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LA REINE AND LA SARRE TOWNSHIPS

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PRELIMINARY REPORT
ON THE
LAREINE AND LASARRE TWPS.,
ABITIBI-WEST COUNTY,
QUEBEC.

by
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INTRODUCTION

The townships of LaReine and LaSarre, Abitibi-West County, were mapped on a scale of one inch equivalent to one thousand feet during the summer field season of 1970. The map-area represented by these two townships, which covers approximately two hundred square miles, consists of flat to gently rolling farmland and woodlots. Geological mapping was carried out using aerial photographs (scale approximately one inch equivalent to one thousand feet) to locate and plot the positions of rock exposures. The map-area, because of its numerous roads and extensive open areas of pasture and fields for crops, was not systematically traversed along evenly spaced straight lines; instead every conceivable indication of possible rock exposures appearing on the aerial photographs were visited. This method resulted in the map-area being searched effectively for outcrops.

LaReine and LaSarre townships are located in the Noranda-Normetal mining district of Northwestern Quebec. The Quebec-Ontario provincial boundary (longitude approximately $79^{\circ}31'$ west) forms the western boundary of the map-area. The LaSarre-Royal Roussillon township boundary (longitude $70^{\circ}5'$ west approximately) forms the eastern boundary. The northern side of the map-area is bounded from west to

east by Desmoloizes and Clermont townships along approximate latitude the parallel of $48^{\circ}52'$ north. The southern side of the map-area is bounded from west to east by Roquemaure and Palmarolle townships along the approximate parallel of latitude of $48^{\circ}43'$ north.

The principal settlement in the map-area is the town of LaSarre located 52 miles by road north of the regional centre of Rouyn-Noranda and 452 miles northwest of Montreal. LaSarre is located on the Canadian National Railway's northern transcontinental railway line. The smaller centre of Dupuy, also on the Canadian National rail line is the only other settlement of consequence.

The two townships have been subdivided in the standard provincial cadastral grid system of mile wide east-west ranges and narrow northsouth lots. Good gravel roads have been established along alternate range lines conveniently cutting across the townships. These roads are connected by number north-south roads run along lot lines. Very few points within the map-area are therefore more than one mile from an access road.

The map-area forms part of the Abitibi Uplands physiographic division of the Canadian Shield which was formerly occupied by post-glacial Lake Barlow-Ojibway. Most of the bedrock of the area is covered by a thin veneer of bouldery till and a mantle of glacial lake clays ranging in thickness from a few feet to over one hundred feet or more in places. The surface topography is generally flat to gently rolling with a few prominent steep-sided hills, whereas it is suspected that the bedrock topography below the mantle of overburden is very much more rugged.

Outcrops are generally sparse and widely separated except for a few areas of large outcrops. Lower flat sections particularly along the LaSarre River and in the western part of LaReine township are occupied by swamps. Many other flat sections were once swampy but have been drained for farming operations.

Very numerous farms of, on the average, 100 to 200 acres in extent, have been established throughout both townships and about two-thirds to four-fifths cleared for pasturage or growing hay or oats to support an active milk and beefcattle industry. The remaining wooded sections mostly of poplar are cut over from time to time for pulp wood.

The principal sources of geological information prior to the present survey are:

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| Geol. Surv. of Canada Map no. 284A | "Demeloizes Sheet" |
| " " " " " " 293A | "Palmarolle Sheet" |

Both maps are on a scale of 1 inch equivalent to 1 mile.

GENERAL GEOLOGY

The bedrock of the map-area is all of Precambrian age and makes up part of the Superior Province of the Canadian Precambrian Shield. The principal rock types are amphibolitized basic volcanic rocks typically showing deformed pillow structures, scattered occurrences of sedimentary rocks and a number of large granitic bodies. Late diabase dikes cut all other rock units. The volcanic and sedimentary rocks have undergone considerable deformation and metamorphism and now belong to the amphibolite facies of metamorphism. Most of the volcanic and sedimentary

lithotypes today are fine to extremely fine grained, tenacious rocks containing varying amounts of amphibole. These rocks do not weather readily and therefore in most exposures are coated with a ubiquitous grey film which totally obscures most of the structural features present in the rock. Mapping for this reason is therefore often extremely difficult and at times very frustrating because the rocks in hand specimen are very similar in lithology and can only readily be distinguished on the basis of their grosser structural features which as indicated are not often readily seen. The difficulties presented by the thin weathered lichen coating cannot be overemphasized; its importance in rendering mapping difficult becomes immediately evident when outcrops in the LaSarre-LaReine area are compared with those to the south where the volcanic and sedimentary rocks are very much less metamorphosed and tend to weather more readily and thus reveal their structures in outcrop.

Pillowed basalts which have undergone deformation ranging from mild to extreme and have been amphibolitized in like degree form the principal volcanic-type recognized within the map-area. The lesser deformed pillowed masses yield top determinations in some instances but many of these determinations are to a degree questionable. The other principal volcanic-type appears to be represented by local layers of basic tuffaceous material. Some of the suspected tuffaceous material may, however, be amphibolitized sedimentary rocks of normal type. No rhyolitic rocks were definitely recognized during the mapping and certainly no large mass of this volcanic lithotype is present within the map-area. Within the basic volcanic masses are innumerable dikes and sills of granitic material; many of these dikes and sills have been sheared and have a pronounced foliated

structure, and could readily be taken for rhyolitic rocks in diamond drill core. Their nature is, however, always obvious in surface exposures, where crosscutting relationships are obvious.

Small exposures of sedimentary appearing rocks are widespread throughout the two townships but excepting for one or two sedimentary bands, mentioned below, continuity of sedimentary layers has not been established satisfactorily because of a lack of exposure and/or difficulty in recognizing the highly metamorphosed or deformed sedimentary types. The most clearly defined sedimentary bands occur in the northern half of LaSarre Township and trend south of east across it. Here occur the most distinctively sedimentary types with well-developed layering: quartzitic layers one quarter of an inch to one inch thickness alternate with schistose material. Associated with this band of sedimentary material is very distinctive rock composed of large porphyroblasts (one-quarter of an inch to one and a half inches in diameter) in a well foliated, somewhat gneissic, matrix. This rock appears to be a metamorphosed, fine-grained, sedimentary type such as a greywacke and occurs associated with the well layered quartzitic material over a length of some three to four miles always apparently in the same stratigraphic position. To the north of this prominent band occurs another band which is much more poorly exposed but which has been traced by prospecting activity and diamond drilling. It appears to consist of quartzite sediments, and graphitic tuffs or sediments interlayered with volcanic rocks and extends across part of ranges VIII and IX in northeastern LaSarre Township. In part a sill-like body of peridotite occurs along with these sedimentary rocks.

In the southwestern quarter of LaReine Township, more or less parallel to the contact of volcanic rocks with the LaReine gneissic granite mass, occurs a band of distinctively layered material which is either metamorphosed normal sedimentary rocks or a tuffaceous rock. The material is highly deformed by two phases of deformation but can be followed over a distance of nearly four miles because of its unique character. Elsewhere in the map area are numerous small outcrops of layered rock, some of which appears to be definitely impure quartzite, others which may be tuffaceous material and still others which possibly are not sedimentary in origin at all but due to an extreme deformation by stretching of pillows or of interlayered volcanic and granitic material. It can be clearly demonstrated in the field that under conditions of extreme deformation clearly pillowed basalts can be squeezed in such a manner as to pull out the pillow rims in an extreme fashion until a well-layered rock is produced which even in good outcrop can be difficult to distinguish from a layered tuff or sedimentary rock and which would be most certainly taken for a sedimentary layering in diamond drill core.

INTRUSIVE ROCKS

The principal intrusive rock type is granitic and occurs as several large masses and numerous smaller bodies including stocks as well as numerous dikes and sills. The principal granite masses are: 1) the LaReine gneissic granite cropping out along the southern

boundary of LaReine township with Roquemaure township forming an almond-shaped mass around which the foliation of the country rock of pillowed basalts is wrapped; 2) the Okikodoseck granite mass occupying much of the western half of LaReine Township and extending into the Demeloizes township to the north; 3) the northern extent of the large Palmarolle batholith which occupies much of the southern half of LaSarre Township. The northern contact of the Palmarolle mass is for the most part not well exposed.

Associated with the Okikodoseck and Palmarolle granite masses are zones of migmatization producing complexes of granitized rocks showing varying degrees of development of foliation and metamorphism.

Smaller granitic masses are 1) the Dupuis granite, a small pluton in the northeastern part of LaReine Township; and 2) the Manley Quebec granitic stock in the west central part of LaReine Township; and 3) the Defontaine granite stock in east central part of LaReine Township. The last two masses appear to be satellitic to the LaReine gneissic granite in the south central part of LaReine Township. Numerous other small granitic masses, dikes, and sills, occur throughout the map-area and are probably much more common than the outcrops examined would suggest.

A large mass of basic intrusive and/or migmatic material occurs in the northwest part of LaSarre Township as a "gabbroic complex" and appears to extend across the township in a southeasterly direction. Elsewhere in the map-area foliated and/or strongly lineated gabbroic-appearing rocks are common, interlayered with clearly volcanic amphibolites.

Whether or not these rocks were originally gabbroic intrusives or are the result of strong metamorphism and deformation of other volcanic types is usually not clear in the field.

Later, fresh-appearing, diabase dikes with either north-south or eastnortheast trends occur in the map-area. The north-south dikes are all distinctively porphyritic and one, the Abana dike, extends right across the map-area to the north into the Demeloizes Township for a distance of ten miles to the Normetal Mine.

STRUCTURAL GEOLOGY

The volcanic and sedimentary rocks appear overall as a squeezed and deformed mass between the major granitic bodies represented by the Okikodoseck, LaReine and Palmarolle batholiths. The supercrustal rocks show a number of trends and in many outcrops it is evident that with the paucity of outcrops in the map-area extending map units for any distance is fraught with the chance of misinterpretations.

In the southern part of LaReine Township some relatively undeformed pillowed layers dipping at low angles (20-40°) to the north indicate facings to the north. These observations would confirm the major structure determined in Roquemaure Township to the south as that of a northern flank of an anticlinal mass with its axis passing more or less along the length of Lake Abitibi in the township to the south. The few poorer facings farther to the north in LaReine Township indicate the possibility of an synclinal axis in the central part of that township.

ECONOMIC GEOLOGY

For over fifty years LaReine and LaSarre townships have been readily accessible and they have therefore been thoroughly prospected for occurrences of economic mineralization, both by traditional and modern geophysical methods. To date little of economic significance has been discovered, but prospecting is much hampered over large sections by thick clay overburden.

Gold-Scheelite veins and stringers occur in the Manley-Quebec granitic stock and have been explored by limited underground workings and a number of diamond drill holes. Some very spectacularly high gold assays over narrow widths have been obtained in past, but no economic masses have yet been defined: the individual veins are too narrow and spottily mineralized to be mined by themselves. Whether mining in bulk would be feasible apparently has not been tested. Some scheelite was produced from the property during World War II, largely hand cobbled from the main shaft dump.

Gold-molybdenite veins and stringers occur in the Defontaine stock in much the same manner as the Manley-Quebec gold-scheelite occurrences and the remarks applied to the latter are equally applicable to the Defontaine occurrences. Both prospects occur on relatively prominent ridges and could readily be tested by stripping operations.

Asbestos occurs in minor amounts associated with metamorphosed peridotite bodies strung out across the northern part of LaSarre Township, and extending into the northwestern corner of LaReine Township. These bodies have been probed by numerous diamond drill holes, apparently without encouragement. Nickel sulphides are commonly associated with such peridotite masses found elsewhere in the region, but it is doubtful whether the LaSarre-LaReine masses have been tested for that metal.

A number of basemetal sulphide showings have been tested by trenching and some diamond drilling with as yet no success.

Sand and gravel suitable for construction purposes and road making are abundant within the map-area, and more than sufficient for local needs. Granite has been quarried from small pits for the construction of several of the local churches.