

Eug. Poitevin

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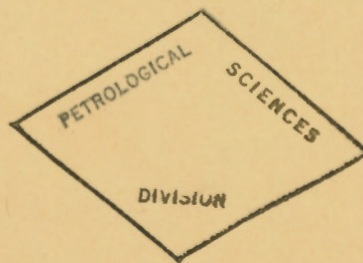
GEOLOGICAL SURVEY

PAPER 47-8

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LACORNE MAP-AREA,
ABITIBI COUNTY
QUEBEC
(REPORT AND MAP)

BY
L. P. TREMBLAY

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LACORNE MAP-AREA,
ABITIBI COUNTY
QUEBEC
(Summary Account.)

By

L.P. Tremblay

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C O N T E N T S

	Page
Introduction	1
Geology	1
Structural features	3
Mineral deposits	3
Spodumene deposits	4
Molybdenite deposits	7

Illustration

Preliminary map - Lacorne, Abitibi county, Quebec.

(Second edition) In envelope.

Lacorne Map-area, Abitibi County, Quebec

INTRODUCTION

This report presents a summary of field work in 1945 and 1946 in the Lacorne map-area (longitude 77°45' to 78°, latitude 48°15' to 48°30'), the west half of the area of the Fiedmont map¹.

¹Geol. Surv., Canada, Map 206A, Fiedmont, Abitibi County, Quebec.

The original mapping was done by James and Mawdsley in 1926, when the area was less readily accessible than at present. In more recent years 4, 127,400 pounds of molybdenite has been produced at the Lacorne property of the Molybdenite Corporation of Canada, and spodumene (tantalite, beryl) pegmatite dykes have been discovered in several places in Lacorne township. The prospect of commercial production of spodumene from the district, and a need for clarification of the early Precambrian structure and stratigraphy of this part of Abitibi county, because of their importance in connection with the search for gold and base metal deposits, provide the incentives for remapping the area.

Outcrops were mapped in the field on air photographs, which are on a scale of about 1 inch to 1,200 feet. The base map is a two to one enlargement of the northwest quarter of the Senneterre 2-mile sheet of the Topographical Survey of Canada, and has, consequently, not the same order of accuracy as the standard 1-mile base..

GEOLOGY

The general distribution of the rocks and their relative ages are shown on the accompanying map.

A belt of Kewagama sedimentary rocks, mapped recently across the adjoining La Motte map-area², splits into two branches in

²Norman, G.W.H.: La Motte Map-Area; Geol. Surv., Paper 44-9.

passing eastward, and the two branches have been partly traced in Lacorne-area. The northern branch has been traced to the east for about 5 miles. The other, due to a swing in the structure west of the Lacorne map-area, trends southward along the southwestern border.

Two other belts of sedimentary rocks, of still unknown age and trending a little east of south, outcrop at the north and southeastern corners of Lacorne township. The southern belt shows interbanding at its contacts with the Kinojevis volcanic rocks and both formations appear conformable. The northern belt seems to be closely folded with the lavas and has on the western side of its northern flank a conglomerate that contains numerous pebbles of quartz-feldspar porphyry and a few of granitic and volcanic rocks.

Rocks of the Malartic group are associated in most places with the Kewagama sediments. In general they are altered to hornblende schists or amphibolite. The group strongly resembles that part of the Kinojevis lavas distributed along the northern margin of the granite batholith. Both are composed of hornblende schists, and to the eye they look very much the same, thereby suggesting a common origin and age for both groups.

The intrusive rocks of the map-area cover nearly all of Lacorne township. They vary in origin and character, and may be arranged according to age, beginning with the oldest, as follows:

- (1) Peridotite, intrusive amphibolite, quartz porphyry (includes acidic flows and breccias), albitite dykes
- (2) Amphibolite, diorite, monzonite, syenite, granite, and pegmatite
- (3) Diabase dykes

Peridotite occurs as lens-like sills within the Kinojevis group close to its contact with the large body of granitic rocks, and also as a small band in the southwestern corner of the map-area. This band is probably the continuation of a large mass of peridotite that occurs between the two Kewagama sedimentary belts of La Motte map-area. The rock is generally massive, weathers light brown, mauve, grey, or green, and, due to its high serpentine content, is softer than the rocks of the Kinojevis and Malartic groups.

Intrusive amphibolite has been noted only within the Kinojevis group, where it forms sills or irregular masses cutting across the structure. It is believed to be derived from a gabbro. Only one mass has been mapped, the other bodies being either too small or doubtfully intrusive. The rock is coarse grained and massive, very similar to massive andesitic flows, and in places is difficult to distinguish from the lava.

Quartz porphyry and rhyolite porphyry form a belt 2,000 to 5,000 feet wide in ranges II and III, Landrienne township. This belt may be a continuation of one of acidic volcanic rocks and quartz porphyry that extends northwestward across the Amos map-area. The rocks are in part massive and in part highly schistose, and their contacts with other rocks are in many places strongly carbonatized. Pyrite is disseminated throughout the schistose parts and at places is concentrated in definite zones. The porphyries vary from white to light grey on weathered surfaces, the schistose parts being white and the massive parts grey. The phenocrysts are either of quartz or of quartz and feldspars. Some bands of rhyolite and masses of acidic agglomerate or breccia are associated with the quartz porphyry.

Albitite dykes, about 4 feet wide, cut the Kinojevis volcanic rocks on the Randall and Fisher properties.

It is possible that the plutonic group (amphibolite to granite) represents different stages in the differentiation of a common magma. The group covers almost all of Lacorne township. It is characterized by a core of muscovite granite, an outer, irregular zone of biotite granite, and an intermediate zone of binary (biotite-muscovite) granite. The binary granite mass is partly surrounded by a body of biotite-hornblende granite and hornblende syenite that grades at places to a hornblende monzonite or to a dioritic rock. At a few places the diorite grades into an amphibolite. This arrangement is not always uniform in the field, as can be seen on the map.

Pegmatite dykes and quartz pegmatitic veins abound in the muscovite granite, particularly near its north and south contacts where they constitute the bulk of the exposed rock. They are also abundant in the western part of the intervening area, and are of common occurrence in a wide zone surrounding the muscovite granite. The main direction of strike of these dykes is about east. Northerly strikes are common, however, in the eastern part of the pegmatite area, north-westerly strikes in the western part, and others between these directions are also encountered. A few others strike about 40 degrees east of north. The easterly trending dykes commonly show good bending,

and are then rarely mineralized. Those trending north or northwest are of uniform grain, in general show no banding, and quite commonly contain some minerals of economic interest. Generally, those dykes striking either north or east are best mineralized when they encounter a favourable structure, such as an embayment along the granite contact, where fracturing has occurred and allowed precipitation of minerals from the pegmatitic solutions.

The quartz-diorite dykes are the youngest rocks in the map-area, and maintain a remarkably persistent and continuous north-east trend.

STRUCTURAL FEATURES

The general structural trend of the formations is between north 70 degrees east and east in the northern part of the map-area, and more nearly southward in the southwestern part.

In the northeastern corner of the area, on the old Fisher and Randall mines, a few small shear zones have been noted, but as the information available from the outcrops is scanty, it would be hazardous to draw any conclusion on the value of these as major or minor features. Nevertheless, their high content of quartz stringers, their close connection in the field with the albitite dykes, and the intense carbonatization of the country rocks in that part of the area suggest that these shear zones may be of more than minor structural importance. Intense prospecting should reveal something of their value, and at the same time facilitate an assessment of the possibilities for ore deposits. At one place in the northeastern corner of the area, where some shearing was observed, a zone of carbonate rock has been formed, and is mapped as such.

The presence of a crushed granite on lot 59, rge I, Landrienne tp. may suggest the eastward extension of the Manneville fault observed in Figuery township south of Lake Figuery¹. But, again,

¹Norman, G.W.H.: Op. cit.

the scarcity of outcrops, due to the thick cover of sand in that part of the area, does not permit any definite conclusions.

MINERAL DEPOSITS

Definite relations exist between the molybdenite-bearing, pegmatitic quartz veins, the spodumene-bearing pegmatites, and the beryl-bearing pegmatites. All these veins or pegmatites are closely related in space to granitic masses. Their occurrence in the field in incomplete concentric zones around and in the granitic batholith suggests a zoning, with beryl in the centre, molybdenite at the outside, and spodumene in between.

Molybdenite occurs in two belts in the map-area. A northwest-trending belt lies close to the western contacts of the biotite and muscovite granites with the biotite schist, but mainly within the schist. This band appears to be the eastern extension of the belt described by Norman as occurring along the southern margin of the granitic mass in Preissac and La Motte townships² and contains

²Norman, G.W.H.: Op. cit.

workable deposits of molybdenite at the Lacorne property of the Molybdenite Corporation of Canada. The molybdenite-bearing veins in this belt are found either in the schist or in the small granitic masses, but always in close relation with these masses of granitic rocks. The other belt trends easterly along the northern contact of the large granitic mass with the volcanic rocks of the Kinojevis group. There the veins are found within the volcanic rocks. In both belts molybdenite occurs generally in very small amounts, except at the Lacorne mine.

Between and adjacent to the two molybdenite belts are two belts of spodumene-bearing pegmatites. Those in the northwest-trending belt are mainly within biotite granite or dioritic rock along the western contact of the muscovite granite. In the other, or easterly trending belt, they are found in lava, biotite schist, and granitic rock. At places the concentration of spodumene is quite high, and more intensive prospecting should reveal large reserves of the mineral in these two zones.

Beryl-bearing pegmatites are widespread within the core area of the molybdenite and spodumene-bearing zones. At no place has beryl been found in valuable concentration, but it has been noted in many pegmatites within the muscovite granite and in some outside of the granite mass but adjacent to it. Again, more prospecting may reveal interesting showings.

Spodumene Deposits

An important occurrence of spodumene has been traced at seven different places on lot 11, rge. II, Lacorne tp. The mineral is in dykes of pegmatite cutting a small mass of biotite granite that is here about a mile wide, in an east-west direction, and is bordered by a band of biotite schist on the west and by a large mass of hornblende monzonite on the east. At least four dykes of some importance, in addition to a number of smaller ones, have been observed. They all strike between north and north 30 degrees west, and dip steeply west. The most important dyke, traceable for about 1,000 feet, has a width varying from 5 to 18 feet, contains an average of about 20 per cent spodumene, and is of remarkably uniform mineral composition throughout. At its most southern exposure the dyke has a width of 18 feet, but is then lost for a distance of 350 feet. When noted again it appears to have split into two branches, each 5 feet wide and converging southward. The eastern branch seems to be the more important, as it can be traced for almost 650 feet farther north. This branch reaches a width of 18 feet at its northern end. The western branch appears to die out as it is followed north. Three hundred feet east of the big dyke, a 3-foot dyke was observed, and 100 feet west of it a dyke varying in width from 4 to 6 feet has been traced, and seems to be of some importance as it carries an average of about 20 per cent spodumene. All these dykes consist of quartz, feldspars (microcline, microcline-perthite, albite), and green spodumene, with some lithium-bearing muscovite, beryl, tantalite, and bismuthinite. In all of them, the amount of spodumene is persistent along the strike, and the spodumene itself occurs in large crystals mainly concentrated in areas of quartz-feldspar graphic intergrowth, and oriented about normal to the walls of the dyke. Large lenses of microcline-perthite interrupt the uniformity of the intergrowth. From a point about 400 feet west of the place where the big dyke splits into two branches another dyke has been traced for about 750 feet southward. At its northern end it is about 4 feet wide, but 500 feet farther south the width has increased to 18 feet. Beyond this point no contacts were exposed. The concentration of spodumene in this dyke is much more variable along strike than it is in the others, and the grain is also finer.

Two spodumene-bearing dykes are exposed on lot 59, rge. IX, Lacorne tp., about half a mile south of Lake Roy. They are in contact partly with a biotite-hornblende granodiorite and partly with large inclusions of biotite schist. One of these dykes strikes south 75 degrees east, dips about 70 degrees south, and has a width varying from 19 feet at the east end to 12 feet at the west end. The contacts are sharp, and the dyke is bordered on both sides by a thin layer of white feldspar. No banding was noted. An important feature is the presence of long (at least 3 feet long in some places) lenses of microcline-perthite forming large crystals in a groundmass of finely intergrown quartz and feldspar. Green spodumene, tantalite, and beryl are the economic minerals noted, with spodumene by far the most abundant. It occurs mainly as crystals as much as 4 inches long, all oriented about normal to the strike of the dyke, uniformly distributed in the quartz-feldspar intergrowth. Beryl and tantalite are in very small amount, whereas spodumene may represent as much as 28 per cent of the dyke, but at places forms as little as 15 per cent. The other dyke strikes north, stands nearly vertically, and is about 18 feet wide. Its mineral composition is not uniform throughout. This dyke is much finer grained than the other, and spodumene is concentrated in patches.

A 5-foot lepidolite-spodumene-bearing pegmatite dyke occurs along the northern edge of a small outcrop of quartz-biotite schist, near a muskog, in lot 25, rge. I, Landrienne tp. It strikes 10 degrees north of east and is exposed for about 50 feet. Quartz, feldspars, spodumene, lepidolite, and muscovite are the main constituents. Beryl, garnet, tantalite, and microlite have also been recognized. Spodumene and lepidolite, the latter the more conspicuous, are the most abundant minerals. Spodumene, as in other instances occurs in crystals of elongated habit, varies slightly in amount, and is of buff to green colour. The lepidolite flakes are up to 1 cm long and are of a deep purple colour. They occur in irregular patches and in vein-like masses that seem to cut across all the other minerals; they seem to replace the spodumene and feldspars especially, and occur in them in very small patches.

A large mass of coarse-grained pegmatitic material cutting across a quartz-biotite schist outcrops on lot 26, rge. I, Landrienne tp. It has been traced for 900 feet in a south 70 degrees east direction and has an exposed width of 250 feet. It may be either a large dyke or a flat sill. Quartz, feldspars, and muscovite, are the main constituents of the dyke, accompanied by small amounts of green to buff spodumene, beryl, tantalite, and garnet. Spodumene is present in irregular masses or pockets where it may form as much as 28 per cent of the rock. The crystals appear to stand vertically, and this would suggest that this mass is a flat-lying body. An accurate estimate of the total amount of spodumene present is difficult to obtain because of its very irregular distribution.

A small outcrop of biotite-hornblende granodiorite is cut by a large, fine-grained spodumene-bearing pegmatite dyke, on lot 38, rge. X, Lacorne tp. The dyke can be traced for 300 feet on the western side of the outcrop, where it forms the edge of a cliff 60 feet high. It strikes about 30 degrees west of north and dips 60 degrees east. The exposed width of this dyke varies from 20 to 65 feet, but its western contact is concealed, and it contains about 38 per cent of large, irregularly distributed inclusions of wall-rock. Quartz and albite are the main constituents. Green spodumene, muscovite, garnet (probably spessartite), tantalite, beryl, pyrite, and a later albite are present in variable amount. The grain is fine to medium. Spodumene is the most abundant mineral, and its content along the dyke is quite variable. It appears to be concentrated in patches or in bands where it may constitute at least 30 per cent of the

rock. It occurs always in small grains varying in size from a fraction of an inch to $1\frac{1}{2}$ inches long. Garnet occurs also in tiny grains concentrated in bands or in patches, and generally where there is no green spodumene. It is yellowish red in colour. This difference in colour between spodumene and garnet and their occurrence in bands give to this dyke a sort of banding, the bands being parallel with the walls of the dyke. Tantalite is in very small grains uniformly distributed, and its concentration is apparently low. Large patches of microcline-perthite are present.

An interesting and very promising occurrence of spodumene occurs on lots 52 and 53, rge. IX, Lacorne tp., about 1,400 feet south of the south shore of Lac Lortie. Not much is known from the exposed surface, as the area where this showing occurs is almost entirely covered by a thick growth of timber and a light mantle of sand and gravel. Outcrops, although very scarce and small, indicate the presence of considerable spodumene, and most of them occur on the top of a high ridge that rises to an elevation of about 150 feet above Lac Lortie. This ridge can be traced for about 2,000 feet in an east-west direction. Most of the information on this deposit has been obtained from the 2,000 feet of exploratory drilling¹ that has been done by

¹The writer wishes to express his thanks to Dr. D.R. Derry for the data and maps regarding the spodumene occurrences of Lacorne township that were placed at his disposal.

Nepheline Products, Limited and Great Carbon Corporation who hold the deposit jointly. Spodumene occurs, as in the other cases, in pegmatite dykes. The dykes strike about 35 degrees south of east, dip between 40 and 60 degrees southwest, and occur close to the northern contact of the Lacorne monzonite mass with volcanic rocks now recrystallized to a coarse-grained hornblende schist. The dykes occur either in the schist or in the granodiorite phase of the monzonite. At least three big dykes and many small ones, all containing some spodumene, have been cut by drilling. They vary in width from a few feet to 45 feet, and are separated from each other by granitic or volcanic rocks. So far they have been traced for several hundred feet, and the drilling has revealed an indicated 300,000 tons of rock with an average spodumene content of 20 per cent. Of the three large dykes cut by drilling, the northeast one is the largest, and the one of next importance occurs about 50 feet to the south. Both of these dykes have been traced for 200 feet down the dip, and, horizontally, the larger one for 600 feet the other for 350 feet. Not much is known about the third dyke, which occurs about 100 feet south of the largest dyke. The spodumene of these dykes is generally buff coloured instead of green, although at places it may be faintly green. The crystals vary up to $\frac{1}{2}$ inch in length, and appear to be partly replaced by albite and quartz. Spodumene, quartz, and feldspars (albite An_{0-6} , microcline, and microcline-perthite) are the main constituents of the dykes and are uniformly distributed. Beryl, spessartite, tantalite (Ta_2O_5 : 32 to 53 per cent), microlite, and betafite are accessories. The grain of these dykes is finer than that of most pegmatites of the area.

Small dykes of pegmatite cut hornblende monzonite in a small outcrop on lot 64, rge. IX, La Motte tp. Within a distance of 100 feet in a north-south direction, at least six dykes, varying in width from 2 to 4 feet, were noted with spodumene and some beryl and tantalite. They strike between west and 30 degrees west of north. Spodumene occurs in small grains, generally concentrated in an intergrowth of quartz and feldspars. Its content appears to be small, but the fine grain may give an incorrect impression.

Molybdenite Deposits

A trench has been excavated on a molybdenite occurrence in lot 58, rge. IX, Lacorne tp. The showing is at the southwestern end of Lake Roy, on the Sullivan claims. There a molybdenite-bearing dyke occurs in a narrow band of volcanic rock, now transformed to a hornblende schist, separating two lens-like sills of peridotite that trend east-west. The band of schist appears to be cut on the east by a small mass of granitic rock. The pegmatite dyke cuts across the schistosity of the hornblende schist, and varies in width from 4 to 13 feet. It has been traced for about 200 feet on a strike of about south 35 degrees east, and dips steeply. The dyke is narrow at its eastern end, but gradually widens towards the west until it reaches the southern contact of the northern peridotite sill, where it seems to die out or to divide into many small, unimportant stringers that follow the contact. This dyke consists of quartz, feldspars (microcline and albite An₀₋₆), mica, molybdenite, and pyrite. A banding is noted at places, and is defined by a centre core of quartz margined with a mixture of fine-grained, but not intergrown, albite and quartz. Molybdenite occurs as well-formed hexagonal crystals, either concentrated in book-like patches or disseminated in individual grains in the feldspathic areas. The amount of molybdenite is not constant along the strike, but the minerals appear to be concentrated mainly in the banded parts of the dyke.