conglomerate, sandstone Arkose, greywacke Iron formation Quartzite
ARCHEAN	Metadiabase dykes	
	Amphibolite, biotite schist, biotite-hornblende schist, granodiorite, granite, granite gneiss, etc.	

Archean

The rocks of the Archean basement are a complex of gneisses, schists, granites, migmatites and metadiabases which, in view of their restricted distribution in the area, have not been subdivided.

In general terms, the oldest rocks are biotite gneisses and highly contorted biotite-hornblende gneisses. These have been intruded by locally porphyritic granodiorites. In places, the granodiorite forms the matrix of intrusive breccias in which the fragments and blocks are amphibolite. Metadiabase (hornblendite) dykes, although few in number, cut all the other rock types.

The Archean rocks are of particular interest here in view of the fact that they have been the source of chemical and detrital sediments deposited in the Labrador geosyncline.

Proterozoic

Sedimentary Rocks

The stratigraphic succession observed in the Finger Lake area is as follows: quartzite at the base, followed by iron formation, clastic sedimentary rocks, dolomite, argillite, and a thick sequence of lavas.

The basal quartzite is generally grey to black, but in places it is olive green, as in the centre of the map-area. The quartzite may be 40 feet thick, locally.

Above the quartzites, there are iron formations of variable lithology and thickness. The principal members of the iron formation, in the western part of the area, are: siderite-magnetite, siderite-hematite, manganiferous siderite, cherty carbonates, granular silica, and magnetiferous shale. The iron formation is at least 110 feet thick.

The iron formation is overlain by a sequence, 115 feet thick, of argillaceous chert and argillite. In places in the western part of the area, this sequence forms well-developed escarpments. Overlying this is a thick sequence of clastic sedimentary rocks of fairly uniform composition, but with variable texture. In general, these rocks have the composition of subgreywackes, but in some cases they grade laterally into arkoses, greywackes, and shales. A particularly striking facies change occurs in the central part of the map-area, where sandstones grade into shales.

Conglomerates occur in the northwest corner of the area, near the contact between the Archean and the Proterozoic rocks, and also to the southwest. The pebbles are predominantly of chert, varying from a few millimeters in size up to more than 25 centimeters. The matrix of these conglomerates is composed of quartz, grey microcline, and argillaceous material; it is much the same as the greywackes.

The clastic sedimentary rocks are overlain by a thick dolomite known as the "Abner dolomite". This rock is generally massive, and its colour varies from pale to dark grey, to white, salmon, buff, and green. It is cut, with no preferred orientation, by abundant quartz and chert veinlets. Stromatolite colonies were observed in the dolomite west of Laura lake. They vary in size from 1 inch to more than 15 inches.

Grey to black slates overlie the dolomite. These slates have apparently absorbed most of the regional stress, as is suggested by their relatively great deformation.

In places, lenses of dolomite appear in these slates.

Volcanic Rocks

Volcanic rocks are exposed in the eastern part of the area, where they appear in an immense arc open toward the east. The intercalation of various types of lavas with fine-grained sedimentary rocks and gabbro sills results in clearly-

defined topographic undulations. Lavas, probably of basic composition, are exposed east of Bones valley. More than 50 per cent of them are pillowed, the remainder being massive and, more rarely, porphyritic.

The pillow lavas are aphanitic and dark green. The pillows range from 6 inches to 6 feet or more in length, but are generally between 1 foot and 3 feet long. Their chilled borders, composed mainly of chlorite, zeolites, and quartz, form layers 1 centimeter to 2 centimeters thick.

The massive lavas of this group are generally greenish-grey to dark green. The grain size rarely exceeds one millimeter, although the central portions of some thick, massive flows are coarsely crystalline. It is difficult to distinguish such rocks from gabbros. Columnar joints occur in the massive lavas. Some marrow bands of porphyritic lava contain elliptical phenocrysts of milky-white feldspars.

Gabbro

Numerous gabbro sills also follow the arc formed chiefly by the lavas. Some of these were injected among lava flows, whereas others are among the sedimentary rocks farther east. The composition of various horizons in the gabbro sills is quite variable and is largely dependent on the thickness of the sills. The thick ones show a concentration of blue quartz in upper portions of ferromagnesian minerals near the base and of calcic plagioclase toward the middle. This results in variations in colour throughout the sill. In general, the sills are separated by slaty sedimentary rocks. These rocks occupy the floors of valleys and are exposed only in the few localities where they are protected by gabbro walls.

The gabbros are very fine-grained near contacts with the sedimentary rocks and grade into well-crystallized gabbros away from the contacts. The tops of the sills are characterized by pegmatitic lenses rich in blue quartz.

Mottled gabbro, probably a facies of the ordinary gabbro, occurs in a few places and usually in the middle of sills. It consists of approximately 35 per cent altered, white feldspar, forming spots. The length of these ellipsoidal spots varies from 1 centimeter to 10 centimeters. The long direction of the plenocrysts is parallel to the strike of the sills.

STRUCTURE

Faults and Shear Zones

A large number of faults were observed, and a study of the aerial photographs suggests that several others are present. The most important fault lies north of Finger lake. There a fault separates the Proterozoic rocks from the Archean complex. A prominent escarpment lies along this fault.

West of Chioack lake, there are two faults cutting the iron formation and the overlying detrital sedimentary rocks. Vertical displacements of many feet can be seen in the field.

North of Laura lake, the iron formation, quartzites, and slates are cut be numerous faults.

Shear zones occur in the lavas and gabbros parallel to the strike of the flows and the regional structural trend. These zones are commonly mineralized with sulphides, and they contain, here and there, tectonic breccias with fragments of slates. These features, along with the disappearance of certain formations, suggest imbricated thrust faults along which the gabbros and lavas have overridden the sedimentary rocks to the west.

Joints

Various joint systems have been recorded in different formations, and one is especially remarkable due to its regularity. It forms a trellis pattern in the detrital sedimentary rocks west of Laura lake. In many places these joints produce vertical walls with very smooth surfaces, even in coarse conglomerates.

Columnar joints are common in thick lava flows.

Folds

The sedimentary rocks near their basal contact are virtually horizontal, and the dips increase gradually eastward.

Rocks such as slates and dolomite are tightly folded locally, but generally these folds have large radii of curvature.

ECONOMIC GEOLOGY

Base and Precious Metals

A few quartz and calcite veins containing sulphides were found in the slates in the northeastern part of the area. Many samples of the vein material submitted to the Quebec Department of Mines laboratories gave the following average contents:

Lead	5.92 per cent
Zinc	2.04 per cent
Silver	$ 1.19 per ton
Gold	$ 0.28 per ton
Copper	0.03 per cent

(Gold and silver were computed at $35.00 an ounce and $0.90 an ounce, respectively). The veins are lenticular and parallel, and their thicknesses vary from 1 inch to a maximum of 10 inches. Disseminated galena was also encountered in many quartz veins farther south. The veins, in general, appear to be barren from the surface inward from 6 to 10 inches.

Careful prospecting of these slates might lead to interesting discoveries.

Many other mineralized zones were noted in the gabbros and in the sedimentary rocks nearby. These zones are rich in pyrite and pyrrhotite, and also contain small amounts of chalcopyrite. Some of the zones outcrop for considerable distances; their widths vary from 2 to 3 feet.

Massive pyrite veins occur in sheared, silicified zones in the dolomite west of Ali lake.

Iron

As shown on the accompanying map, iron formations appear in many places. The largest outcrops are found near the western border of the area. They consist mainly of cherty-hematite, siderite, and magnetite

Between West Arm Finger lake and Middle Arm Finger lake, gently-dipping iron formations outcrop in a very flat terrain. These iron formations, as well as those seen near the contact with the basement complex, contain between 30 to 40 per cent iron in the form of hematite-magnetite-siderite.

Northwest of Laura lake a few iron formations outcrop in a zone of highly complex structure. The majority of these rocks possibly have been dynamically metamorphosed, as suggested by the presence of a few iron silicate minerals.

All these formations have been studied in detail by Consolidated Fenimore Iron Mines, Limited.

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