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PRELIMINARY REPORT ON GAMACHE AREA, ABITIBI-EAST COUNTY

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DEPARTMENT OF MINES
GEOLOGICAL SURVEYS BRANCH

PRELIMINARY REPORT

ON

GAMACHE AREA

ABITIBI-EAST COUNTY

BY

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INTRODUCTION

The Gamache area, mapped during the summer of 1952, lies between latitudes $49^{\circ}15'N.$ and $49^{\circ}30'N.$ and between longitudes $74^{\circ}30'W.$ and $74^{\circ}45'W.$ It comprises an area of approximately 200 square miles situated some 30 miles southwest of the southern tip of lake Chibougamau and nearly 115 miles northwest of lake St. John. It includes almost all of Gamache township, a little more than half of Crisafy township, less than one-third of Hazeur township, a little more than a quarter of Pambrun township, and narrow strips of Pancamp and Rasles townships.

The area is easily accessible by sea-plane from bases in the Chibougamau area. Caopatina, Verriers, Chrysologue, Proust, Oriol, Messine, Pierre, Crisafy and Monaco lakes offer good landing places, and several other lakes of lesser importance may be accessible to certain types of sea-planes such as the Beaver.

The Saint Félicien-Chibougamau highway passes about 12 miles northeast of the map-area. A branch-road is actually under construction to connect the Chibougamau highway to the property of Chibougamau Explorers Limited which is situated near Norhart lake, some three miles east of the northeast corner of the map-area.

Opawica river trends northwest across the whole area. It is navigable for the greater part of its course with the exception of a few rapids and falls which necessitate portages. Verriers, Chrysologue, Proust and Oriol lakes intercommunicate and thus facilitate access to the west-central part of the area. At high-water, Verchères and Pierre lakes are easily accessible from Oriol lake.

On the whole, the area has an elevation of approximately 1,300 feet above sea-level. Local relief is small and the highest elevations are in the region contained by Crisafy, Monacc, Messine, Verchères and Pierre lakes. The height of the hills in this area does not exceed 250 feet above the level of the nearby lakes.

Most of the map-area is drained by Opawica river except for the northeast part around Meston lake which is drained by Obatagamau river

flowing north of the area. Both rivers belong to the James Bay drainage basin.

GENERAL GEOLOGY

All the consolidated rocks of the area are of Precambrian age. In the northern part of the area there are some Keewatin-type rocks, mainly altered volcanics such as andesite and basalt, interstratified with a few beds of tuff and, in places, sedimentary rocks. With the volcanic rocks are found a few outcrops of altered intrusive rocks such as diorite, granodiorite and gabbro. Immediately south of this belt lies one of hornblende, chlorite, and mica schists and amphibole gneiss. Gneissic rocks occupy the southern part of the area where a gneissic granite and various types of paragneisses are found. Numerous diabase dykes, probably late Precambrian in age, occur throughout the map-area.

Table of Formations

CENOZOIC	Recent and Pleistocene	Sand, gravel, glacial till
Great Unconformity		
PRECAMBRIAN	Intrusive rocks	Diabase dykes (Keweenaw?) Gneissic granite Diorite, granodiorite and gabbro
	Rocks of undetermined age	Biotite paragneiss, hornblende paragneiss; hornblende schist, chlorite schist, mica schist, amphibole gneiss
	Keewatin (?)	Basalt and andesite flows with a few beds of tuff and some sedimentary rocks.

Keewatin(?)

Keewatin-type rocks underlie a belt which trends east-west and occupies the northern part of the area. This zone is eight miles wide and is the extension to the south and to the west of those described by Holmes (1) and Gilbert (2),

- (1) Holmes, Stanley W., Preliminary Report on Fancamp-Hauy Area, Abitibi-East County; Que. Dept. of Mines, P.R. No.271, 1952.
- (2) Gilbert, J.E., Preliminary Report on Rohault Area, Abitibi-East and Roberval Counties; Que. Dept. of Mines, P.R. No.267, 1952.

respectively. Due to the paucity of exposures, the southern limit of the belt is indicated only approximately on the map. The rocks are mainly altered volcanics such as andesite and basalt interstratified in places with a few beds of tuff and a few outcrops of sedimentary rocks.

Basaltic flows constitute the greater part of the rocks of this belt. The basalt is fine-grained and may show variation in colour from dark green to dark grey and even to black. Usually highly schistose, it may in places be relatively massive. Plagioclase and hornblende appear to be the essential constituents but chlorite is also present. In certain places the hornblende is completely replaced by chlorite and the rock becomes a chlorite schist. In several localities the chlorite schist contains veinlets and lenses of quartz and carbonate with which are sometimes associated disseminated sulphides. Here and there, andesite may be distinguished from the basalt by its paler colour and its smaller percentage of hornblende relative to that of plagioclase.

In a very few places a few beds of tuff were found interstratified with the lava flows. This rock is characterized by its fine grain and is composed of an interstratification of alternately light and dark grey beds with an average thickness of 1/16 of an inch.

A few outcrops of sedimentary rock were observed in the volcanic belt. This rock is a pale grey, fine-grained mica schist.

Rocks of Undetermined Age

Hornblende Schist, Chlorite Schist, Mica Schist, Amphibole Gneiss

The rocks of a band, approximately one and three-quarter miles wide, immediately south of the volcanic rock belt have been grouped separately because information on them is inadequate to permit a definite classification. The rocks of this band consist of a hornblende schist, a chlorite schist, a mica schist and an amphibole gneiss. The amphibole gneiss is observed in the westerly two-fifths of the band, south of Caopatina lake, whereas the other three types are found in the eastern part.

The hornblende schist is a blackish, fine-grained rock which breaks into slabs when struck by a hammer.

The chlorite schist is a green, highly schistose rock with a high percentage of chlorite. This schist closely resembles that already described with the Keewatin-type rocks.

Small exposures of mica schist occur in a few places in this band. This rock is light grey, fine-grained and foliated.

The amphibole gneiss is a black, heavy, medium to coarse-grained rock. Although generally gneissic, there are a few outcrops where it is characterized by a massive structure and a granular texture. It is composed mainly of amphibole and plagioclase. This rock might possibly be an altered

intrusive or the result of the metasomatism of one or the other of the amphibole rocks found in the area.

Biotite Paragneiss

A rock composed of biotite, feldspar and quartz underlies about 15 per cent of the map-area. It outcrops in an east-west trending belt south of the schistose band just described. One mile south of this belt a second, mile-wide band of biotite paragneiss passes close to Deux Iles, Messine and Verchères lakes. Near the latter it divides into two segments which enclose a granitic stock. This stock extends from the centre of the area, westward through Verchères, Oriol, Proust, Chrysologue and Verriers lakes. A few exposures of biotite paragneiss are found east and west of Monaco lake in the southeast corner of the map-area, as well as in those belts where the hornblende paragneiss predominates.

The biotite paragneiss of the northern belt is a fine-grained, light to dark grey rock. In certain places relic bedding is indicated by the alternation of bands rich in biotite with others rich in leucocratic minerals. Biotite, quartz and feldspar are the characteristic minerals but muscovite, epidote, chlorite, hornblende and garnet are encountered in places. The paragneiss of the Messine Lake band is characterized by a greater abundance of garnet, porphyroblasts of which are easily observed standing out on the weathered surfaces.

Hornblende Paragneiss

Approximately 25 per cent of the map-area is underlain by hornblende paragneiss. It outcrops in two, more or less regular bands, separated by the Messine Lake belt of biotite paragneiss and by the granitic stock between Verchères and Verriers lakes. There are also a few exposures along the southern limit of the map-area, two miles west of Monaco lake, which seem to belong to a south-trending zone. A few beds of hornblende paragneiss are also found interstratified with the biotite paragneiss.

The hornblende paragneiss is a black, gneissic, fine- to medium-grained rock. The characteristic minerals are hornblende, plagioclase, biotite and also garnet in a few places. Hornblende needles in parallel alignment in places constitute as much as 60 per cent of the whole rock. Certain medium-grained facies of the hornblende paragneiss resemble the amphibole gneiss observed south of Caopatina lake.

Intrusive Rocks

Diorite, Granodiorite and Gabbro

Associated with the lava flows are some dark, medium-grained rocks usually with granular texture which are believed to be intrusives. Their essential constituents are hornblende, plagioclase and, in minor amount, orthoclase, and the names diorite, granodiorite or gabbro are used, according

to the relative proportions of these minerals.

Gneissic Granite

Gneissic granite underlies approximately 25 per cent of the map-area and the greater part of this gneiss lies in the southern half of the area. There are also a few exposures of gneissic granite in the northwest section of the area, on an island which lies midway between the two long, south-west-trending points in Caopatina lake. There are also some granitic rocks in the northeast corner of the area, under Neston lake and around its eastern shores. These two northern localities are in the belt of Keewatin-type rocks. A few narrow granitic dykes cut the volcanic rocks in the northeastern part of the map-area.

Numerous inclusions of paragneiss were observed in the gneissic granite near the contacts of the granite with the paragneisses. Abundant dykes and zones of pegmatite cut the gneissic granite.

Numerous facies of granitic rocks have been grouped under the name of gneissic granite. The prevailing type in the area is a grey to pink, medium- to fine-grained rock characterized by a gneissic structure which is well developed in places. The essential constituents are quartz, potassic feldspar, plagioclase, biotite and hornblende, and the granite of the contact zones often contains muscovite. The relative proportion of biotite and hornblende varies considerably from place to place.

The granite on the small island in Caopatina lake is a medium-grained, white to pinkish rock with a gneissic structure and a cataclastic texture. It consists mainly of leucocratic minerals such as quartz and feldspars and contains a little muscovite, chlorite and epidote.

The approximate boundaries of the Neston lake granitic body, as shown on the accompanying map, have been located with the help of a geophysical map prepared for Neston Lake Mines Ltd. The only known outcrop of this granite is found on a small point on the north shore of Neston lake and even this outcrop was not examined by the writer since the level of the lake had been raised to allow sea-planes to land and the outcrop was submerged.

The volcanic rocks are cut in several places by small, fine-grained granitic dykes.

Diabase

Several diabase dykes cut the paragneisses and granitic gneisses. The most important one, that of Oriol lake, has a known length of about four miles and a width of at least 400 feet. Diabase dykes are reported to cut the Keewatin-type rocks of the northern part of the area but were not observed by the writer.

The diabase is a black, heavy rock usually with a characteristic ophitic texture. It is medium-grained except near its contacts where

the grain is finer. This variation in grain size is easily observed along the western contact of the Oriol Lake dyke, particularly near the granitic outcrops of the southern part of the lake. The essential minerals are pyroxene, amphibole, plagioclase and, in certain cases, olivine. In the altered facies the pyroxene is generally replaced by amphibole. The relative percentage of these various minerals vary in such a way that in some places plagioclase predominates whereas in other places mafic minerals are more abundant.

Cenozoic

The greater part of the area is covered with a mantle of glacial drift of variable thickness. The greater part of it is till but there are a few fluvio-glacial deposits. Morainic deposits are relatively abundant and a few eskers are found. These are composed of clayey sand or gravel, and trend between south and southwest.

STRUCTURAL GEOLOGY

Folds

There is a general east-west trend of the layers, schistosity, and gneissic structures, as well as of the contacts of the various formations in the northern part of the map-area. The zones of gneissic rocks are less regular in the south.

In the Keewatin-type rocks the lavas and clastics are usually schistose, whereas little or no schistosity is observed in the accompanying basic intrusives. It seems that the schistosity is everywhere parallel to the bedding and to the lava flows. Except for a few pronounced local variations, the general strike is about east-west, with a few deviations north and south of east. In the western part of the belt, dips vary between 30° and 90° to the north, whereas in the eastern part the average dip is steeper and varies between 60° and 90° north, although a few steep dips are to the south.

In the zone of hornblende, chlorite, and mica schists and amphibole gneiss to the south of the Keewatin-type rocks, the schistosity strikes slightly north of east and dips are generally steeply south.

No top and bottom determinations of the formations were possible. However, if these formations are in normal position and the schistosity is everywhere parallel to the original bedding, there is, in the northern part of the area, the possibility of an anticline whose axial line would strike about east-west but whose plunge is unknown. It is impossible to locate precisely the trace of the axial plane due to the paucity of outcrops, but a fair approximation would place it about three miles south of the northern limit of the map-area. The change in the direction of the dips already noted could also be explained either by a fault or by an unconformity.

The trend of the gneissic structure of the paragneisses usually conforms to the shape of the individual outcrops. The general orientation of the various outcrops, the repetition of the rock units, the general orientation of the formations and the steep dips combine to indicate the probability

that the paragneisses form a series of tight folds whose axes trend east-west. These same criteria serve to interpret local structures which are, in certain places, transverse to the regional structure. Thus, there is a north-plunging syncline in the area between Grimaldi and Verchères lakes. This fold is transverse to the general structure and is due to the intrusion of two granite bodies lying to the east and to the west of the fold.

In the gneissic granites, near their contacts with other rocks, the gneissic structure is parallel to these contacts but is more or less regular away from them.

Shear Zones

There are many shear zones in the northern third of the map-area, but they are much rarer in the southern part although a few were observed.

The northern shear zones trend east-west with slight deviations to the north or south. A few are north-south. Near the southern tip of Pierre lake, in the southwestern part of the area, the granite is sheared along a zone parallel to the length of the lake, i.e., about north-south.

ECONOMIC GEOLOGY

General Statement

In the past few years prospectors have done extensive work in the northern part of the map-area with the result that most of the area north of the central line of Gamache and Hazeur townships has been staked. A few claims have also been staked south of this line.

The mineralized zones of the northern part of the area are characterized by carbonatization and silicification of the rock. In these zones, disseminated pyrite is found, as well as chalcopyrite in a few localities and galena in one place. Assays have revealed the presence of gold in one place and of a little silver in a few others.

Mineralization in the paragneisses consists of disseminated pyrite and also of chalcopyrite in certain places. The two places where this mineralization is most persistent are the southeast and southwest shores of Messine lake, and a point approximately 1,500 feet south of Verchères lake. Both these localities are in biotite paragneiss. Analyses of samples from the second locality reveal the presence of silver, copper and zinc.

A number of companies had worked, or were working, in the northern part of the area at the time of the writer's investigation. Among these are Adnor Mines Limited, Wright-Hargreaves Mines Limited, Hazeur Chibougamau Mines Limited, Meston Lake Mines Limited, Flomic Chibougamau Mines Limited, and Quema Mines Limited.

Description of Properties

Adnor Mines Limited (1,2,3)*

This company holds a group of 21 claims situated in the northeast corner of Gamache township and in the southeast corner of Fancamp township. These claims are numbered C.46125, cl.1 to 5; C.46126, cl.1 to 5; C.43792, cl.2 to 5; C.43793, cl.2, 4 and 5; and C.45444, cl. 1 to 4.

A shear zone (1) situated 600 feet east of post 3, claim 2, C.46125, has a width varying between 6 and 10 feet and has been spotted at intervals over a distance of about 700 feet in a northeast direction. The volcanic rock has been carbonated and silicified and contains numerous veinlets of quartz which rarely exceed 6 inches in width. It is reported that the panning of samples from three localities along this zone has revealed gold.

There is a second gold-bearing zone (2) situated 350 feet south and 450 feet west of post 4, claim 3, C.43792. At this place, the altered volcanic rock is exposed for a distance of about 230 feet in a north-south trending trench. The rock is a carbonated and silicified hornblende chlorite schist, cut by four shear zones whose widths vary from two to ten feet. The two zones in the northern part of the trench strike N.80°E., that in the centre strikes S.80°E. and the southernmost one, S.50°E. Dips are vertical and the zones are injected with lenses and veinlets of quartz. Disseminated pyrite and chalcopyrite are found in the quartz and in the schist wall-rock of the veins. It is claimed that the panning of samples from the two northern zones has revealed gold. Two specimens were taken from the southern zone of the northern part of the trench, one from a quartz vein and the other from the adjoining schist. These heavily mineralized specimens, on analysis, have revealed 0.843 and 0.116 ounce of gold per ton, respectively.

By mid-August, 1952, 25 diamond-drill holes totalling 12,318 feet had been completed. Four of these holes were drilled to determine the geological section of the property, three to study the gold-bearing zone (1) of the western part of the property, and the others to determine the possible extension of the gold-bearing zone of Chibouga mau Explorers Limited, whose holdings lie to the east of the map-area. It is believed that this zone crosses the eastern limit of the Adnor property some 1,300 feet south of the northern limit of Gamache township (3). The core from one hole reveals native gold over a width of one foot but none was observed in the cores from the adjacent holes.

Wright-Hargreaves Mines Limited (4)

This company's holdings consist of a group of six claims situated west of the Adnor Mines property in Gamache township. The claims are numbered C.46129, cl.1 to 5; and C.46128, cl.1.

*Numbers in brackets correspond to those on the accompanying map which indicate showings and a few drill holes.

The country rock consists of lavas associated with a few sills of gabbro and diorite. There is in the southeast corner of claim 3, C.46129, a shear-zone (4) of carbonated and silicified rocks which seems to extend over a distance of at least 700 feet; this zone strikes N.70°W, and dips 80° to the north. It is reported to have shown gold and that a sample assayed 0.4 ounce to the ton over a three-foot width.

The company has diamond-drilled a total footage of 1,800 feet in six holes along this zone.

Hazeur Chibougamau Mines Limited (5)

The property of Hazeur Chibougamau Limited consists of 16 claims in the southeast corner of Rasles township and of 5 claims in the northeast corner of Hazeur township.

The country rock consists of lavas associated with a few basic intrusives. The company's main showing (5) lies 1,050 feet east of post 1, claim 1, C.46530, on the limit between Hazeur and Rasles townships. Here the rock is a carbonated chlorite schist whose schistosity strikes between N.85°W, and 75°W, and dips between 45° and 65° to the north. The numerous quartz veins are usually parallel to the schistosity but some, up to one foot wide, although striking in the same direction dip only about 20° to the north. Galena and pyrite are found in the quartz as well as chalcopyrite in a few places. There are two types of quartz - one having a light bluish tint whereas the other is milky white.

The outcrop has been exposed in a trench about 230 feet long along the strike of the schist and over a width of about 50 feet.

Seventy feet from the eastern end of the trench, the zone is cut by a north-south fault and the apparent displacement of the eastern block with respect to the western one is approximately 50 feet to the north. The zone is cut at the eastern end of the trench, by a quartz vein which has been spotted by means of short trenches, along a line, about 185 feet long, striking N.20°W. Inclusions of schist in the vein suggest a strike of N.10°W, and a dip of 30° to the east. The exact width of the vein is unknown but it does exceed 5 feet. The quartz contains pyrite and galena, the latter's percentage being higher than that in the zone described previously.

There is an exposure of schistose gabbro 65 feet east of the quartz vein just described, whose schistosity strikes N.10°W, and dips 45° east.

It is reported that a quartz sample from the northern end of the main shear zone has assayed one ounce of gold to the ton. It is also reported that native gold was observed in a 6-inch-wide vein in carbonated chlorite schist which lies 180 feet west and 40 feet south of the intersection of the township line with the southern edge of the main showing.

Meston Lake Mines Limited (6)

The property of Meston Lake Mines Limited consists of 23 claims grouped around Meston lake, in the northeast corner of Gamache township.

The main showing (6) is on a small point on the northeast shore of Meston lake and consists of a gold-bearing quartz vein in a granitic rock. The company undertook to diamond-drill this showing during the winter of 1952, but the results were not very encouraging. At the time of the writer's visit, the outcrop was submerged because the level of the lake had been raised to allow sea-planes to land.

Flomic Chibougamau Mines Limited (7)

This company controls a group of 20 claims situated west of those held by Meston Mines Ltd. During the winter of 1952, 17 diamond-drill holes, totalling 8,429 feet, were drilled. It is said that the formations encountered were basic volcanics and gabbro but more massive than those found east of the property.

Quemac Mines Limited

This property consists of 10 claims in Fancamp township northeast of the Adnor Mines property. During the spring and winter of 1952, the company carried on a diamond-drilling programme and sank 7 drill holes, totalling 4,200 feet, along a line extending north-south across the property. The country rock consists of Keewatin-type volcanics cut by granitic intrusives and quartz veins, the latter being slightly mineralized with pyrite and chalcoppyrite.
