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SAKAMI LAKE (SOUTH AREA)

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Geology of the SAKAMI LAKE AREA New Quebec Territory

Preliminary Report

by

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INTRODUCTION

The Sakami Lake area occupies about 360 square miles bounded by latitudes 53°10' and 53°25' and longitudes 76°30' and 77°00'. The area lies just south of the junction of Sakami and La Grande (Fort George) rivers, about 90 miles east of James bay and approximately 255 miles northwest of Chibougamau. It was mapped during the summer of 1965 for the Geological Exploration Service.

The easiest access to the area is by float-plane from Chibougamau, Matagami, or Fort George. From Sakami lake most parts of the area can be reached by motor-canoe.

The map-area is characterized by rolling topography with intermittent swamp areas, and occasional cliff-forming hills. Relief averages no more than 150 feet, with the most prominent elevations in the eastern part.

The area is moderately forested with coniferous trees, mainly spruce with some pine, and minor balsam, tamarack, and birch. Recent fires have destroyed the forest over several square miles, especially in the southwest.

Game is scarce in the area, although bear, rabbit, beaver and partridge were noted. Ducks and geese were seen on many of the lakes and rivers. Fish are present in the lakes and net-fishing on Sakami lake has been sponsored by the Federal Department of Indian Affairs.

The area is drained by Sakami and La Grande rivers; the latter empties into James bay at Fort George, about 100 miles to the west-northwest.

GENERAL GEOLOGY

Pleistocene glaciation has influenced the development of the present topography. Numerous low, rolling hills consist of nonsorted, unconsolidated debris. Some of these hills are irregular in outline; others have a marked, elongate, northwest trend. Many of the lakes are bound, in part, by low ridges of unconsolidated debris. In some parts the topography is bedrock controlled, with resistant rock forming low hills and conspicuous ridges.

Glacial striae are common over the bedrock areas; they show a general northeast-southwest trend.

The exposed bedrock throughout the area is Precambrian in age. Granitic rocks, metasediments, metavolcanics, biotite-feldspar gneiss, dioritic rocks, metamorphosed ultrabasic rocks, quartzites, and banded quartz iron-formation are the most common types. These rocks have variations, and show different degrees of folding and shearing.

Coarse-grained granite rocks, some of which are interlayered with fine-grained biotite-feldspar gneiss, underlie that part of the map-area east of Sakami lake.

The central part of the area is occupied by a complexly interlayered sequence of metagraywacke and metavolcanics, with minor outcrops and lenses of dioritic and metamorphosed ultrabasic rocks; the latter is a massive, green, actinolite-rich rock with pronounced diablastic texture. The metavolcanics consist of basalt, dacite and rhyolite. Basalt is common throughout the zone. Dacites and rhyolites are found in the central part of the zone; they can be easily mistaken for siltstones in hand-specimen. Metagraywacke is most common along the east side of the central region. This interlayered sequence forms a pronounced northeast-trending feature in the map-area.

Metabasalt and diablastic actinolite rock are the most common rocks in the southwest part of the map-area; here they show conspicuous intrusive relations with quartzite and banded quartz iron-formation. The quartzite is highly schistose and shows varying degrees of sericite development. Intricate open and close folding characterizes the banded quartz iron-formation. Thin lenses of bluish-gray magnetite occur sporadically throughout the formation.

Dioritic rocks, ranging from quartz diorite to diorite and amphibolite gneiss, predominate in the northwest part of the map-area. Aplitic dikes, monzonite porphyry, and diabase dikes form minor exposures in this part. Foliation within the dioritic rocks has no characteristic trend, and folding, where present, is complex.

Table of Formations

Cenozoic	Pleistocene and Recent	Sandy gravel deposits, beach and river deposits, peat bogs, recent soil and swamp development
		Unconformity
Precambrian		Diabase dikes Monzonite porphyry Syenite; gray granite Dioritic rocks - quartz diorite, diorite, amphibolite gneiss, aplitic dikes Metamorphosed ultrabasic rocks Banded quartz iron-formation Quartzite; talc schist Metavolcanics - dacite and rhyolite, metabasalt Metagraywacke Pinkish-gray granite Gray granite; biotite-feldspar gneiss Fine-grained granitic gneiss; pinkish-gray granitic dikes

Fine-grained Granitic Gneiss

Fine-grained, equigranular, granitic gneiss forms several large hills in the central part of the granitic complex east of Sakami lake. The weathered surface is light-gray and somewhat friable. The rock consists of quartz and feldspar, with approximately 1 - 3% biotite which generally gives the rock a distinct foliation. Traces of reddish garnet are found in some places. The gneiss is cut by numerous coarse-grained, pinkish-gray, granitic dikes of varying widths which intersect the foliation at high angles. The dikes are generally steeply dipping and trend approximately 140°.

Gray Granite, Biotite-feldspar Gneiss

Coarse-grained, gray, garnet-, and tourmaline-bearing granite interlayered with fine-grained biotite-feldspar gneiss forms the major rock group in the eastern part of the map-area.

In the granite, quartz and coarse, light-gray feldspar are the predominant minerals; biotite, tourmaline and garnet occur in traces, but occasionally form up to several percent of the rock. The garnet is anhedral to well formed, and is invariably the almandine type. Tourmaline forms black, coarse, elongate, well-formed crystals which occasionally occur in clusters constituting 15 - 25% of the rock over small areas.

Crystals of the tourmaline are often several inches long.

The fine-grained biotite-feldspar gneiss consists of feldspar, quartz, approximately 25 - 30% biotite and occasional traces of garnet. The gneiss is exposed most extensively at lower elevations and along lakeshore areas. The hills of more resistant gray granite tend to conceal the layered nature of the complex. However, the protected parts of the hills, around the bases of cliffs, often show exposures of gneiss in contact with the granite.

Intrusive relations of the granite into the gneiss were observed at some places. Several instances of compositional banding were seen in the gray granite. The attitude of the compositional banding, the contacts of the gneiss and granite, and the attitude of the foliation in the gneiss are parallel.

Pinkish-gray Granite

Coarse-grained, pinkish-gray granite forms several large outcrops in the eastern part of the area. Quartz and pinkish feldspar are the predominant minerals. Biotite and tourmaline occur sporadically and in minor amounts. This granite appears very similar to that forming the pinkish-gray, coarse-grained, granitic dikes in the fine-grained, granitic gneiss.

Metagraywacke

The metagraywacke is a medium-gray, fine-grained rock consisting of quartz, feldspar, biotite and occasional chlorite. Where chlorite has developed the rock has a slight medium-greenish-gray color and weathers to a medium-gray. Exposures occur most extensively along lakeshore areas. The rock is very hard. It often shows conspicuous thin biotite which imparts a foliation to the rock.

Metavolcanics

Dacite and Rhyolite

Dacite forms several outcrops of massive, very fine-to fine-grained, light-gray-green rock. It is very hard and, in weathering, develops a light-gray rind of variable thickness. Dark minerals appear as fine, disseminated flecks on the fresh surface; they form about 3 - 15% of the rock.

The rhyolite is dark-purplish-gray, very hard, and very fine grained to almost amorphous. The outcrops weather medium-gray, and often to a platy surface.

The dacite and rhyolite are found mainly in the central part of the map-area, and are closely associated with the metagraywacke.

Metabasalt

Metabasalt is more extensive in the central part of the area than the dacite and rhyolite. It is characteristically very fine-grained, and dark-gray to dark-green. Weathered surfaces also are dark-gray to dark-green, and occasionally show a fine pattern of close intersecting joints. Outcrops vary from large, low, hill areas to dikes which are often found associated with the quartzites and banded quartz iron-formation. Although outcrops occur throughout the central region in a zone trending northeast-southwest, the most extensive exposures are seen in the southwest where recent burning has destroyed much of the forest cover.

Quartzite, Talc Schist

The quartzite is a fine-grained, light-gray, highly sheared rock. It is most extensively developed in the southwest part of the area. Sericite development is common and gives the rock a distinct schistosity. In several places, minor banded biotite-amphibole-garnet rock is found associated with the quartzite, forming an interlayered sequence. The garnet appears as distinct thin zones within the rock.

Minor amounts of light-gray, soft, talc schist are also found associated with the quartzites.

The talc schist forms thin lenses, up to 8 or 10 inches wide. However, they constitute no more than 1% of the outcrop area in which they occur.

Banded Quartz Iron-formation

The banded quartz iron-formation consists of fine-grained, light-gray quartzite interbanded with lesser amounts of magnetite and rust-colored argillaceous siltstone.

The magnetite is fine to very fine grained, dark-gray-blue, and forms discontinuous bands. The argillaceous siltstone shows gradations to a rust-colored, garnet-bearing rock in which the garnets are dark-red, often well formed, and compose over 50% of the layer concerned. Quartzite always forms over 50% of the rock in the outcrop.

The banded quartz iron-formation is highly folded. Several basalt dikes and diablastic actinolite rock units cut across the banded structure.

Metamorphosed Ultrabasic Rocks

The metamorphosed ultrabasic or diablastic actinolite rock is a massive, medium-green, fine- to medium-grained rock. It has a marked diablastic texture.

This rock is found in the central and southwest parts of the map-area, but was not noted in the granitic rocks east of Sakami lake. The exposures occur as lenses, or as dikes cutting other rock units, particularly the banded iron-formation and the quartzite.

Another variety of metamorphosed ultrabasic rock forms exposures on several of the small islands in the central area. The rock is extremely hard and weathers to a medium-gray with darker, spheroidal features (possibly olivine pseudomorphs) forming resistant knobs. These circular features, about 1/2 inch in diameter, are disseminated fairly evenly on the weathered surface, but are not readily distinguishable on fresh surfaces.

Dioritic Rocks

These rocks range from quartz diorite to diorite and amphibolite gneiss. In outcrop they are medium to coarse grained, massive to foliated, and have a dark mineral content ranging from about 15% to 60%. Light-gray feldspar and dark-gray-green amphibole are the predominant constituents. In some places mineral segregation has occurred, giving the rock a distinct gneissic structure.

Minor aplitic dikes intrude the amphibolite rock in several places. The dikes are less than one foot wide, weather light-gray, and have no distinctive trend.

Syenite and Gray Granite

Light-pinkish-gray syenitic rocks form several outcrops. They are medium to coarse grained and massive. They have variable amounts of dark mineral, up to approximately 10%. Some dark mineral is chlorite; it gives the matrix a medium-greenish-gray color.

Associated with the syenite is light-grayish granite. It is medium to coarse grained and massive. The syenite and granite are closely associated and may be variations of the same parent material.

Monzonite Porphyry

The monzonite porphyry is characterized by very coarse, well-formed feldspar crystals disseminated in a mesh of medium to coarse crystals of feldspar which are subhedral to euhedral. There is a sharp distinction in the sizes of the two types of crystals. The fine-grained matrix of the rock contains some quartz and dark mineral.

The most common component is the mesh of medium to coarse crystals which forms about 75 - 85% of the rock. The rock is light- to medium-gray. It occasionally shows a slight foliation developed through rough parallelism of the medium to coarse feldspar crystals.

Diabase Dikes

Diabase dikes occur at several places in the map-area, particularly in the western part. The rock is massive, often has well-developed ophitic texture, and occasionally is slightly magnetic. One large dike in the west-central part of the area trends about 340°, is vertical, and is approximately 125 feet wide. This dike intrudes dioritic rock and aplitic dike material, and is considered to be the youngest rock in the area.

STRUCTURAL GEOLOGY

Two distinct trends of foliation and folding exist in the eastern part of the area. One trend is approximately northwest, the other southwest. The folds are open and there is no evidence of overturning.

However, the most conspicuous structural feature in the map-area is the southwest trend imparted by foliation and banding among the metagraywacke and metavolcanics in the central part. The contact relations between this zone and the area to the east have not been established.

The banded quartz iron-formation is highly folded and contorted. Inspection of several of the folds indicates a consistent westward plunge and suggests a larger synclinal structure which is slightly overturned to the north and the axis of which plunges to the west. Small, approximately parallel faults, with an apparent displacement of a few inches, are numerous in the iron-formation. Basaltic dikes in the vicinity are parallel to these faults.

Quartzites in the southwest part of the area have several narrow zones of soft, rusty, weathered material. These zones trend southwest, are approximately 2 - 4 inches wide,and are associated with highly fractured material in the immediate vicinity. These features suggest some faulting in the localities concerned.

Some areas of dioritic rock are gneissic and highly folded, but neither folds nor gneissosity show any consistent trend. Faulting is not apparent.

Lineations, measured mainly from drag-fold axes, throughout the map-area generally have a westward plunge ranging from 20° to 40°.

ECONOMIC GEOLOGY

In the southwest part of the map-area are several exposures with indications of sulphide mineralization; others contain magnetite. Sulphide mineralization associated with the quartzite has a conspicuous rusty weathering; fresh material shows traces of pyrite and, to a lesser extent, bornite and possibly pyrrhotite. Concentrations of about 5% pyrite were observed in some specimens; however, concentrations are usually less than 2%. In one instance the mineralization is associated with a highly-fractured zone in the quartzite; here, faulting is also suggested. A high degree of rust weathering occurs in the zone; it suggests that there may be some connection between the apparent faulting and the mineralization in the vicinity.

Magnetite occurs within the banded quartz iron-formation. It forms discontinuous layers which give the rock a striking color-banding of dark-bluish-gray in light-gray. The magnetite forms up to 30% of the outcrop in those zones where it occurs.

Staking has been extensive throughout the western half of the map-area, particularly in the southwest. During the summer of 1965, Barringer Research Ltd. of Toronto conducted geophysical surveys in the southwest part of the area. No drilling had been done in the area up to November, 1965. No mineral showing of any economic interest was observed in the map-area east of Sakami lake.

REFERENCE

Sakami Lake Area, New Quebec - Map 23-1957, Geological Survey of Canada, Department of Mines and Technical Surveys.