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PRELIMINARY REPORT ON THE LAC LA TREVE AREA, ABITIBI-EAST COUNTY

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PRELIMINARY REPORT
ON
THE LAC LA TREVE AREA
ABITIBI-EAST COUNTY

BY

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PRELIMINARY REPORT

ON

THE LAC LA TRÈVE AREA

by J.-E. Gilbert

INTRODUCTION

Location and means of access

The Lac La Trève area, mapped during the summer of 1949, includes the major part of La Trève lake which is about 135 miles north-northeast of Senneterre, a town on the Quebec-Cochrane line of the Canadian National Railways. The area lies between longitudes 75°30' and 75°45'W. and latitudes 49°45' and 50°00'N. and is immediately east of the Branssat-Kreighoff area, mapped by the writer in 1948 (1). It comprises about 200 square miles and includes most of the townships of Daine and La Ribourde and, along its eastern margin, a narrow strip of Saussure and Guettard townships, all in Abitibi-East county.

La Trève lake can be reached by hydroplane from bases at Senneterre, Amos, or Rouyn in about one and a half hours' flying time. By canoe, the best route is from Senneterre along Bell river to Mattagami, Olga, Goéland, and Maicasagi lakes, and thence along Maicasagi river and its tributary, La Trève river. Another possible canoe route from Goéland lake is up Waswanipi and Chibougamau rivers, the latter of which flows southwestward across the southern section of the map-area. Along the upper sections of Maicasagi and Waswanipi rivers, the whole length of La Trève river, and that part of Chibougamau river leading to the map-area, the current is strong, and rapids and falls are numerous, making the canoe routes long and difficult ones that should be undertaken only under the most favourable conditions and by persons experienced with canoes.

Two good portages connect La Trève lake to the Chibougamau river basin, one of which is from Dussault bay eastward and outside of the map-area, and the other from the southern tip of Rita bay southward. The lake can also be reached from Inconnu, La Ribourde, and Daine lakes to the west by a portage, one and a third miles long, between Daine lake and Rita bay. Most of the portages of the area were cleared out during the field seasons of 1948 and 1949 by the writer's parties, and two lines, shown on the accompanying map, were blazed from the southern part of Rita bay southward, to facilitate access to that section of the map-area located between La Trève lake and Chibougamau river.

Travelling through the bush is, in general, fairly easy.

(1) GILBERT, J.-E., Branssat-Kreighoff Area, Abitibi-East County;
Que. Dept. Mines, P.R. No. 221, 1948.

Topography

La Trève lake is about 1,050 feet above sea-level, and Daine and La Ribourde lakes, near the western edge of the map-area, are about 75 feet lower. The level of Chibougamau river where it crosses the southern boundary of the map-area is a little less than 1,000 feet above sea-level.

Most of the area is of subdued topography. The most conspicuous landmark is an elongated, northeasterly-trending ridge, underlain by unaltered diabasic rock, in the northern half of the map-area. This ridge stands about 150 feet above the low and flat surrounding ground and, near the small lake south of Gisèle lake, it forms a steep scarp more than 250 feet high. Other, less prominent elevations occur in that section of the area underlain by schistose volcanic rocks close to the west shore of Gilbert bay, at the two granitic bosses south of Gisèle lake and east of Rita bay, and in a belt, about two miles wide, slightly south of and somewhat parallel to the course of Chibougamau river, in the southern part of the map-area.

GENERAL GEOLOGY

Exposures of bedrock are relatively abundant in the elevated areas described above but are very limited in number and extent in the central, low section around the southern half of La Trève lake. It is, however, possible to infer from their distribution that volcanic and sedimentary formations occupy about 75 per cent of the area. The remainder is underlain by acidic intrusive rocks of various types, with a few small bodies of altered, gabbroic to dioritic intrusives and dykes of fresh diabase.

The volcanic and sedimentary rocks in the region extending eastward from this area have been considered by Beach and Norman as belonging to at least two different ages, which they designated as Pre-Opémisca and Opémisca (1, 2, and 3). As some of the volcanic and sedimentary rocks in the Lac La Trève map-area are strikingly similar to those of the Pre-Opémisca while others strongly resemble the Opémisca series, the same classification is being applied to the pre-granitic rocks of the area here under review.

Pre-Opémisca Rocks

Volcanic series

The extrusive igneous rocks of the Pre-Opémisca series are represented within the limits of the present map-area by two bands of unequal size, trending more or less east-west, and composed of volcanic rocks

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- (1) BEACH, H.H., Mechamego Lake, Abitibi Territory, Quebec; Geol. Surv. Can., Map 608A, 1941.
- (2) " " " Michwacho Lake, Abitibi Territory, Quebec; Geol. Surv. Can., Map 623A, 1941.
- (3) NORMAN, G.W.H., Opémisca (West Half), Abitibi Territory, Quebec; Geol. Surv. Can., Map 602A, 1941.

of typical Keewatin appearance. The larger of the two bands outcrops in the northern half of the map-area and is close to six miles wide at the western boundary. Farther east, it decreases slightly in size, but the band averages a width of about four and a half miles across the entire area. The southern band of Keewatin-type volcanics is about half a mile wide and outcrops about one mile north of the southern limit of the southwestern section of the map-area. Eastward, it is interrupted by a large body of granitic rock extending from the south into the present area but it reappears between the granite mass to the south and sedimentary formations to the north, about one and a half miles west of the eastern boundary of the map-area.

Lithologically, the volcanic rocks of this series are dominantly fine-grained, schistose, amphibole-rich lavas close to basalt in composition. Andesitic types occur in relatively thin flows within the basalt, and dacite outcrops with andesite along the northwestern shore of La Trêve lake, immediately east of the entrance to Gilbert bay.

Ellipsoidal flows are relatively common in the northern band of volcanics, and amygdaloidal and vesicular facies occur interbedded with them. Thin interbeds of buff-coloured tuffs and of fragmental lavas are present here and there throughout the series.

Sedimentary series

Sedimentary and tuffaceous formations of Pre-Opémisca age outcrop mainly in the southern half of the map-area, where they constitute a belt slightly more than four and a half miles wide at the western boundary and apparently decreasing to a width of less than one and a half miles at the eastern boundary. In addition, one exposure of highly carbonated rock of probable sedimentary origin was found close to the western boundary of the map-area, about two and a half miles south of La Trêve river; it probably is in the same belt as a small group of exposures of sedimentary rocks in the Bränssat-Kreighoff area to the west (1). The western section of the main belt is slightly better exposed than the remaining part, which is covered by a thick mantle of sand and gravel. Outcrops in this generally covered part were observed only at scattered points along the northern shore of Chibougamau river, in the central-southern section of the map-area.

The Pre-Opémisca sedimentary rocks constitute an assemblage of fine to very fine-grained, generally highly feldspathic rocks, with a few exposures of chert, slates, greywacke, and chert-pebble conglomerate. The rocks generally weather buff to white and are usually poorly bedded, although the very fine-grained types are commonly well layered. The dominant, highly feldspathic rock is fine-grained, poorly-bedded, grey in colour and slightly schistose. Impure chert beds and black slates occur at a few localities, and a few exposures of conglomeratic rock with subangular cherty pebbles set in a fine-grained, feldspathic matrix were found along the north shore of Chibougamau river three miles west of the eastern boundary of the map-area and also along the easternmost blazed line about one quarter of a mile north of the river.

(1) GILBERT, J.E. Op. cit. p.5.

Altered gabbro and associated diorite

Medium to fine-grained altered gabbroic to dioritic rocks outcrop here and there throughout the Pre-Opémisca volcanic and sedimentary series. The exposures are few and occur generally on or near the top of small elongated ridges trending parallel to the local bedding or schistosity of the older intruded formations. The gabbros and associated diorite are altered and schistose and are now composed mainly of dark green amphiboles and altered plagioclase in variable proportions, but hornblende generally makes up more than 60 per cent of the rock. As no exposures of this type of rock were found in the section of the map-area underlain by rocks of the Opémisca series, it is considered that the small gabbroic and dioritic masses were probably introduced as concordant lenticular bodies into the volcanic and sedimentary rocks, prior to deposition of the Opémisca series.

Opémisca Series

Rocks considered as belonging to the Opémisca series of Norman and Beach outcrop in a wide belt extending across the central part of the map-area. At the western boundary, this belt is slightly less than four miles wide and, at the eastern limit of the map-area, it is at least five miles across. An isolated exposure of porphyritic lava, resembling the typical porphyritic basalt of the Opémisca series, about two miles north of Chibougamau river and 1,000 feet west of the eastern boundary of the map-area, indicates that this belt of Opémisca series may extend that far south and thus be more than eight and a half miles wide in that part of the area.

The rocks of the Opémisca series include pebble and boulder conglomerate, fine to medium-grained sedimentary rocks, and porphyritic basalt and andesite.

The conglomerate is well exposed on the southern shore of Dussault bay, slightly less than one mile west of the eastern boundary of the map-area, and along most of the southern edge of the diabase dyke that extends southwestward across Geneviève bay. Another exposure of similar conglomeratic rock occurs 3,000 feet north of the outlet of La Ribourde lake, and numerous boulders of similar rock are present along the south and east shores of Geneviève bay and along the shores of Daine lake. The conglomerate contains generally well-rounded pebbles, cobbles, and boulders of acidic intrusive rocks, of cherty and tuffaceous sedimentary rocks, and, to a lesser extent, of altered gabbroic and volcanic rocks. In places, pebbles make up close to 80 per cent of the rock. The matrix is usually a fine-grained, feldspar-rich greywacke.

The medium to fine-grained sedimentary rocks of the Opémisca series include generally poorly-bedded greywacke and arkose, in places containing relatively high amounts of disseminated iron oxides, some chert and feldspathic sediments. Along the east shore of the entrance to Rita bay, and about one and a half miles farther south along the shore, a basic, fresh, porphyritic lava occurs interbedded with the Opémisca sedimentary rocks. Exposures of a similar lava are also to be seen at low water along the west side of the southern of the two large islands in the centre of Rita bay and along the eastern shore of the extreme southwestern extension of the bay. At this

latter place, the porphyritic basic lava grades northward into a coarse-grained, occasionally porphyritic andesite in which the content of feldspar varies from one outcrop to another. There are similar exposures of coarse-grained or porphyritic andesite scattered throughout the southern half of the belt of Opémisca rocks, as shown on the accompanying map. The basic facies of the Opémisca lava appear relatively unaltered and the rock is massive. The differential weathering between the phenocrysts of the ferromagnesian minerals and the fine-grained matrix gives the rock a very rough and pitted surface. The more feldspathic facies, on the other hand, appears considerably altered, most of its feldspar is believed to be secondary, and its weathered surfaces are relatively smooth.

Post-Opémisca Rocks

Granitic rocks

Granitic rocks underlie about 25 per cent of the map-area and fall naturally into three different groups:

- a) A generally gneissic, pale grey, oligoclase granite or quartz diorite, exposed in the northwest corner of the area and extending eastward to Mildred lake. It is a border facies of a large granitic mass that lies north and northwest of the map-area.
- b) A coarse to medium-grained, commonly altered and contaminated, hornblende syenite or diorite, well exposed along Chibougamau river and in the extreme southern section of the map-area. This intrusive is generally quartz-poor, well jointed, and is, at a few places, intruded by a quartz-rich, commonly foliated, pale grey, biotite granite, and by pegmatitic dykes.
- c) Five bosses and numerous dykes of acidic intrusive rocks of various compositions scattered between the two main bodies of granitic rocks just described. South of Gisèle lake, the rock is a medium-grained, altered, pink, biotite granite. A group of exposures of fine-grained, contaminated, hornblende-biotite granite and quartz-syenite occur southeast of the entrance to Rita bay. Along the north side of the northern of the two large islands in the central section of the bay, the rock is a fine-grained granodiorite. One exposure of fine-grained, grey, quartz syenite was found slightly more than three and a half miles south of the latter locality and four miles west of the eastern limit of the map-area, and a fine-grained grey granite underlies a small hill located half a mile east of the western boundary of the map-area and two and a half miles slightly west of south from La Ribourde lake.

Small granitic, syenitic, and porphyritic dykes occur at scattered localities throughout the present area but are found more abundantly intruding the rocks of the Opémisca series than elsewhere.

Late basic dykes

Basic dykes of probable Keweenawan age outcrop in widely separated parts of the area. The most prominent is a fine to medium-grained,

fresh, olivine diabase extending, possibly with short interruptions, from the eastern limit of the map-area, half a mile south of the southern shore of Dussault bay, southwestward to beyond the western end of Geneviève bay. From 200 to 300 feet wide, it has a finer-grained, chilled, border facies. It is well jointed, but highly resistant to erosion, and forms a conspicuous landmark across the north-central half of the map-area.

A little quartz is visible in some of the fine-grained diabase exposed half a mile east of the western boundary of the map-area and half a mile north of the outlet of La Ribourde lake.

A small dyke of fresh diabase is exposed about half a mile west of the west shore of Gilbert bay, and a deeply-weathered, coarse, magnetite-rich, diabasic gabbro forms two low exposures about half a mile south of the western end of the same bay.

Fine-grained, dark-coloured trap dykes outcrop in the Opémisca series in close relation with the main olivine diabase dyke.

STRUCTURAL GEOLOGY

The general trend of the pre-granitic formations of the area is close to east-west at the western limit of the map-area, whereas, towards the east, the average strike of the bedding and schistosity bends to become about N.60°E. near the eastern boundary. The contact between the gneissic granitic rocks of the extreme northern section of the map-area and the intruded volcanics is closely parallel to the foliation of both the intrusive and the volcanic rocks. The more massive granitic mass exposed in the southern part of the map-area is somewhat more discordant, but likewise displays a tendency to have its limits nearly parallel to the strike of the adjacent intruded formation. The smaller granitic bodies tend to cut across the other formations.

The sedimentary beds and lava flows are, with very few exceptions, steeply inclined to the north or are vertical. A few good pillow structures in the main band of pre-Opémisca volcanics of the northern half of the map-area indicate that the tops of the flows are towards the south. No reasonably safe determination of tops and bottoms of beds could be obtained in the sedimentary formations of the area owing to the paucity of exposures and, for the same reason, no definite proof was found of the unconformity between the Opémisca and Pre-Opémisca rocks that exists farther east (1 and 2). The distribution of exposures of porphyritic lavas of Opémisca age seems to indicate that the lavas are interbedded with the sedimentaries instead of overlying the sedimentaries, as believed by Norman and Beach (1 and 2) in the map-areas to the east.

Observations on small drag folds in the Pre-Opémisca and Opémisca formations indicate that the major folds, that undoubtedly exist in both series, have a vertical or very steep plunge.

(1) NORMAN, G.H.W., Op. cit.

(2) BEACH, H.H., Op. cit.

Small shear zones are of fairly common occurrence in the volcanic and sedimentary rocks of the area. Most of them, however, are very limited in size and do not show any concentration of interesting minerals. The largest ones, and also those in which pyrite, quartz, or carbonate is present, are indicated on the accompanying map. Most of the shear zones strike parallel to the local bedding or schistosity.

No evidence of major faulting was found in the area, although there are some fractures that show small displacement of the walls. Joints are abundant in the granitic intrusive of the southern section of the map-area.

ECONOMIC GEOLOGY

Sulphide-bearing lenses and veins of quartz and carbonate are present in some of the shear zones in the pre-granitic rocks of the area, more abundantly throughout the northern belt of volcanics than elsewhere. This feature along with a locally complex structure and the occurrence of granitic rocks to the north, makes that section of the area an interesting one for prospecting.

The occurrence of massive pyrrhotite and pyrite, apparently related to the main diabase dyke but slightly east of the present map-area, makes worthwhile a thorough investigation of the formations in the vicinity of that type of rock.

A fine dissemination of pyrite is common in the small granitic bosses and dykes and in the adjacent intruded rocks. Along the northern tip of the northern of the two large islands in the middle of Rita bay, there are concentrations of sulphides in quartz veins cutting the mineralized intrusive. This and the other small granitic bodies, as well as the adjacent rocks, should be carefully investigated.