

# RP 221(A)

PRELIMINARY REPORT ON BRANSSAT - KREIGHOFF AREA, ABITIBI-EAST COUNTY

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PRELIMINARY REPORT  
ON  
BRANSSAT-KREIGHOFF AREA  
ABITIBI-EAST COUNTY

BY  
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QUEBEC  
1948

BRANSSAT-KREIGHOFF AREA

Abitibi-East County

by J. E. Gilbert

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

The Branssat-Kreighoff Area, which was mapped during the summer of 1948, is situated in the county of Abitibi-East and extends between latitudes 49°45' and 50°00' N. and longitudes 75°45' and 76°00' W. It comprises about 200 square miles and includes the main part of Kreighoff and Branssat townships with narrow strips of projected townships Nos. 716 and 616 to the west, and of Daine and La Ribourde to the east. Inconnu lake, close to the centre of the area, is 122 miles north-northeast of the town of Senneterre, a divisional point on the Quebec-Cochrane line of the Canadian National Railways.

The area can be reached most readily by hydroplane from bases at Senneterre, Amos, or Rouyn. From Senneterre, the trip requires about one hour and fifteen minutes of flying time. The best canoe route from Senneterre is down Bell river to Mattagami lake, and then up Waswanipi river to Goéland lake. From Goéland lake, the route is either along Waswanipi river and Renault creek to reach into the southern section of the area or through Maicasagi lake and along Maicasagi and Inconnu rivers to reach into the northern and central parts of the area. The canoe route

involves considerable packing and should not be undertaken except by experienced canoemen. The air route is easier and probably cheaper.

Excepting the means offered by Inconnu and La Trève rivers, Branssat and Renault creeks, there are no easy water routes for travel within the area. To reach the northern part from Inconnu lake by canoe, it is necessary to go eastward along tributary streams and lakes and along one portage of little more than a mile to reach La Trève lake, seven miles east of the area, and thence westerly along La Trève and Maicasagi rivers. In the southern part of the area, there is a poorly blazed trail (not shown on the accompanying map), about five miles long, joining Gilles bay, on Inconnu lake, to the northern tip of Renault lake. During the field work done for this report, most of the portages were cleaned out, and a number of lines, as shown on the accompanying map, were blazed to facilitate access to various sections of the area. Travelling through the bush is, in general, easy.

The southwestern section of the area, underlain chiefly by gabbroic rocks, is fairly high and rugged. The remaining part is, in general, of subdued topography, with low, rolling hills usually not rising more than one hundred feet above the surrounding thickly-covered ground. Notable exceptions are a series of northwest trending ridges, underlain mainly by gabbro, which extend from the northwest side of Inconnu lake to the western boundary; a very conspicuous sharp knoll composed of granitic rock, one mile southeast of the northwest corner; and a plateau about two miles long and three miles wide, underlain by highly folded volcanics, near the northeast corner of the area.

Renault lake, at the southern edge of the area, is apparently in a fault zone, and its shores are high and rocky. Inconnu and most of the smaller lakes are, on the other hand, very shallow and surrounded by low and flat ground. The drainage pattern of the area reflects, in general, the complicated structure of the underlying rocks.

### GENERAL GEOLOGY

The above-mentioned elevated parts of the area exhibit a good number of bedrock exposures. In the remainder, outcrops are scanty and difficult to find.

Volcanics and sedimentary formations each occupy about 30 per cent of the area, and a group of altered basic intrusive rocks another 20 per cent. The remaining 20 per cent consists of acidic intrusive bodies, which constitute marginal zones or lobes of more extensive granitic masses lying outside of the map-area, and a few small bodies of porphyries and late diabase.

#### Volcanic series

The volcanic rocks of the Inconnu Lake area can be roughly divided into one main southeasterly trending belt in the northern half of the area and three zones of lesser extent in the southern half and separated from the main belt by a wide band of sedimentary material.

The northern belt may be regarded as some seven and a half miles in average width, with its northern boundary following La Trève river in the northeast corner of the map-area, and its southern limit passing just north of

Inconnu lake. A large mass of gneissic diorite invades the belt in the northwest corner, and a smaller, crescent-shaped body of similar rock is lodged in the volcanic rocks south of La Trève river. Several concordant bodies of gabbro are present throughout the belt; the most prominent of which lie south and west of Branssat lake.

The three zones in the southern half of the area which have been shown as being underlain by volcanic rocks probably are parts of a more extensive development of these rocks west and south of the map-area. They have been separated by large intrusions of basic igneous rock. Difficulty has been encountered in drawing their boundaries, but some aid in attempting to do so is given by the fact that, in general, the basic intrusives form the hills and ridges while the volcanics underlie the lowlands. Two of the zones are near the western margin of the map-area -- one just south of Inconnu river, and the other one to two miles north of there. The third, and most extensive of these southern zones, enters the southern boundary of the area at Renault lake and, at the north end of this lake, it turns eastward as a narrow band which continues beyond the east boundary of the map-area. The width of this zone is three miles at the southern boundary, while along its eastward extension it hardly exceeds half a mile.

The best exposures of volcanic rocks are near the northeast corner of the map-area and in the section immediately west of Branssat lake. Lithologically, the rocks of this series are similar in the different parts of the area. They are fine-grained, usually schistose, amphibole-rich lavas, close to basalt in composition. Slightly less basic facies, tending towards andesite, are found in scattered places, but more

acidic types are very rare. There are minor occurrences of ellipsoidal lava throughout the whole series, but the best exposures can be seen near the eastern boundary of the area north of Inconnu lake for a distance of about four miles, and on the ridge about one mile northeast of the northern tip of Renault lake. Thin interbeds of tuff are to be seen in different places.

#### Sedimentary rocks

About 30 per cent of the area is underlain by a southeasterly-trending belt of sedimentary rocks. Inconnu lake is near the centre of this belt which, with widths of three to more than eight miles, extends into the Capsisit Lake area (1) to the west and towards La Trève lake to the east. A small group of exposures of similar rock, near the eastern boundary of the map-area, three miles north of Inconnu lake, is possibly a part of a small secondary belt which, farther east, may be connected with the major belt.

Lithologically, the typical sedimentary rock of the area is medium- to very fine-grained, generally well banded, and highly feldspathic. Primary quartz usually makes less than 10 per cent of the constituent minerals; biotite is the usual dominant ferromagnesian mineral, but, in the more basic facies, amphibole appears to be the more abundant. Dark, very fine-grained slaty types can be seen at various places, such as on the east shore of Gilles bay. There are also scattered occurrences of impure chert beds, and a few

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(1) GILBERT, J.E., Preliminary Report on Capsisit Lake area, Abitibi-East County, Que. Dept. Mines; P.R. No. 210, 1947, p. 4.

thin beds of siliceous magnetite were found near the western boundary of the area. Conglomerate outcrops at a few places along the north shore of Inconnu lake, and numerous boulders of similar rock were found along the shores of two lakes just east of Inconnu lake, outside of the present area.

#### Altered gabbroic rocks

Coarse to fine-grained altered basic intrusive rocks are abundant in the area, especially in the western part. There, basic rocks intrude both the volcanic and sedimentary formations but are much more abundant in the volcanics and at the contact between the two series. The smaller masses are all concordant to the flows or bedding and were undoubtedly introduced into the volcanic and sedimentary rocks as sheets or lenses. As the physiographic expression of some of the larger masses also indicates that they are concordant bodies, it is presumed that most if not all of the altered basic intrusives were introduced as sheets or sills. Complicated subsequent folding has given them their somewhat apparent discordance in places, such as in and near the southwest corner of the map-area.

Lithologically, the rocks of the gabbro series are now composed mainly of amphiboles and altered plagioclase whose relative amounts may vary widely even in the same mass. Anorthositic lenses are relatively abundant in some of the best exposed portions, and faint banding caused by the alternance of ferromagnesian-rich and plagioclase-rich layers occurs, among other places, in the large mass south of Inconnu river and in the two masses south of Branssat lake. Dioritic facies in the gabbro were found in only a few



places; one very coarse-grained mass composed of hornblende and plagioclase, one and a half miles northeast of Branssat lake, is believed to be a differentiate from the same magma that produced the gabbro and it has been mapped as belonging to the group of gabbroic rocks.

The smaller masses of gabbroic rocks are generally schistose as a result of the dynamic metamorphism which affected the region after their intrusion. In the larger masses, the schistosity is confined to near their margins; towards the centre, the granularity of the gabbro has been better retained.

#### Granitic rocks

Granitic rocks of three principal types, constituting about 20 per cent of the map-area, intrude the volcanic, sedimentary, and gabbroic rocks.

The northwest and northeast corners of the area and a narrow crescent-shaped section, about three miles west of the northeast corner, are underlain by a fine to medium-grained gneissic quartz-diorite which probably represents portions of offshoots of a very large granitic mass that extends several miles towards the north. The typical gneiss is a fairly well-banded, light to dark grey rock with, in addition to the predominant feldspar, between 10 and 25 per cent of fractured, glassy quartz and with biotite as the main ferromagnesian mineral. It is cut by dykes and small masses of fine-grained biotite granite, by numerous pegmatitic dykes and lenses, as well as by a few aplite dykes.

The southernmost section of the area, from Renault lake eastward, is underlain by a highly contaminated border facies of a large granitic mass that extends to the south and east. In the present area, the rock is a medium-grained, pink or greyish pink biotite granite in which the quartz and biotite contents show extreme variations. The biotite is largely altered to green chlorite. Numerous partly digested greenstone inclusions are visible in the granite near its borders. Pegmatite dykes were frequently observed cutting through the granite.

A group of outcrops belonging to the Capsisit Lake granite mass, more fully exposed around Capsisit lake to the west (1), occurs close to the western boundary of the present area, between Inconnu river and the southern boundary. Here, the rock is a medium-grained pink granite containing about 20 per cent fractured glassy quartz, 10 per cent chloritized biotite, and 70 per cent pink altered feldspar. Near its border, it contains numerous gabbroic and volcanic inclusions.

#### Other dykes and sills

Apart from the pegmatitic and aplitic dykes mentioned above, in or near the granitic masses, acidic dykes are not numerous in the area. A few contaminated and altered granitic dykes outcrop here and there, and a few feldspar porphyry sill-like bodies are found at widely scattered places in the volcanic and sedimentary rocks, the largest ones being those outcropping on Inconnu

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(1) GILBERT, J.E., Preliminary Report on Capsisit Lake Area, Abitibi-East County. Que. Dept. Mines; P.R. No. 210, 1947, p. 4.

river, slightly west of the outlet of the lake, and those at the southern tip of Gilles bay. These feldspar porphyry bodies are very frequently schistose, and were probably introduced as sheets prior to the folding of the enclosing rocks.

Relatively unaltered, non-schistose diabase dykes occur at a few scattered points in the area. In all cases, although they trend parallel to the local bedding, schistosity, or gneissic character of the enclosing rock, it appears that they were intruded after the folding and metamorphism of these rocks. The diabase is medium grained, rusty-weathering and consists mainly of pyroxene and creamy white plagioclase in variable proportions. It has a relatively high amount of magnetite, and some olivine can be seen in most of the occurrences. The diabase is probably the youngest intrusive in the area.

## STRUCTURAL GEOLOGY

### Folding

The volcanic and sedimentary rocks and the altered gabbro have in general been intensely deformed and complexly folded together by probably more than one period of dynamic metamorphism so that the attitude of the different folds and the localization of their axes are often difficult to ascertain. The general trend of the bedding and schistosity is about northwest-southeast, but many variations and complications are found through the area. The dips are usually steep or vertical.

A large plunging fold is indicated in the northern section of the area by the crescent-

shaped body of gneissic diorite and the larger mass to the west, both of which have borders and gneissic trend parallel to the schistosity of the surrounding volcanics. The majority of a number of drag folds observed in the volcanics east of the crescent-shaped intrusive mass indicate that the main fold is an anticline, plunging  $55^{\circ}$ S.E., with its axial plane striking  $S.65^{\circ}$ E. and dipping about  $80^{\circ}$ S.W. On the northern limb of the fold, the beds, according to this interpretation, would be overturned.

Attitude determinations on undeformed pillows in the lava flows north and south of Huguette lake indicated the tops as being towards the south. In the sedimentary rocks, well-developed fracture cleavage in the slaty beds on the eastern shore of Gilles bay indicated tops towards the north. From these determinations, a synclinal axis is presumed to lie somewhere near the centre of the sedimentary belt or slightly farther north. This conclusion is strengthened by the fact that the sedimentary belt is bounded on both sides by volcanic and gabbroic rocks of very similar characteristics.

In the southern part of the area, the structures are more complicated. The direction of their trends follows the margins of the two acidic intrusives, possibly indicating that these were part of the active force that produced the folding of the intruded rocks. It is also conceivable that the volcanics and gabbro in the southwestern section of the area were subjected to folding before the intrusion of the granite masses which might have come up through steeply plunging folds.

### Shearing and faulting

A number of small shear zones were observed in the area, more abundantly throughout the volcanic and altered basic intrusive series than in the sedimentary rocks, and seldom in the granitic masses. These, usually narrow, shear zones are, except where the rocks are highly drag-folded, parallel to the local schistosity or bedding. The largest ones or those which are made more interesting either by pyrite mineralization or by quartz-carbonate replacement are shown on the accompanying map.

Renault lake is probably located in a fault zone trending N.40°E. The volcanics on its east shore near the southern boundary of the area are highly sheared in places, parallel or nearly so to the elongation of the lake itself, and slickensides are visible on the cliffs along the east shore. The movement along the fault is believed to have been very close to vertical.

### ECONOMIC GEOLOGY

As mentioned above, a relatively large number of small shear zones were located in the area during this investigation. Most of them contain a certain amount of carbonates, and quartz is fairly often associated with them. Pyrite also occurs in some of them, and traces of chalcopyrite were seen in a few places. Numerous small lenses of quartz and carbonate were also found, especially in the volcanic and sedimentary rocks. White barren quartz veins are relatively abundant in the volcanic, sedimentary, and altered basic intrusive rocks. Blue quartz, in the form of lenses, stringers, and eyes, is common.

in the sedimentary rocks south to Gilles bay and in the gabbro to the west.

Low gold and silver values were obtained from a small quartz-carbonate-rich shear zone in volcanic rocks, two miles south and one mile east of the northwest corner of Kreighoff township. Heavy pyrite and pyrrhotite replacement occurs in sedimentary rocks near their contact with the volcanics and a small intrusive mass at a point in Branssat township one and a half miles east of the western boundary and five miles south of the northern boundary of the area. Stripping and trenching there have exposed a heavily oxidized and mineralized band up to three feet wide which is strongly magnetic and contains considerable massive sulphides and quartz nodules. Assays, however, indicated only low values in silver, copper, and nickel, but no gold in this zone. A similar type of massive sulphide rock was found as a large boulder, half a mile south of the middle of the long portage that goes southwestward from the outlet of Inconnu lake, but there, also, only low values in silver, copper, and nickel were indicated by assays.

A strong magnetic anomaly was noted south of Inconnu river, two and a half miles east of the western boundary of the area. A line was blazed from the river to this place, as indicated on the accompanying map, and a dip needle survey was made in the locality. It was found that the maximum readings were obtained, not in the massive gabbro exposed nearby, but in a low and thickly-covered area between gabbroic exposures.

In the northern belt of volcanics, especially near the eastern boundary of the present area and farther east towards La Trève lake, there are a large number of quartz-carbonate-pyrite-rich

lenses and stringers, and the highly folded and crumpled volcanic rocks provide suitable structures for the localization of mineral deposits. The vicinity of an acidic intrusive is another favorable factor, and the presence of intensely carbonatized rock exposures near the eastern boundary, about four miles south of the northeast corner, indicate that hydrothermal solutions were active in this region.

Although no encouraging assay results have so far been obtained, the places mentioned above and other parts of the area warrant further attention by the prospectors.