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BOUCHETTE LAKE AREA

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Geology of the BOUCHETTE LAKE AREA Montcalm and Pontiac Counties

Preliminary Report

by

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PRELIMINARY REPORT

on

BOUCHETTE LAKE AREA

MONTCALM AND PONTIAC COUNTIES

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INTRODUCTION

The Bouchette lake area, mapped during the summer of 1971, occupies 403 square miles bounded by latitudes 47°30' and 47°45' and by longitudes 76°30' and 77°00'. The center of the area lies about 60 miles southeast of Val d'Or. The area includes all of Foligny township, and parts of Devine, Chassin, Didace, Sagean, and Champrodon townships.

The Bouchette lake area lies to the west of a region mapped by the author (1970), north of a region mapped by A.F. Laurin (1961), northeast of a region mapped by Wahl and Osborne (1950) and east of a region mapped by N.B. Gillies (1952).

Access to the region is provided by unpaved secondary and logging roads. Canadian International Paper Company Routes #30, 29 and 22 reach various parts of the area. Forest development roads provide additional access by vehicle or foot.

Dozois reservoir, Capitachouane and Ottawa rivers and Gull creek provide access to the southwestern and central portions of the map-area by canoe. Aircraft affords access to certain portions of the area inaccessible to field vehicle or canoe. The closest plane base is on Des Loups lake at Le Domaine, 40 air miles to the south.

Topographically, the area may be divided into two regions. One region, characterized by low-lying hills and broad, gently undulating swampy plains with a local relief of 200' above an average elevation of 1150', occupies the southeastern 3/4 of the map-area. This topography is broken only by a long arcuate ridge adjacent to the Ottawa river that has a local relief of 400' to 500'. A second region of elongated hills with a local relief of 350' above an average elevation of 1250' occupies the northwestern quarter of the map-area.

The entire map-area lies within the Ottawa river drainage basin.

Most of the area is forested; however, roughly 1/6 of the region is swampy and there tree growth is poor.

GENERAL GEOLOGY

All of the consolidated rocks of the area are Precambrian in age and form a part of the Grenville structural Province. The following categories of rocks have been recognized: (a) basement gneisses; (b) complex of metagabbro and mafic anorthosite; and (c) Grenville Group gneisses. The precise nature

of the gabbroic complex and its relation to the two other rock groups is uncertain at present. Most of the rocks have been metamorphosed to the upper amphibolite facies; however, granulite facies metamorphism is evident locally.

Table of Formations

Pleistocene and Recent	Sand, gravel and glacial till	
Precambrian	Grenville Group	Mixed paragneiss
	Metagabbro Complex	Gabbroic anorthosite Mafic anorthosite Metagabbro
	Basement Gneisses	Diopside-hypersthene gneiss Banded gneiss Norite Amphibolite Pink granitic gneiss Gray granitic gneiss Gray biotite-garnet gneiss Gray biotite gneiss

Basement gneisses

Gray biotite and biotite-garnet gneiss

These rock types dominate the area lying to the north and west of Gull creek and underly half of the map-area. They are best exposed in the Dozois reservoir area. They are fine- to medium-grained and consists largely of biotite, plagioclase

and quartz with varying amounts of potash feldspar and garnet. Hornblende is present locally. Where the garnet content exceeds 3%, the rock has been mapped as a gray biotite-garnet gneiss. In general, these rocks exhibit both a subtle compositional layering, defined by a varying percentage of mafic minerals, and a strong compositional layering defined by gray to pink coarse-grained quartz-feldspathic layers. The quartz-feldspathic layering may occupy 20% to 80% of the rock volume, but most commonly forms 50%.

Mafic layers are common within the gray gneiss. They are medium- to coarse-grained and consist of diopside, hornblende and plagioclase with or without quartz and garnet. Layers have been observed up to 6' thick, but they are more commonly 6" to 1'. Commonly they are boudinaged and form rootless folds.

In the northwestern corner of the map-area the gray gneiss commonly exhibits a tan charnockitic weathering; is more leucocratic and garnet-rich; and contains significant amounts of hypersthene (replacing biotite). Most of the gray gneiss in the northwestern corner appears to have been metamorphosed under granulite facies conditions.

Gray granitic gneiss

This unit occurs throughout the western portion of the map-area and appears to have a genetic relationship to the gray biotite gneiss. It is massive, medium- to coarse-grained and consists of biotite, plagioclase, feldspar and quartz with or without garnet. Mafic minerals always form less than 10% of the rock. It is gray on fresh surfaces, weathering to a light tan. It commonly

exhibits a faint compositional layering and contains layers of the finer grained biotite gray gneiss. Coarser grained quartz-feldspathic pegmatite veins, similar in color and appearance to the gneiss, are ubiquitous and may form up to 25% of the rock. In the northwestern corner of the map-area the rock may exhibit charnockitic weathering and contain hypersthene.

Pink granitic gneiss; pegmatite

Pink granitic gneiss occurs in the southwestern, southeastern and northeastern portions of the region. It is medium- to coarse-grained, pink to white in appearance and exhibits a compositional layering defined by alternating quartz-feldspar-rich and biotite-rich layers. It consists of biotite, potassium feldspar, plagioclase, and quartz. Hornblende is common but not ubiquitous. Mafic minerals form 10% to 30% of the rock. In places the gneiss is strongly sheared and exhibits feldspar augen up to 3" in diameter.

Locally coarse-grained pink feldspar pegmatites are developed with feldspar crystals up to 10" in diameter. Boudinaged amphibolite layers and blocks up to 15' in diameter occur locally within the gneiss.

Amphibolite

This rock type occurs as mappable bodies in the western portion of the map-area at two localities on Dozois reservoir and west of Baird lake. It is a medium-grained, homogeneous rock, dark green to dark brown in color, consisting of diopside and

hornblende with minor plagioclase and garnet. Disseminated pyrite or pyrrhotite is commonly present . Plagioclase forms about 10% of the rock at the Dozois locality and less than 5% at the Baird lake locality. At the Baird lake locality the rock exhibits an agmatic structure with a mobilisate of plagioclase and biotite forming about 10-15% of the rock.

Norite

Norite is found on the northeastern portion of Dozois reservoir. It is coarse-grained, largely unfoliated and consits of hypersthene, hornblende, plagioclase and garnet. Very coarse-grained patches are common with plagioclase laths up to 5" in length. Mafic minerals form 60% of the rock. Because it occurs in close spatial association with the basement gneisses, it is grouped with them.

"Banded" gneiss

This unit occurs in scattered outcrops on Dozois reservoir and Gull creek. It exhibits a striking "banded" appearance in outcrop due to alternating layers variable in composition and grain size. Layering is 1" to 3" in thickness. The rock is fine- to medium-grained and consists of biotite, garnet, quartz, plagioclase and potassium feldspar. Quartz and potassium feldspar tend to be concentrated in the more leucocratic, finer-grained layers which contain 0% to 10% mafic minerals while garnet, biotite and plagioclase are concentrated in the mafic, coarser-grained layers containing 10% to 40% mafic minerals.

Diopside-hypersthene gneiss

Numerous outcrops of this unit occur in the northwestern portion of the map-area. It is variable in appearance, but is characterized by the presence of diopside, hypersthene, plagioclase, garnet and quartz. It is generally homogeneous, fine- to medium-grained, tan to gray or white on weathered surfaces and gray on fresh. Hornblende and biotite may be present locally. Mafic minerals comprise 20% to 40% of the rock. A complex system of feldspathic or quartz-feldspathic veins commonly cuts across it.

Metagabbro complex

The rocks of the metagabbro complex have been divided into two broad compositional groups; metagabbro and mafic anorthosite. Superposed upon these compositional groups are apparent metamorphic facies differences which alter the appearance and the mineral assemblage of the rocks locally. A special type, a gabbroic anorthosite, characterized by fresh igneous textures, has been mapped.

These rocks dominate the southeastern third of the map-area.

Metagabbro

The metagabbro is a medium-grained equigranular rock consisting of plagioclase, hornblende, hypersthene, diopside and garnet. Locally scapolite, biotite, sphene and opaques are present. Mafics minerals form 40% to 80% of the rock.

The rock is generally dark gray to dark green or black in color and commonly exhibits a charnockitic weathering. The mafic mineral assemblage is variable and may consist solely of hornblende, hornblende-garnet, diopside-hypersthene, or diopside-hypersthene-garnet or various combinations of the four minerals. Zones of these assemblages can be outlined within the rock unit.

Mafic anorthosite

Mafic anorthosite is a medium-grained equigranular rock consisting largely of plagioclase with 10% to 30% mafic minerals. The mafic mineral assemblage varies similarly to that of the metagabbro. Where the rock contains only a hornblende or hornblende-garnet assemblage it exhibits a distinctive sugary granular appearance. Where pyroxenes are present the rock is gray on fresh surfaces and weathers tan to yellow.

Gabbroic anorthosite

A small body of this rock type is found along White Moss creek in the southeast corner of the map-area. It is very coarse-grained, ophitic and consists principally of plagioclase and hypersthene.

Grenville Group

Mixed paragneiss

The mixed paragneiss occurs wholly within the southeastern quarter of the map-area. It consists of marble, quartzite, biotite-garnet-sillimanite gneiss, amphibolite, garnet

metagabbro and diopside-garnet gneiss indivisible at the map scale. One small island on Cabonga reservoir contained all of these rock types in outcrop.

The marble is medium- to coarse-grained and consists principally of calcite with minor scapolite, calcic hornblende, quartz, sphene, plagioclase and mica. The quartzite generally occurs as thin layers within the pelitic gneiss; is milky to vitreous in appearance; and commonly contains graphite flecks and garnet. The biotite-garnet-sillimanite gneiss is generally well-foliated, gray on fresh surfaces weathering to a rusty brown. The three mafic units are homogeneous, medium- to coarse-grained and occur as thin layers to large blocks within the marble or as layers within the pelitic gneiss. Pegmatite associated with the rocks of the Grenville group is white to pink in appearance occurring as irregular masses and veins. It is composed principally of potash feldspar and quartz.

PLEISTOCENE

Most of the map-area is mantled with glacial or glaciofluvial deposits. As a result, exposures are scattered, the outcrop area beirg much less than 1%. In some lake and reservoir areas; however, the cover is thin and wave action and subsequent drops in water level have created good exposures. This has occurred on Kitchener lake, Dozois reservoir and Barriere lake.

Thirteen eskers were mapped. They range from 1/2 mile to 4 miles in length and are composed of sand, pebble and cobble. They vary in height and width, but average 30' high and 80' to 90'. The movement of the last dominant ice sheet was S5° W.

STRUCTURAL GEOLOGY

The dominant foliation of the region trends north to northeast with intermediate dips to the east and southeast. Lineation patterns and local deviations from the pervasive regional foliation trend suggest a very complex structural history.

Preliminary structural data indicate that the basement rocks have undergone at least three periods of deformation including an initial horizontal isoclinal folding event. During one or more of the deformation periods pressure and temperature was sufficient to produce local melting.

The structural relationship of the metagabbro complex to the basement rocks and the Grenville paragneiss is still poorly understood. The Grenville units mapped within the metagabbro on Cabonga reservoir, Barriere lake and Bouchette lake do not serve to elucidate the problem as contact relations are not exposed.

Although topographic lineations are numerous within the map-area they do not appear to have a relation to any major fault zones, but may be related to regional joint patterns. Small scale faulting and shearing is common within the area and most prevalent in the metagabbro. Field observations suggest that the occurrence of granulite facies rocks in the northwest portion of the area may indicate local zones of intense shearing.

ECONOMIC GEOLOGY

Claims have been staked in the region southeast of

Harris lake. A few shallow trenches were observed along old logging roads in that area and also on two small islands on Cabonga reservoir.

Ilmenite was found in outcrops and in the prospects to the south and southeast of Harris lake. It occurs finely disseminated within the metagabbro and occurs in irregular pegmatite masses where it may form 20% to 25% of the rock. It was also found in thin pegmatitic veins in an outcrop of metagabbro on Seven Miles bay. The ilmenite is generally slightly magnetic, indicating the intergrowth of magnetite. The occurrence of ilmenite in the metagabbro appears to be correlated with linear magnetic highs.

Magnetite was observed at scattered localities throughout the granitic gneisses and in pegmatitic layers within the biotite gneiss. To the west of Cob lake one outcrop of a coarse-grained pegmatitic rock contained 10% to 15% magnetite.

Graphite, pyrite and arsenopyrite were observed locally within the mixed paragneisses on Cabonga reservoir and the southeastern corner of the region. Graphite and pyrite were also found in scattered localities within the gray granitic gneiss and the gray biotite gneiss. Lenses within a rusty-weathering granitic gneiss just to the north of the map-area along the Traverse creek road contained up to 10% graphite.

Concerted effort was made to examine the bedrock over a circular magnetic high just to the north of where the Ottawa river enters Dozois reservoir. Unfortunately, in spite of good access

on old logging roads, no outcrops were found. Outcrops on adjacent portions of Dozois reservoir indicate that the structure may be a small igneous intrusive or gneissic dome.

Gravel deposits are actively being searched for and utilised for road building by the CIP. The charnockitic metagabbro adjacent to CIP Route #30 has been utilised for rip-rap in small dams at Barriere lake and Seven Miles bay.

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LEGENDE

PLEISTOCENE

13 Sable, gravier, till glaciaire

PRECAMBRIEN

12 Paragneiss mixtes

11 Metagabbro

10 Anorthosite mafique

9 Anorthosite gabbroique

8 Gneiss gris à biotite

7 Gneiss gris à biotite et grenat

6 Gneiss gris granitique

5 Gneiss rose granitique

4 Amphibolite

3 Norite

2 Gneiss rubané

1 Gneiss à hypersthene et diopside

LEGEND

PLEISTOCENE

13 Sand, gravel, glacial till

PRECAMBRIAN

12 Mixed paragneiss

11 Metagabbro

10 Mafic anorthosite

9 Gabbroic anorthosite

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7 Gray biotite-garnet gneiss

6 Gray granitic gneiss

5 Pink granitic gneiss

4 Amphibolite

3 Norite

2 Banded gneiss

1 Diopside-hypersthene gneiss

SIGNES CONVENTIONNELS

Contact géologique, approximatif

Affleurement

Direction et pendage de la foliation: a) inclinée b) verticale c) horizontale d) pendage inconnu

Direction et plongement de la linéation

Affleurement minéralisé: (Il) ilmenite, (Py) pyrite et arsenopyrite, (Gr) graphite, (Mg) magnetite

Stries glaciares

Esker

Chemin de camion

SYMBOLS

Geologic contact, approximate

Outcrop

Strike and dip of foliation: a) inclined b) vertical c) horizintal d) dip unknown

Trend and plunge of lineation

Mineralized outcrop: (Il) ilmenite, (Py) pyrite and arsenopyrite, (Gr) graphite, (Mg) magnetite

Glacial striae

Esker

Truck road

DECLINAISON MAGNETIQUE APPROXIMATIVE 12° OUEST

APPROXIMATE MAGNETIC DECLINATION 12° WEST

Géologie par: J.K. Otton, 1971
Geology by :