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LA MOTTE MAP-AREA
ABITIBI COUNTY
QUEBEC

(REPORT AND TWO MAPS)

By

G. W. H. Norman



OTTAWA
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DEPARTMENT OF MINES AND RESOURCES
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LA MOTTE MAP-AREA,
ABITIBI COUNTY, QUEBEC
(Summary Account)

By

G.W.H. Norman

OTTAWA, 1944

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INTRODUCTION

A geological revision of the La Motte map-area was undertaken in 1943 as part of an investigation of molybdenite, tantalite, beryl, and spodumene deposits in this general region. The area includes Preissac and La Motte townships and adjacent parts of Cadillac, Malartic, Bousquet, La Pause, Manneville, Villemontel, and Figuery townships. It was mapped in 1925 by W. F. James and J. B. Mawdsley, but since that date two trunk highways, Nos. 60 and 61, have been constructed across the district and numerous new colonization roads have made many parts of the area more easily accessible. The present geological maps differ from the original map, which is now out of print, principally in closer definition of outcrops and outcrop areas, in greater subdivision of rock formations, and in the location of sand and gravel deposits.

Present interest in the area centres chiefly on molybdenite mining at Indian Peninsula, Kewagama Lake, in Preissac township, and at the southwest corner of La Corne township, which lies immediately east of La Motte. The Indian Peninsula deposits were discovered in 1901, and were extensively tested at the surface during and before the last war. In 1919, a 100-ton mill, since burned, was completed, but this mill operated for only a few days. In 1942, Dome Exploration (Quebec), Limited, outlined an ore-body by drilling southeast from the old surface workings at the peninsula. Indian Molybdenum Limited, the company organized to operate the deposit, has driven an inclined shaft to tap the ore-body 150 feet below the surface, and in September 1943 completed a 500-ton mill to treat the ore. The La Corne deposit, discovered in 1915, was developed, between 1927 and 1930, on two levels from an inclined shaft. It was reopened in 1942 by Wartime Metals Corporation, Limited, who revised and enlarged the mill to handle 200 tons daily.

Tantalite, beryl, and spodumene occur in pegmatite dykes in the La Motte area and in La Corne township east of the area. These minerals have attracted the attention of prospectors and many of the dykes have recently been staked.

This paper presents a summary of the geology of the molybdenite and pegmatite deposits and points out the probable concealed location of a strong zone of shearing and carbonatization in the northern part of the area that should be of interest in prospecting. On the accompanying maps all the larger deposits of gravel and sand suitable for road building are shown. Smaller deposits of sand and gravel sorted by the waves of the glacial lake that once covered this region are to be found on the slopes or summits of some of the hills.

GEOLOGY

The general distribution and subdivisions of the Precambrian rocks of the area are shown on the accompanying maps. Comprehensive descriptions of the various rock types are given in reports¹ by Bancroft and by James and Mawdsley, and need not be repeated.

¹ Mines Branch, Dept. of Col. Mines and Fisheries, Que., Ann. Rept., pp. 160-207 (1911); pp. 199-236 (1912); Geol. Surv., Canada, Sum. Rept. 1925, pt. C, pp. 52-77.

Two belts of Kewagama sedimentary rocks, which diverge eastward, have been mapped recently across Cléricky and La Pause areas², directly west of La Motte area. These

²

Geol. Surv., Canada, Maps 634A and 635A.

belts can be traced across La Motte area also, and the general structure between these belts, as in the two areas to the west, is believed to be anticlinal, although direct evidence of the structure, due to extensive metamorphism, granitic intrusion, and insufficient outcrops, is scanty. The greater part of the Malartic volcanic rocks that lie between these two sedimentary belts is converted to hornblende schist, biotite-hornblende schist, and amphibolite, and it is only along the margins of this volcanic belt that rocks occur in a relatively unaltered state and resemble those of the Kinojevis and Blake River groups. Determinations of the top sides of beds suggest that the Blake River rocks overlie the Kewagama group, although the contact of these groups is in most places heavily sheared and may be for much of its length along a fault. On either side of the outlet of La Motte Lake the tops of lava flows of the Kinojevis group face southward toward adjacent Kewagama strata, indicating, presumably, that the Kinojevis lavas underlie the Kewagama beds and cannot, therefore, be correlated with the Blake River group, which, by definition, overlies the Kewagama sedimentary group. However, farther west, in La Pause map-area, the upper sides of beds in the westward extension of the Kinojevis group and mapped there as part of the Blake River group face away from the northern Kewagama belt as if they overlaid the sedimentary rocks, and until these conflicting relationships are explained the stratigraphic position of the Kinojevis group of lavas will remain in doubt.

The intrusive rocks of the area fall into three main groups that, according to age and beginning with the oldest, are:

- (1) The peridotite group
- (2) The diorite-syenite-granodiorite-granite group
- (3) The diabase-gabbro group

The peridotite group underlies a large area along the anticlinal structure between the two sedimentary belts in the south half of the map-area, and occurs as small sills in the Kinojevis group on either side of the outlet of La Motte Lake. Peridotite exposures in the large anticlinal area range up to 1/4 mile wide by 1/2 mile long, and in some of them a well-layered, sill-like structure is apparent. In general, however, the outcrops are insufficient to enable individual bodies of these intrusive rocks to be traced and mapped separately from the small masses of greenstone and hornblende schist with which they are closely associated.

Although the character of the peridotite intrusions is not clear, the rock appears to form 75 per cent of the belts on either side of the granitic intrusions along the centre of the anticlinal structure, and north and south of these belts, as along the south side of Kewagama Lake and near the outlet of La Motte Lake, it occurs as scattered, small, sill-like bodies. Locally the peridotite weathers reddish brown, but in most outcrops it resembles massive

greenstone, except that it is softer, due to its talc content, and has a characteristic surface, produced by curving and intersecting narrow indentations or fractures, which in places can easily be mistaken for pillow structures. A characteristic and distinguishing feature of many peridotite outcrops are small dykes consisting of fine, radiating, amphibole fibres arranged to form variously oriented groups of parallel thin plates 1 to 2 inches in diameter.

The diorite-syenite-granodiorite-granite group is probably a differentiated series from a common magma, although the presence of augite syenite, which forms a separate intrusion and possesses features indicative of a more alkaline suite of rocks than the others, affords an important petrological problem. The various members of the group are not all of the same age, and in general the order of decreasing relative age is toward the lighter coloured and more siliceous or quartz-rich members. Of the dark-coloured minerals hornblende is characteristic of the earlier intrusions of the group, particularly of their marginal phases. Biotite is the common dark mineral constituent, and locally gives place to muscovite in what appear to be the youngest phases of the group, phases that are also characterized by the presence of fairly conspicuous garnet. Around the intrusive masses, except for the augite syenite, the metamorphism of volcanic rocks to hornblende schist and amphibolite, and of greywacke to biotite-staurolite, biotite-chloritoid schist, and biotite schist, is on a regional, rather than a localized, contact scale. A wide aureole of very coarse-grained amphibolite, in part with a high biotite content, surrounds the syenite mass. The amphibolite is cut by coarse-grained diorite that, in turn, is cut by dykelets of the syenite, and it is difficult in this aureole to decide how much of the material is intrusive and how much of it is recrystallized and altered volcanic or sedimentary rock.

Within the map-area are innumerable pegmatite dykes and pegmatitic molybdenite-bearing quartz veins closely related to some of the granitic intrusions. Near granite contacts there are also zones heavily impregnated with pyrite. The pegmatite dykes of economic interest, those containing tantalite, beryl, and spodumene, are confined to a zone that includes the most northerly of the granite intrusions. This zone extends eastward from the west end of the large granite mass that underlies the northeast part of Preissac township and adjoining territory. Pegmatite dykes form nearly 50 per cent of the border of the northeast, Preissac mass and about 10 per cent of its interior. Tantalite, beryl, and molybdenite occur in dykes in and near the border of this granite, and spodumene-bearing dykes occur to the east and southeast of it in the eastern part of La Motte and in La Corne townships. Pegmatitic quartz veins with molybdenite lie in a belt that is situated directly south of the pegmatite zone, and includes the most southerly of the granite intrusions of the area, commencing at the western end of the Indian Peninsula granite mass. The distribution of molybdenite about the Indian Peninsula granite mass compares with that of tantalite and beryl about the northeast Preissac granite mass, except that molybdenite concentrations, as at Indian Molybdenum mine, appear to be more closely linked with structural control, produced by fractures and faults developed by deformation at the margin of the granite, than are the pegmatites. The location of pyrite zones in places along granite contacts is shown on the accompanying maps. These zones are conspicuously

iron stained and can be traced for many hundreds of feet. They consist of rock sparsely, in places heavily, impregnated with pyrite, accompanied in places by quartz, but work to date suggests that their copper and gold content is negligible.

Diabase and gabbro dykes, remarkable for their persistency and general northeast trend, are the youngest intrusive rocks of the area. They display considerable variation, in granularity from dense, black margins to very coarse, mottled centres, and in composition from types with olivine to others with quartz. The dyke on the northeast shore of Fontbonne Lake consists almost entirely of red granophyre, resembling granite, and containing nearly 50 per cent quartz.

STRUCTURE

The general structural trend of rocks in the map-area, as indicated by the distribution of the formations, is east to slightly south of east except on the east side of La Motte township where the trend is southward. This change in trend may be, in part, due to the intrusion of large masses of granite that underlie a large part of La Corne township directly east of the map-area. All formations, however, swing sharply to the south in passing a line running northeast diagonally across the centre of Cadillac and La Motte townships. This change in trend is a regional feature and somewhat resembles a major drag-fold.

The general structure between the two sedimentary belts is, as mentioned above, believed to be anticlinal or anticlinorial. The width of the southern sedimentary belt remains fairly constant, suggesting that the belt may form part of the limb of one fold. The northern sedimentary belt widens eastward, in La Motte area, to about three times its width in La Pause area directly to the west. East of La Motte area this belt appears to split into two belts. These features seem to imply that the structure of the northern sedimentary belt in La Motte area is more complex than that of the southern belt, and that it may comprise more than one fold.

The map-area includes two zones of strong shearing, one along the contact of the southern belt of Kewagama and Blake River rocks, the other in the Kinojevis group across Manneville, Villemontel, and Figuery townships. A third zone of shearing may lie along the south side of Kewagama Lake and pass under the narrows between Kewagama and Chassignolle Lake. This zone is exposed, however, only on the point at the mouth of Blake River, and there separates agglomerate to the north from pillowed greenstone to the south.

The shear zone in the Kinojevis group, though very poorly exposed, is believed for several reasons to indicate the presence of a strong fault, which is perhaps continuous westward along the north side of Kinojevis River and along the Aiguebelle-Clericy township boundary to the Destor fault¹.

Ambrose, J. W.: Clericy and La Pause Map-areas, Quebec; Geol. Surv., Canada, Mem. 233, p. 36 (1941)

In La Motte area this zone is exposed at the south sides of lots 45 to 47, rge. 2, Manneville tp., and on the south side of Figuery Lake. At both localities, intensely sheared, fractured, and altered, medium-grained granodiorite occurs south of the zone, and the zone itself is heavily carbonatized and contains green mica and irregular stockworks of quartz.

The well-exposed volcanic rocks in Manneville township are, except in a narrow belt of intense shearing along the north side of the carbonate zone, exceptionally massive and unaltered and are not intruded by any granitic, or even by any fine-grained acid, dykes. Their exceptionally massive and unaltered state is in sharp contrast with the recrystallized and altered condition of the sedimentary rocks exposed to the south of the carbonate zone, where intrusive rocks occur in large masses and as numerous dykes. Even though rocks directly south of the zone are poorly exposed, faulting of considerable magnitude seems essential to account for the great contrast in metamorphism of rocks on either side. Between Figuery Lake and the outlet of La Motte Lake to the south there are indications of several zones of strong shearing, which suggest that the Manneville fault may branch in passing eastward, or comprise a series of parallel faults. As this zone is so poorly exposed there is very little evidence in La Motte area that it controlled the location of mineralization. However, at several places in Landrienne township, directly east of the map-area and on strike with this zone, occurrences of gold-bearing quartz are reported by James and Mawdsley¹, and on strike to the west of the

¹ Geol. Surv., Canada, Sum. Rept. 1926; pt. C, pp. 59-66.

map-area is the large, quartz-veined, dolomite deposit, on the old MacCormack claim in Manneville township, which contains small amounts of pyrite and, in places, a little gold².

² Geol. Surv., Canada, Mem. 166, p. 277 (1931)

MINERAL DEPOSITS

Molybdenite

Data regarding the discovery, early development, and character of the molybdenite deposits of the area are given by Eardley-Wilmot³. Since 1925 considerable additional

³ Molybdenum; Mines Branch, Dept. of Mines, Pub. No. 592, pp. 125-131 (1925)

information has been obtained by drilling and underground development, both at Indian Peninsula and in La Corne township. The molybdenite-bearing quartz veins of the area are closely associated with the granite masses from which they appear to be derived, and in this and other features are closely akin to pegmatites.

The general distribution of veins containing molybdenite is shown on the accompanying maps. It will be noticed that in the La Motte area molybdenite occurs particularly about the margin of the Indian Peninsula granite mass and its extension to the east. Minor amounts of molybdenite occur also about the margin of the larger granite mass in the northern part of Preissac and La Motte townships. In La Corne and Fiedmont townships, east of the map-area, molybdenite-bearing veins, similar in character to those in La Motte area, occur, but except those at the southwest corner of La Corne township show a less well-defined relationship to granite masses.

The Indian Peninsula granite mass, particularly its western, muscovite phase, is cut by innumerable quartz veins, a foot or less to 20 feet wide, trending in general southeast and dipping for the most part steeply southwest. Most of these veins lie at a considerable distance from the granite contact and contain very minor amounts of molybdenite. Appreciable amounts of molybdenite apparently occur only in veins at or close to the contact. The most extensive occurrence of molybdenite-bearing veins at Indian Peninsula is along the north contact of the granite at the property of Indian Molybdenum, Limited. The contact of the Indian Peninsula granite, except near the Indian Molybdenum mine, is concealed in a wide area of overburden, and for this reason it is impossible to know whether conditions similar to those at Indian Molybdenum mine are duplicated elsewhere. The molybdenite showings at the old O'Brien claim on the west shore of Kewagama Lake, near the south contact of the granite, occur in association with muscovite granite as at the Indian Molybdenum mine, but whether this should be considered a favourable factor is not certain.

A massive body of quartz with irregularly distributed molybdenite, known as the Montpas-Sylvestre showing, occurs at the east contact of the Indian Peninsula granite mass east of Kewagama Lake, in lot 5, rge. 2, La Motte tp. This deposit can be traced north 15 degrees west across a series of separate exposures for about 700 feet along the east slope of a prominent ridge. The exposed width is 100 feet at one place, but the true width cannot be estimated until the dip, which may be either gentle or steep, is ascertained. Elongate granite and pegmatite inclusions, which form 50 per cent of the deposit in places, and mica-coated shear planes, strike north 10 degrees east to northeast at an angle across the deposit and dip 30 to 70 degrees east. Molybdenite occurs as scattered, well-formed crystals in quartz on the south side of the deposit, but is confined chiefly to a zone of mixed quartz vein material and included sheared pegmatite with a surface width of 50 feet in a trench across the central and largest exposure of the deposit. The zone strikes nearly northeast; it tapers to a point about 50 feet north of the trench, but is difficult to follow southward. The molybdenite content of this zone is probably between 0.5 and 1 per cent. Directly north of the deposit the granite contact apparently makes a sharp bend westward, and this feature of the deposit would merit investigation if extensive testing of the deposit by drilling were ever contemplated.

Indian Molybdenum Deposit¹. The Indian Molybdenum

¹ Data, and geological maps by Dr. B. J. Keating, were very kindly placed at the writer's disposal by Mr. J.G. McCrea, General Manager of Indian Molybdenum, Limited, and greatly facilitated study of the deposit.

deposit, discovered by drilling in 1942 in the south part of lots 8 and 9, rge. V, Preissac tp., lies between two faults in muscovite granite at the north contact of the Indian Peninsula granite mass. The marginal zone of the granite consists of muscovite granite, grading in a few places into biotite granite, with segregated masses or dykes of coarse quartz-perthite-muscovite pegmatite, and is useful as a local horizon marker in indicating fault movements and gently plunging rolls of the granite contact. As its thickness appears to remain fairly constant, the width of the horizontal exposure of this zone roughly indicates the steepness of the dip of the contact. Near the mine, where the dip is about 40 degrees northeast, the zone is wide, but in the large V-shaped indentation northwest of the mine, the dip in places is steep or vertical and the zone is correspondingly narrow. Directly northeast of the deposit, white to pinkish muscovite granite is in contact with a small body of an older, grey, porphyritic biotite granite, and on either side of this body, with biotite-hornblende schist. The schist shows banding in places and contains zones with drawn-out fragments, but is unlike the typical altered greywacke of the district and is probably an altered tuff. In places directly in contact with the granite the biotite content of the schist increases to nearly 100 per cent. Interlayered with the schist are a few, irregular, sill-like bodies of foliated diorite, and on its western side, in the V-shaped indentation northwest of the mine, are peridotite and minor pillowed greenstone. The strike and dip of the schists conform roughly with that of the granite contact. There is, however, an apparent repetition of schists and other rocks, including a layer with fragments and a zone with quartz and massive to disseminated pyrite, that suggests duplication by faulting on either side of the narrow, northeast extension of muscovite granite northwest of the mine.

The two faults that bound the ore-body are about 40 feet apart. They dip 40 to 50 degrees northeast and strike southeast about parallel to a series of quartz veins in the granite to the west, and at a slight angle to the general more northerly trend of the granite contact. The character of the faults is known only underground in the mine. The footwall fault there has a sharp slip surface with relatively massive rock on either side. The hangingwall fault is fairly sharp in places, but in other places branches and consists of a zone of intensely crushed and altered granite several feet wide cut by molybdenite-stained, gouge-filled slips. A horizontal shift eastward along the northeast sides of the faults is indicated by the duplication of the pegmatite border zone. This zone occurs at the muscovite-biotite granite contact in the inclined adit northeast of the ore-body, and at the face of the adit, west of the ore-body, separated from the footwall fault by a few feet of biotite schist. The fracture pattern between the faults suggests that they are of the reverse or thrust type.

Gently dipping quartz veins, 6 inches to a foot wide, connected by steeply dipping stringers, occur at intervals in the granite from the hangingwall fault southwards across the greater part of the ore-body. In the crosscut near the bottom of the inclined adit the veins increase in number near the footwall fault, along which they coalesce to form a solid vein of quartz. This vein contains about 5 per cent red feldspar as scattered bunches

of coarse crystals and is 12 feet wide in places. For 10 feet or more directly above this wide vein granite occurs only as isolated lenses and blocks surrounded by quartz. Deformation after the introduction of the quartz produced a series of small slips in the quartz and intervening granite. These slips are roughly parallel to the footwall fault and have formed along the sides of many of the veins and about granite lenses surrounded by quartz. The slip surfaces are lined with muscovite and with fine-grained molybdenite that along some of the slips occurs in conspicuous amounts. Some veins show little indication of deformation, and these, unlike the sheared veins, contain in places white feldspar (microcline) and hexagonal plates of molybdenite. Molybdenite also occurs to some extent disseminated as small flakes in the granite distant from any veins.

The extension and character of the ore zone on either side of the underground workings is known only in drilling. The drilling indicates that the ore zone ends southeastward where the faults pass out of the granite into or along the sides of a wedge of schist that comes in between the older biotite granite to the northeast and the main muscovite granite to the south. Northeastward the ore zone passes into relatively barren granite. A drift-filled depression 50 feet wide and 400 feet long extends northwest from the ore zone, at the surface. This probably marks the northwest extensions of the ore zone faults. The blocky, fractured character of the granite at the northwest end of the depression suggests that the faults tail out in a wide fracture zone in passing away from the contact into the granite.

La Corne Molybdenite Deposit¹. The La Corne

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Data, plans, and every facility for studying the La Corne deposit were very kindly placed at the writer's disposal by Mr. T. Fell, manager of the mine.

deposit² lies at the southwest corner of La Corne township,

2

Hawley, J.E.; Molybdenite Deposits of La Corne Township, Abitibi County; Ann. Rept., Que. Bur. of Mines, pt. C, pp. 97-122 (1930).

about 19 miles south of east from Indian Molybdenum mine. A wide sand plain in the vicinity of the deposit conceals bedrock except at four small outcrop areas spaced at intervals of 1,000 to 2,000 feet apart along a narrow strip extending 5,000 feet north. The outcrops indicate that, directly south of the deposit, a small mass of biotite granite, at least 1,500 feet wide and 3,000 feet long, extends northeast under the sand plain, but the form and boundaries of this mass are very imperfectly known. Biotite schist, with a series of intersecting cleavages striking northeast, slightly divergently, and dipping 60 to 70 degrees south, flanks the north and south sides of the granite. The general strike of the contact of the biotite schist with greenstone, about 4,000 feet west of the deposit, is west of north, but the contact is perhaps crenulated, due to drag-folding, and dips steeply west.

The series of veins that form the deposit occurs at the northwest side of the granite, and is partly exposed in a biotite schist outcrop about the mine shaft. Quartz veins, mostly under a foot wide and containing minor amounts of molybdenite, occur also in the other outcrops in the sand plain, and have the same general trends as those at the main deposit. The biotite-schist-granite contact at the deposit strikes about 45 degrees east of north and dips 70 degrees northwest. It is not a sharply definable feature, however, as numerous parallel granite dykes, 1 to 20 feet wide, cut the schist in a zone 100 feet wide along the contact.

The principal veins at the deposit trend in part slightly north of east and in part west of north. The easterly veins form an en echelon series stepping east-northeastward, and extend from the biotite schist across the contact into the granite. They maintain fairly regular widths, ranging from 1 to 7 feet, throughout their length, particularly in the schist, and dip about 60 degrees south. The northerly veins occur only in the granite and end at the contact. They are lenticular and expand from narrow widths to 14 feet in places and dip very steeply or vertically.

The easterly veins consist of quartz margined on either side by zones a few inches to a foot wide containing much white feldspar (plagioclase) in the schist and muscovite in the granite. Molybdenite is concentrated in the marginal feldspathic and micaceous zones and also in aggregates of muscovite that form bunches 6 inches to 1 foot in diameter at widely spaced intervals in the interior of the veins. Besides molybdenite the veins contain pyrite and minor amounts of bismuth, bismuthinite, and chalcopyrite. Conspicuous amounts of tourmaline and beryl are present in some veins, and traces of scheelite were discovered at one place by using an ultra-violet lamp.

The northerly veins consist of quartz, red feldspar (microcline and albite), muscovite, and molybdenite. Quartz in these veins occurs as irregular seams and lenses alternating with successive and narrower bands of red feldspar and muscovite, along which molybdenite is concentrated. The feldspar-mica bands are considerably sheared and show slickensided surfaces that developed later than the molybdenite. The molybdenite content of, and the potential ore reserves provided by, these veins is greater than that in the easterly veins. The results of assays given by Hawley¹ show 0.43 and

¹ Ibid., p. 121.

0.52 per cent molybdenum in easterly veins and 1.01 per cent molybdenum in the one northerly vein tested.

The similarity of the mineralogy of the La Corne and Indian Molybdenum deposits, their location at granite contacts, and the wide distribution of associated quartz veins controlled by a definite fracture pattern at these two localities suggest a similar mode of origin. Regarding the origin of the La Corne deposits Hawley² states "..... fracturing and faulting continued throughout the intrusive

² Ibid., pp. 119-120.

granite over some period of time. This is best related to the cooling down of the intrusive and was accompanied by the injection of the quartz and pegmatite veins, with molybdenite Still later faulting occurred after the veins were formed, rendering some of them of little value." The regional structure in the vicinity of the deposit is a drag-fold that plunges probably steeply southwest, and it is possible that both the intrusive granite mass, which may be a sill or a stock, and the rake of the vein system may have a similar inclination. It seems probable, however, that some local structure, either a warping of the granite contact or a fault zone such as at Indian Molybdenum mine, controls the local concentration of molybdenite-bearing veins at the La Corne deposit.

Tantalite-, Beryl-, and Spodumene-bearing Pegmatites

A definite grouping of tantalite-, beryl-, and spodumene-bearing pegmatites occurs in the map-area about the large granite mass of northeast Preissac, northwest La Motte, and adjacent parts of Figuery and Villemontel townships. Tantalite and beryl, though nowhere present in large amounts, occur more commonly in pegmatites near the border of this granite mass than elsewhere. Indeed most of the occurrences of these two minerals in the map-area are within or close to the border zone of this granite, and their presence at any distance from this granite is rare. Molybdenite, also, is present in small amounts in the border zone of this granite, particularly at its western end. Siliceous pegmatites there contain crystals and bunches of molybdenite 1 inch or more in diameter in places, and about 1,200 pounds of molybdenite is reported¹

¹

Eardley-Wilmot, V. L.: Molybdenum; Mines Branch, Dept. of Mines, Canada, p. 129 (1925).

to have been cobbled and shipped from one of these pegmatite dykes, at the Height of Land property, at the extreme west end of the granite mass. The spodumene-bearing pegmatites occur in greywacke, greenstone, and granite for several miles eastward from the Preissac granite. The original presence of spodumene in pegmatites within the Preissac granite is suggested by plume-like aggregates of fine muscovite scales 1 to 8 inches long. These aggregates have sharp boundaries and a shape and arrangement normal to the walls similar only to some of the spodumene occurrences in the district. The grouping of tantalite- and beryl-bearing pegmatites within or close to a granite mass, and of spodumene without and at some distance from it, compares closely with a similar grouping present in the Northwest Territories².

Jolliffe, A. W.: personal communication.

Tantalite. The most important tantalite discovery in the area, the Aldous showing, lies in lot 54, rge. 7, Preissac tp. This occurrence forms part of a pegmatite dyke cutting the La Motte granite about 1,000 feet north and parallel to its south border. The dyke can be traced for

about 500 feet eastward across a knob of granite and dips about 15 degrees north. At its eastern end it is about 20 feet wide, but its width is irregular due to its branching and braided structure. Tantalite occurs as isolated small crystals at points along the exposed length of the dyke, and is concentrated in a small shoot about 60 feet long and about 10 inches wide at its eastern end. The eastern end of the dyke has a banded structure consisting of a central series of quartz lenses, margined by coarse muscovite, which, in turn, pass abruptly into a coarse, quartz-albite zone containing streaks of red garnet, minor beryl, minute green chrome spinel, and a few large masses of perthite. Tantalite occurs as individual crystals, ranging in size from minute specks to 3/4 inch wide by 3 inches long, and as radiating crystal clusters replacing albite and quartz directly beneath the lowest muscovite zone. A concentration test by the Bureau of Mines Ore Dressing and Metallurgical Laboratories, of a 70-pound shipment collected from loose blocks blasted from the dyke, showed a tantalite content of 0.65 per cent, or 13 pounds to the ton. Analyses of the concentrates, whose specific gravity was 6.2, gave:

	Per cent
Ta ₂ O ₅	54.17
Cb ₂ O ₅	26.37
Fe	6.73
Mn	5.10
TiO ₂	0.36

To test possible variations of the Ta₂O₅ content of tantalite from this zone specific gravity tests were made on ten very carefully prepared specimens, by H. V. Ellsworth of the Mineralogical Section of the Geological Survey. These results gave a range from 6.25 to 6.64, but in the greater number of specimens the specific gravity approached the mean average of 6.43.

The only other tantalite occurrence in the district that has been trenched and opened up for examination is situated in lot 11, rge. 2, Figuery tp. This occurrence is in a pegmatite dyke 5 feet wide, which extends vertically northwestward across a peridotite outcrop about 1,000 feet north of the La Motte granite. The main part of the dyke consists of coarse albite with 30 per cent quartz, margined sharply on either side by fine-grained aplite of the same composition containing streaks of red garnet. Along the centre of the dyke are discontinuous lenses of quartz 1 to 2 inches wide. Tantalite occurs as conspicuous crystals in places in the dyke, but most of the crystals are very small and the percentage of tantalite throughout is low. Three specific gravity tests on one large crystal gave an average of 6.26, indicating about the same Ta₂O₅ content as in specimens from the Preissac occurrence.

A few small crystals of tantalite having a specific gravity of 7.175, the highest recorded from the district and indicating a Ta₂O₅ content of 65 to 70 per cent, were collected from a dyke near the south border of the granite, 1 1/2 miles east of the Aldous showing.

Beryl. Many of the pegmatites in the border zone of the La Motte granite, particularly in its northeast part, contain small amounts of pale green, cloudy beryl. Beryl also occurs as a minor constituent of the spodumene-bearing pegmatite east of the La Motte granite, and in the easterly trending molybdenite-bearing quartz veins at the La Corne Molybdenite mine. The crystals in the La Motte granite pegmatites vary from $\frac{1}{4}$ to $1\frac{1}{2}$ inches in diameter and from 1 to 4 inches in length. Like the tantalite they are particularly common in dykes containing central bands of quartz margined by muscovite and, similarly, are associated with or close to the muscovite bands. Dykes containing beryl range from a few inches to 20 feet or more wide, but the beryl crystals are widely separated, most commonly along definite bands, and the proportion of beryl in the numerous dykes inspected proved to be very low.

Spodumene. The area containing spodumene-bearing pegmatites extends eastward for at least 13 miles, and south-eastward 10 miles from the east end of the northern La Motte granite mass. The occurrences of spodumene in La Motte area are indicated on the accompanying maps. In view of the wide distribution and relatively high concentration of spodumene in many of the dykes the reserves of spodumene in the district may prove to be large. The spodumene-bearing dykes, unlike those with tantalite and beryl in the La Motte mass, have sharp, tabular, steeply dipping walls, and a fairly constant composition throughout, with rare instances of banding. They range from a few feet to 30 feet in width and can be traced for hundreds of feet. Albite, microcline, quartz, and spodumene are the chief constituents of these dykes, accompanied by minor muscovite, and in places by a little pale green to pale blue beryl and, more rarely, tantalite-columbite. The textural relations of the four chief constituents compare with those of a very coarse-grained igneous rock, except in local segregations where the crystals are 1 foot or more in size. In the coarse segregations spodumene crystals may be 2 inches wide by 18 inches long, and in one reported instance 4 feet long. In some dykes, feldspar, quartz, and spodumene occur in very nearly equal proportions, and a Rosiwal analysis on a large specimen from one dyke indicated about 20 per cent spodumene by volume, equivalent to nearly 24 per cent by weight. The spodumene content of the dykes, however, though seemingly constant in any one dyke, varies, and in some dykes spodumene is restricted to local concentrations. An analysis¹ of a fresh specimen from one dyke gave:

Analyst, R.J.C. Fabry, Section of Mineralogy, Geological Survey.

	Per cent
SiO ₂	63.72
Al ₂ O ₃	26.24
Fe ₂ O ₃	0.90
FeO	Trace
CaO	0.22

	Per cent
MgO	0.16
Li ₂ O	5.77
Na ₂ O	2.25
K ₂ O	0.03
MnO	0.06
TiO ₂	0.06
H ₂ O	0.52
	<hr/>
	99.93