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PRELIMINARY REPORT ON LOIS LAKE AREA, AIGUEBELLE AND PRIVAT TOWNSHIP, ABITIBI-WEST ELECTORAL DISTRICT

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PRELIMINARY REPORT

ON

LOÏS LAKE AREA

AIGUEBELLE AND PRIVAT TOWNSHIPS

ABITIBI-WEST ELECTORAL DISTRICT

BY

B. LEE

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PRELIMINARY REPORT

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INTRODUCTION

An area of fifty square miles, comprising ranges VII, VIII and IX, Aiguebelle township, and ranges I and II, Privat township, was mapped geologically by the writer and assistants during the summer of 1951. Mapping was done on a scale of 1 inch equals 1,000 feet. The area completes a strip 3 to 5 miles in width mapped by the writer in 1949, 1950 and 1951 which extends easterly for 40 miles from the Ontario boundary.

Previous mapping was undertaken by Buffam in 1925 (1) and a re-examination was made by Lang in 1932. (2).

The northern part of the area is readily accessible by road from Taschereau, a village on the Canadian National railway. The southern part of the area can be reached from the south shore of Loïs lake and from the Canadian National railway.

PHYSIOGRAPHY

The area lies within the clay belt of northwestern Quebec. However, a major physiographic feature of this broad area, the clay lowlands, is represented in this area by only one narrow band of varved clay which lies astride the I - II range road of Privat township from lot 12 to lot 27. The average width of this band is 2,000 feet. Elsewhere to the north of Loïs lake, the terrain is one of rolling stony forest soils and sands pierced by numerous low oval-shaped rock hills whose long axes are parallel to the regional strike.

South of Loïs lake, the number of outcrops is much greater. A series of rugged, equidimensional hills are ranged parallel to the strike of the formations. Near the lake, these are separated by draws with muskeg floors. Towards the south, the land rises rapidily to the Abijevis hills, a range of high, steep, easterly-trending hills which lies to the south of the map-area.

Heavy aprons of sand mask the rock surfaces north of Loïs lake in lots 38 to 50, ranges I and II, Privat township, and south of the lake in lots 14 to 28, ranges VIII and IX, Aiguebelle township. Gravel occurs within the general area of the sand in the form of bars; it occurs in quantity to the east of the railway in lots 11 and 12, range VIII, Aiguebelle township, where it has been excavated in the past for ballast.

(1) References are at the end of the report.

Over most of the area, the drainage is into Loïs lake, which in turn drains, via Loïs river, into Macamic lake. Several small lakes and ponds occur within the map-area. However, the major water-feature is the narrow easterly-trending Loïs lake. This lake occupies a trough which is thought to have been developed by the down-dropping of blocks along a number of narrow parallel shears. The trough continues across the side of Black creek to the east margin of the area in lots 65 and 66, range IV, Aiguebelle township. A second remarkable topographic feature developed along a fault marks the east end of Loïs lake. Here narrow, steep rock-walled bays extend north and south for a total length of 3 miles. The narrow trough which contains these bays extends beyond the north and south margins of the map-area. Within it lie Genest lake to the north and Fréville lake to the south.

GENERAL GEOLOGY

The consolidated rocks are all of Precambrian age and consist of a series of acid and intermediate volcanic flows, a thick series of widely distributed coarse pyroclastic rocks with associated narrow bands of well sorted tuff, a broad band of basic tuff (the Privat band), and a number of acid, intermediate and basic intrusive bodies in the form of plugs and dykes.

The rocks occur on the north limb of a syncline whose axis lies south of the area and is possibly the synclinal axis shown by Ambrose (3, maps 634A and 635A) as trending a few degrees north of west in ranges IV and V, Aiguebelle township. The strike of the formations is N.80°E. to N.85°E. from the west boundary as far east as lots 40, ranges I and II, Privat township, and lots 23, ranges VII and VIII, Aiguebelle township. To the east the strike is S.75°E. to S.80°E., indicating a probable cross fold. Dips are consistently steep, ranging from 85° south through vertical to 85° north. Tops face south, as determined by pillowed flows and by grain gradation within the numerous tuffs and the finer pyroclastic rocks.

After folding, the volcanic and pyroclastic series was invaded by small quantities of diorite, and by dykes of andesite, diabase, and quartz-feldspar porphyry. One short, narrow dyke of pyroxenite also occurs within the lavas.

Numerous parallel, narrow shear zones occur in outcrops along the north and south shores of Loïs lake, as well as on several of the rocky islands which dot the eastern third of the lake. Such shears, which strike east, taken in conjunction with the long, narrow shape of Loïs lake, are felt to indicate a major zone of weakness underlying the Loïs lake trough. The highly schisted rock which occurs in the extension of this zone to the west of the map-area was not found in the Privat-Aiguebelle part of the zone.

A number of faults having strikes of N.10°E. to N.25°E. are found in the area south of Loïs lake, and give the topographic profile a stepped appearance. Diabase dykes occur within several of these faults. The most striking fault other than the Loïs lake shears, is the strong northerly-trending fault mentioned previously, which marks the east end of Loïs lake. A number of minor faults striking N.25°W. are suggested by narrow shears and trenches in the north central part of the map-area.

Prominent drag folding occurs on the north and south shores of Loïs lake, and is apparently associated with the Loïs lake shearing. Intense dragging, though on a small scale, is found along both shores of Loïs bay.

Chloritization is the principal alteration, and is found in both lavas and pyroclastic rocks. Pods of heavily carbonatized pyroclastic rocks occur irregularly in all pyroclastic bands. Such pods, indicated by a dark brown gossan, are discontinuous.

TABLE OF FORMATIONS

Recent and Pleistocene	Forest soils, gravels, sands, varved clays
Post-Algeman	Diabase, pyroxenite, quartz and feldspar porphyries
Post-Keewatin	Diorite, aplite (found only in drill cores)
Keewatin-type	Andesites (pillowed and massive), trachyte, rhyolite, pyroclastic rocks; tuff, agglomerate

KEEWATIN-LIKE ROCK TYPES

Andesite

Massive and pillowed andesites make up the bulk of the lavas within the map-area. The oldest band occurs in the northeastern part of the area, northeast of the "Privat band" of basic tuffs. Here, pillowed andesites occur with trachytic rocks. Pillows strike N.70°W., with tops toward the southwest.

Narrow and discontinuous bands of pillowed andesite alternate with more acidic flows and heavy pyroclastic bands in the area north of Loïs lake and southwest of the Privat band.

The bulk of the andesite occurs south of Loïs lake in the form of massive and pillowed flows. Much of the massive andesite here is the result of erasure of pillow outlines during metamorphism, and occasionally vague pillows or parts of pillows occur in an otherwise massive flow. Ropy lavas, which grade into flow breccias, are common.

The pillows range from 6 inches to 6 feet in length by 3 inches to 4 feet in width. Vesiculation occurs, forming broad bands concentric with the pillow rims but separated from them by a massive band, and also in concentrations at the rim itself. Amygdules of quartz and of calcite are found. Two narrow, pillowed bands occur in which metamorphism has developed a very coarse grain, giving the rock the appearance of a diorite.

Both massive and pillowed andesite are, on the whole, fine grained. On the fresh surface, and on glacially polished surfaces, the rock is dark greyish green to dark green. The weathered surface in brownish to dark green. The rocks are well chloritized, and certain bands, particularly the ropy flows and flow tops, contain finely disseminated pyrite.

Trachyte

Trachyte is found along the south shore of Loïs lake in the west half of the map-area. From lot 30, range IX, Aiguebelle township, the band thickens toward the southeast. Narrow bands occur elsewhere in andesites, such as in the older andesites northeast of the "Privat band". At the north end of Fréville lake, a well developed flow top was noted in outcrops of trachyte on both sides of the fault trough mentioned earlier; it shows no apparent offset.

The trachyte is light grey on the fresh surface and on extensive glacially polished surfaces on the south shore of Loïs lake. The weathered surface is dark grey, with occasionally a brownish overtint. The rock is fine grained to very fine grained and compact. Both massive and pillowed flows occur; however, the bulk is massive.

Rhyolite

Several small patches of rhyolite occur in the northwestern part of the area, notably in lots 5 and 6, ranges I and II, and lots 12 to 14, range II, Privat township.

The weathered surface is a striking white to pale greyish yellow in colour, against which the numerous quartz eyes show clearly. Fresh surfaces range from light grey to pinkish in colour, are very fine grained, locally quite glassy, and normally show a conchoidal fracture.

In the north ends of lots 5 and 6, range I, and in lot 6, range II, Privat township, the rhyolite has been strongly sheared. Such exposures, in which the rock is now a sericite schist, are strongly carbonatized and pyritized. On the weathered surface cubes of pyrite are altered to small beads of limonite, giving the surface a finely mottled appearance.

Isolated exposures of rhyolite also occur in the north ends of lots 24 to 26, range I, and in lots 35, 36 and 39, range I, Privat township.

Pyroclastic Rocks (Agglomerates and Tuffs).

A great number of bands of agglomerate occur north of Loïs lake. The bands vary in thickness from 3 feet to 175 feet. The agglomerate shows considerable dragging towards and in exposures along the north shore of Loïs lake.

The fragments vary greatly in size, from 1.5 to 18 inches in diameter. Within a particular band the fragments show definite gradation. At the bottom of a band, the fragments are coarser and more numerous. Higher in the band, the fragments are finer and the proportion of tuffaceous matrix is greater. The upper part is in many cases completely tuffaceous.

The fragments are generally quite angular, less commonly sub-angular or rounded, and consist of whitish-weathering trachytic or andesitic material. The matrix is very fine grained and finely pitted. It weathers to a light grey colour. The fresh surface is commonly greenish, the fragments being a lighter shade of green. In many specimens the fresh surface is quite glassy. Certain bands are marked by a matrix with greenish weathered surface, the result of chloritization of the fine grained material.

Within the band which occurs at the narrows of Loïs lake at the north ends of lots 36 to 42, range IX, Aiguebelle township, and which can be traced across the islands to the east for 5,000 feet, the fragments have been replaced by fine grained massive pyrite and marcasite. The largest of these replacements noted was 9 inches in diameter.

Within this northern part of the map-area, characterized by agglomerate, numerous limonite gossans occur. They are lenticular in form, overlie carbonatized and pyritized zones (in which a little chalcopyrite is occasionally seen), and were found nowhere to exceed 100 feet in length.

Associated with the agglomerate are narrow bands of well bedded tuffs, some of which are highly silicified. Such bands are useful in determining tops and in tracing drag folding.

A wide band of basic tuffs enters the map-area in the north ends of lots 39 to 46, range II, Privat township, and extends southeastward to its eastern boundary. The average width of this band, here called the "Privat band", is 5,000 feet. In sharp contrast to the younger, narrow, discontinuous bands of well bedded tuffs, the Privat band is made up of very narrow layers of evenly fine-grained basic material. The majority of the layers range from one quarter to one half inch in thickness, and, as a result of differential weathering, give the rock surface a finely striated, or grooved, appearance. The fresh surface is dark grey to black in colour; the weathered surface is brownish. Within the Privat band, there are a number of layers which reach 6 inches in width. These wider layers have developed, under pressure, distinct loops and nodes and in places have the appearance of pillowed lavas.

The tuffs of the Privat band are incompetent and have responded readily to pressures applied during folding. As a result the entire band contains well developed drag folds, numerous cross fractures which lie along the axial planes of the drags, and zones of intense shearing parallel to the bedding which have developed micaceous schists. Narrow quartz veins occur throughout the band.

Where the Privat band crosses Loïs bay no displacement of the contacts could be found.

POST KEEWATIN-TYPE INTRUSIVE ROCKS

Diorite

The andesites of lots 4 to 9, range VIII, Aiguebelle township are intruded by a narrow S-shaped boss of diorite, some 500 feet wide by 6,000 feet long. The diorite has a granitic texture and is medium grained. The feldspar, which is grey is tinted a pale green by chlorite. Glassy quartz occurs in the diorite in small amounts. A number of smaller bosses of diorite occur in the west quarter of the map-area.

Basic Dykes

Numerous dykes and irregular masses of intermediate to basic rock are found cutting all other rocks of the area. Like the andesites, the dyke rocks are greyish green to deep green in colour on the fresh surface and brown to brownish green on the weathered surface. Distinct chilled edges are found, together with faint banding parallel to the contacts. The majority of such basic dykes are narrow, the average width being 2 feet. Several longer dykes, with lengths up to 150 feet, cut the bands of agglomerate. On account of their narrow widths, they are not shown on the accompanying map.

Aplite Dykes

Narrow aplite dykes were noted in drill intersections in the north ends of lots 52 and 53, range II, Privat township. No such dykes were observed on surface within the map-area. The aplite is very glassy and has the appearance of a clean quartzite, tinted a pale yellow.

Porphyry Dykes

A number of very narrow dykes of quartz and feldspar porphyry cut all other rocks. Within these dykes, feldspar phenocrysts 1.0 to 1.5 mm. in diameter and eyes of quartz occur in a very fine-grained or glassy deep reddish brown groundmass.

Pyroxenite

A single small mass of pyroxenite lies in the northwest corner of lot 36, range IX, Aiguebelle township, where it is found on both the north and south sides of the narrows of Loïs lake. The body is 6 feet wide, and passes beneath overburden on both sides of the narrows. The rock is coarse grained and black. On the fresh surface, a small amount of grey feldspar can be seen separating clusters of the black ferromagnesian mineral.

PLEISTOCENE AND RECENT DEPOSITS

As previously mentioned, the unconsolidated deposits of the map-area consist mainly of sands and gravels.

Lacustrine, varved clays are found in a narrow easterly-trending strip which borders the road between ranges I and II, Privat township, from lot 12 eastward to lot 27. Elsewhere the surface is overlain by sands and grey forest soils.

The sands occur as broad outwash aprons and as faintly arcuate, south-facing ridges.

Gravel occurs in the form of kames, and in several broad, low, poorly defined eskers.

STRUCTURAL GEOLOGY

Folding

The extrusive and pyroclastic rocks of the map-area form part of the north limb of a syncline, with axis to the south of the area. The flows and beds dip steeply towards the south, many are vertical and some are steeply overturned to the north.

Within the west half of the area north of Loïs lake and the west third south of the lake, the regional strike is N.80°E. However, about an axis which trends S.30°W. from Bazin lake in lots 35 and 36, range III, Privat township, to lot 19, range VII, Aiguebelle township, there is a decided swing in regional strike from N.80°E. to S.75°E. This swing suggests a cross fold with the aforementioned south-westerly-trending axis as a synclinal axis.

The rocks on the north and south shores of Loïs lake contain numerous drag folds which are probably associated with the strong Loïs lake shear. Tight drag

folds also occur along both shores of Loïs bay at the east end of Loïs lake. These drags are particularly prominent in the wide band of basic tuff, the so-called Privat tuff band.

Faulting.

Faulting is represented by large-scale shear zones, and by younger, smaller, transecting faults.

The major shear zone of the area underlies the southern part of the Loïs lake and, therefore, crosses the area in an easterly direction. Pyroclastic rocks on the right of way of the Canadian National railway south of Lac Loïs station and on the south shore of Loïs lake in lot 16, range IX, Aiguebelle township, are highly sheared. Numerous strong shears which occur on both shores and in the islands of Loïs lake suggest the zone is made up of a number of parallel and branching shears. The presence of a strong shear within Loïs lake is also suggested by the drag folding which occurs along the north and south shores of the lake. The most easterly evidence of the shear is found on the south shore of Loïs lake in lot 51, range IX, Aiguebelle township, in the form of a drag fold. Farther to the east, there is no direct evidence of the Loïs lake shear, although it is possible that it continues at least along the lower course of Black creek.

A branch of the Loïs Lake shear is postulated to cross the western part of Loïs lake in a northeasterly direction, across the northern part of lots 24 and 25, range II, Privat township, where a number of exposures of pillowed andesite are highly sheared.

Highly sheared agglomerate in lots 38 and 39 range I, Privat township, separated from an exposure of rhyolite by a narrow ditch, suggests a shear trending N.75°E. from the north end of lot 35 easterly to Loïs bay in lot 51, range I, Privat township. Sheared agglomerate, together with a fault scarp in the northern parts of lots 37 to 39, range II, Privat township, suggest a branch of this shear passing from Bazin lake through LeClerc lake to meet the more easterly-trending shear in the neighbourhood of lot 47, range I, Privat township.

Two sets of younger faults also occur within the map-area. These are suggested by fault scarps, by the offsetting of some flows and by the apparent truncation of others. In both sets the dips are apparently steep. One set has an average strike of N.25°E. One member of this set has been invaded by a dyke of gabbro or peridotite at the narrows of Loïs lake in lot 36, range IX, Aiguebelle township. The second set of younger faults has an average strike of N.25°W. and occurs in the central part of the map-area, north of Loïs lake. The faults are suggested by sharp sheared scarps.

One fault has been invaded by a wide dyke of feldspar porphyry.

The north and south bays at the east end of Loïs lake form a remarkably straight topographic feature. Loïs bay and its companion, Genest lake to the north, lie in a narrow, steep, rock-walled depression. This same depression passes south of Loïs lake through Fréville lake and continues, somewhat west of south, as a deep, narrow, dry-floored trench. This trench is referred to by Lang (2, p.24) as the Robertson-Vaudray depression, it extends some 30 miles to the south of the map-area. It is remarkable in that, although the shore rocks of Loïs bay show considerable dragging, there is no apparent displacement of the lava-tuff contact across the bay. However, south of Loïs lake, in the eastern part of range VIII Aiguebelle township, there appears to be truncation of a number of series of flows at the fault.

ECONOMIC GEOLOGY

To date (1951) nothing has been produced economically within the map-area, and, with the exception of the Bolgo group of claims in the northeast corner, little prospecting appears to have taken place.

Mineralization within the Lois Lake shear zone consists of pyritization and carbonatization. The pyroclastic rocks near the shear at the narrows of Lois lake and on the islands to the east, in lots 36 to 41, range IX, Aiguebelle township, are considerably knotted by the shearing, and, locally, the knots have been replaced by finely crystalline masses of pyrite or marcasite. The knotted zones are capped by a rich chocolate brown gossan. The largest masses of pyrite were found on the island at the north end of lots 41 and 42, range IX, Aiguebelle township. Several pieces of pyrite, the largest weighing about 40 pounds, were found as float on the same island. The source of the float was not determined. A heavy brown gossan was also observed on the north shore of Lois lake south of lot 47, range I, Privat township; however, little massive pyrite was found associated with the gossan.

Part of the property of Bolgo Gold Mines Ltd. lies in the northeast corner of the map-area covering lots 51 to 56, range II, Privat township. Interest was apparently centered on a small area directly east of Genest lake where the bedrock consists of interbedded flows of massive and pillowed trachytes and andesites. Six diamond drill holes, with a total length of 2,275 feet, were drilled. Two narrow aplite dykes, containing a considerable amount of fine fuchsite and some widely scattered quartz stringers were intersected. No assay results were available.

REFERENCES

1. BUFFAM, B.S.W. Destor Area, Abitibi County, Quebec; Geol. Surv. Can., Sum. Rept., 1925, Pt. C. pp. 82 - 104 (1927)

2. LANG, A.H., Palmarolle and Taschereau Map-Areas, Abitibi County, Quebec; Geol. Surv. Can., Sum. Rept., 1932, Pt. D. pp. 22-35 (1933)

3. AMBROSE, J.W., Clericy and La Pause Map-Areas, Quebec; Geol. Surv. Can., Mem. 233 (1941)