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PRELIMINARY REPORT ON BELLETERRE AREA (SHEET NO 4), GUILLET TOWNSHIP

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PRELIMINARY REPORT

ON

BELLETERRE AREA (SHEET NO. 4)

GUILLET TOWNSHIP

BY

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PRELIMINARY REPORT

ON

BELLETERRE AREA (SHEET NO. 4)

GUILLET TOWNSHIP

by

P.E. Auger

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

During the field season of 1948, an area was covered in detail around the northern, eastern, and southern boundaries of Sheets No. 1 and No. 2, which were mapped in 1945 and 1946. This was done in order to square off the map of the three preceding years' work (1) and to obtain additional information on the structure and the geology in relation to the ore deposits of the region.

The area examined is in Guillet township. It has a U shape with the ends of the prongs oriented westward and attached to the north-south boundary line between Guillet and Blondeau townships. The northern prong extends from the northern limits of sheets No. 1 and No. 2 as far as the centre of Twin lake and Thibault lake. The southern prong extends southwards from sheets No. 1 and No. 2 to about 2,700 feet south of Lac aux Sables. The eastern part of the map, or the base of the U, extends eastward from the eastern boundary of sheet No. 2 to the north-south centre line of Guillet township.

The map accompanying the present report is a composite map including the areas mapped previously. It covers an area of approximately 35 square miles, of which 15 square miles were mapped during the field season of 1948. Most of this area is in unsurveyed ground and there were no picket lines to help the mapping as in sheets No. 1, No. 2, and No. 3. East-west base lines were cut at 3,000-foot intervals and north-south pace-and-compass traverses were run 500 feet apart between the base lines.

GENERAL GEOLOGY

A good outline of the general geology of the area is given in the preliminary reports of the preceding years (2)

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(1) Auger, P.E.: Que. Dept. of Mines, P.R. 194, 203, and 209.

(2) Auger, P.E.: works cited.

The area is underlain by Precambrian rocks which are overlain almost everywhere by recent sediments, mostly of glacial origin. More than half of the area is underlain by intermediate to basic Keewatin-type volcanic rocks. These are overlain by acidic volcanic rocks which occupy the southeastern part of the area. On top of these are metamorphosed sediments, visible in the extreme southeastern corner of the area, and also to the south and east, beyond the limits of the area mapped.

Intrusive rocks are abundant. The oldest rock is the diorite, which appears to be quite conformable to the volcanic structure. Granite and syenite are exposed in large amounts along the northern and southern boundaries of the area. Porphyry, lamprophyre, and diabase dykes intrude the volcanic rocks and most of the above-mentioned intrusive rocks in the area.

Table of Formations

Quaternary		Stream and swamp deposits Sand and gravel, eskers
Precambrian	Intrusive rocks	Diabase dykes Lamprophyre dykes Porphyry dykes Syenite, syenite porphyry Granite Diorite
	Keewatin-type	Metamorphosed sediments Acidic volcanics, mostly porphyritic and fragmental Intermediate to basic volcanic rocks including diorite phases Chlorite sericite-schist Tuff

Keewatin-type Volcanic Rocks

Keewatin-type volcanic rocks underlie most of the area. They are composed of three main types of rock: the intermediate and basic lava, the acidic lava and the tuff beds. Dioritic types of lava are also exposed in several places, but, in most cases, they are difficult to distinguish from the intrusive diorites.

The basic lavas are very rare; a few exposures only were found in the northern part of the area.

Intermediate lava, mostly altered andesite, is the most abundant volcanic rock. The pillow and massive lavas belong to this group. Their most extensive distribution is in the northern and eastern portions of the area.

Acidic lava overlies the basic lava and is exposed almost exclusively in the southeastern corner of the area. These acidic volcanic rocks are composed mostly of rhyolite, rhyolite porphyry and fragmental rocks interlayered with lava flows of intermediate composition near the base of the series. Typical volcanic structure and textures are rare in the acidic lava. Layering is good enough in places to give valuable data on the structure. Amygdules are present in a few exposures and fragments are quite common in most places. The fragmental rocks are distributed irregularly throughout the rock mass or in the form of bands interlayered with the lava flows. Chlorite- and sericite-schists, which represent altered phases of the volcanic rocks, are most widespread in the intermediate lava. This type of alteration is more intense and concentrated along shear zones, fault zones, and contorted zones which are particularly abundant in the eastern and southeastern parts of the area. Dioritic volcanic flow rocks are usually massive and show little structure. They are interlayered with the intermediate and basic lava flows and have close spatial relationship with the intrusive diorite. Some of the diorites are of the "spotted" variety, which we believe is due to the development of large ferromagnesian crystals or clusters of small crystals of similar composition by metasomatism or contact metamorphism.

Silicified tuff is quite abundant throughout the area, especially in the southeastern and northwestern sections. It occurs in well banded layers containing magnetite and a few quartz veins. In the southeastern part of the area, on the property of Lake Expanse Gold Mines Ltd., some tuff layers contain numerous phenocrysts and fragments, some of which are more than one inch in diameter. These tuff bands are good horizon-markers which help greatly in the interpretation of the regional and local structures. In most places the mineralization is closely related to these structural units.

Metamorphosed sediments are exposed in a few places at the extreme southeastern corner of the area. They are composed of greywacke which is locally altered to mica-schist. This belt of sediments extends far beyond the limits of the area mapped. Too few exposures have been seen by the writer to permit a complete discussion of their age and relationship with the other rocks of the area.

Intrusives

Diorite

Masses of diorite are found everywhere throughout the area. In most places their outline is conformable to the general structure of the region. Some of them seem to have an important bearing on irregularities observed in the structure as is the case along the southern border of the area close to the eastern edge. The rock is composed of coarse- to medium-grained diorite in which the feldspars are largely altered to epidote and kaolin, while the dark

minerals are altered to chlorite. The composition, the structure, and the distribution of these rocks suggest a close genetic relationship to the volcanic rocks described above.

Granite Syenite and Syenite Porphyry

The northern and southern parts of the area are underlain by granitic rocks which belong to a large batholitic intrusive extending outside of the area to the north, west, and south. The rock is a quartz-rich granite in the northern section, but is deficient in quartz in the southern section where, in places, it is a real syenite. There is a small body of granite 4,000 feet east of Taché lake. It is approximately 3,000 feet in diameter and is of the same composition as the main batholitic rock to the north, with possibly a larger amount of silica, especially around the borders of the mass. Porphyritic phases occur in the intrusive mass of the south and as dykes projecting from the main intrusive body into the volcanic formations.

Porphyry Dykes

Dykes of porphyry are abundant in sheet No. 2 at the Belleterre mine and to the north and northeast of the town of Belleterre. In the present area some dykes are exposed in the northern section. They are granitic in character and are probably related to the large intrusion of granite to the north.

In the southeastern part of the area there are some quartz feldspar porphyry dykes which intrude the acidic volcanic rocks and which accompany some bands of fragmental material. It looks as if these dykes had the same close genetic relationship to the acidic volcanics as the diorites have to the intermediate lava.

Lamprophyre Dykes

Most of the lamprophyre dykes found in sheet No. 4 are of the biotite lamprophyre type. They are abundant in the northwestern section of the area, especially in the vicinity of the small granitic stock in the northwestern part of the Ortona Gold Mines Ltd. property. On the property of Lake Expanse Gold Mines Ltd. biotite-lamprophyre is exposed at several places, everywhere more or less conformable to the general structure of the volcanic formations.

Diabase Dykes

The northern extension of a large dyke of younger diabase which is exposed in sheet No. 2 was traced for a short distance in the northern part of the present map-area. It is about 20 feet wide and strikes N.25°E. The rock is massive and dark coloured, weathering to a light brown.

STRUCTURAL GEOLOGY

It is almost impossible to study the structure of the present area without referring to sheets No. 1 and No. 2, which are enclosed by it, and to sheet No. 3, which borders it to the west.

All along the eastern part of the area the structure has the same north-eastward trend that was observed in the eastern half of sheet No. 2. Local anomalies such as drag folding, warping, and intense brecciation of some beds were observed on the property of Lake Expanse Gold Mines Ltd. In places, the brecciation and mineralization seem to be related to the drag folding.

In general the structure trends N.55°E. and dips steeply south along the eastern border of the map.

In the northern and southern sections of the area, the structure of the volcanic rocks, as evidenced by the attitude of the tuff bands and of the lava flows, is influenced by the intrusive masses of granite and diorite.

North and northeast of Lac Taché, the tuff beds swing northward with a definite tendency to parallel the granite contact. Northeast of the isolated granite stock, numerous drag folds were observed in the volcanic formations. These folds are distributed in the direction of prolongation of the long axis of the stock and they show a gently plunging (0° to 20°) fold axis towards the northeast. On each side of the stock the structure swings from northwest to north and to northeast, suggesting that the intrusive rock extends underneath the surface exposure of volcanic rocks and affects the trend of the structure.

The same type of structural phenomenon may be seen in the southeastern part of the area, where a body of intrusive diorite affects the structure of neighbouring volcanic formations.

ECONOMIC GEOLOGY

Gold is the only mineral found in commercial quantities in the Belleterre region. It is present in quartz veins in the form of free gold accompanied by very small amounts of sulphides. The only producing mine of the region is the Belleterre mine of Belleterre Quebec Mines Limited, which has been in operation for more than twelve years. The Belleterre Quebec Mines Ltd. and other companies have explored and developed several mineral deposits located within the limits of the accompanying map.

Lake Expanse Gold Mines Ltd.
(Now the property of Belleterre Quebec Mines Ltd.)

This property is situated on the southeastern side of Guillet (Mud) lake. It is one of the oldest mineral discoveries of the area.

The claims are underlain by interlayered bands of tuff, greenstone and diorite which have a northeasterly trend. The tuff bands show numerous drag folds. They are discontinuous and are intersected by several faults and diorite intrusions.

The gold occurs at widely spaced intervals along a definite belt which occupies the north-central part of the property. This belt is composed of several layers of tuff, diorite and volcanic rocks in which the structure is characterized by drag folds, crumpling and brecciation. It is approximately parallel to the structural trend of the region (N.50°E.). Within this belt the gold appears to be localized in areas where the structure of the tuff and the volcanic rocks is most affected by brecciation and drag folding.

The prospect on which most work has been done is ore zone No. 1, which is in the western part of the property. It has a general north-south trend and is composed of a series of drag folds and shears accompanying a crumpled tuff band. Small lenses of quartz and a fair amount of sulphides can be seen over a length of about 400 feet throughout the zone which has a width from 20 to 30 feet. The mineralization consists of pyrite, chalcopyrite, pyrrhotite, galena and sphalerite. Free gold was found at several places in the quartz. The higher-grade gold mineralization appears to accompany the sphalerite-galena mineralization.

Extensive drilling was done in this zone. It failed to reveal the presence of an extensive orebody, but indicated, at the southern end of the zone, numerous small mineralized veins containing an encouraging amount of gold.

The other zones are about the same type as No. 1 ore zone, but not so extensive. Some of them carry gold in commercial amount at the surface, but a few holes put down by the former owners to explore zones at depth failed to yield interesting results.

Since Belleterre Quebec Mines Ltd. acquired the property, a new discovery (No. 25) was made by the writer a short distance south of ore zone No. 3. The zone is composed of quartz injecting and replacing a band of fragmental rock. This is intersected by narrow lenticular fractures filled with smoky quartz. About 75 feet to the north, another vein was uncovered by the company soon after this discovery. At the surface the zone seemed to be about 10 feet wide, with a steep dip to the south. Shallow drilling on the first discovery showed that the vein has a flat dip. The best intersection, at a depth of about 30 feet, was only 2 feet wide. Very high values in gold were obtained on the outcrop especially where the quartz contained galena. No free gold was observed.

Ortona Gold Mines, Limited

This property was described in the writer's preliminary report of 1945, Sheet No. 2 (1). No additional work has been done on the property since that time.

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(1) Auger, P.E.: Que. Dept. of Mines, P.R. 203.

Mudlac Gold Mines, Limited

The Mudlac property is situated immediately north of the northeastern corner of the Belleterre property.

Very extensive drilling has been done systematically across the property. It has given important information on the geology of the area but no interesting results were obtained as far as economic minerals are concerned. A few quartz veins are visible at the surface. The most important are two parallel veins located a few hundred feet south of Harding lake. Both veins strike N.45°E. and dip 70° to 80°S. They are localized along shear zones in volcanic rock and diorite. They have been traced over a distance of 80 to 100 feet, the width varying from 1 to 3 or 4 feet. They are composed of quartz, rusty in places, with some sulphide mineralization. Gold values are reported from surface sampling. Drilling did not give encouraging results on these veins.

Norterre Mines Ltd.

Immediately east of the Belleterre property there is a group of claims on which very little rock is exposed. Trenching was done around 1935 when Noranda Mines Limited was doing development work on the property. These trenches were filled at the time of the writer's visit, and it was impossible to see the veins.

According to B.T. Denis (1), several veins or quartz lenses containing gold were discovered in claims R-20699 and R-20693. These were 4 inches to 2 feet wide and were traced over a length of 100 feet.

Diamond drilling was done on the property during 1946-47, but it failed to show any important commercial mineralization.

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(1) Denis, B.T.: Quebec Bureau of Mines, Ann. Rept. 1935, Part B, p. 74.