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PRELIMINARY REPORT ON THE WEST HALF OF MONTBRAY TOWNSHIP, ROUYN-NORANDA COUNTY

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PROVINCE OF QUEBEC, CANADA

DEPARTMENT OF NATURAL RESOURCES

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MINERAL DEPOSITS BRANCH

J.-É. GILBERT, CHIEF

PRELIMINARY REPORT

ON THE

WEST HALF OF MONTBRAY TOWNSHIP

ROUYN-NORANDA COUNTY

BY

C. THIBAULT

QUEBEC
1961

P. R. NO. 466

PRELIMINARY REPORT

on the

WEST HALF OF MONTBRAY TOWNSHIP *

Rouyn-Noranda County

by

C. Thibault

INTRODUCTION

The west half of Montbray township is adjacent to the Quebec-Ontario interprovincial boundary, its centre being situated about 25 miles northwest of the twin cities of Rouyn and Noranda. Both cities are served by Highway 59 (east-west direction), Highway 46 (north-south direction) and by the Senneterre-Taschereau branch of the Canadian National railway.

The area covers 50 square miles and is bounded by longitudes 79°24'35" and 79°31'25" and by latitudes 48°17'14" and 48°25'. Its eastern part is accessible by canoe from Desvaux lake through Dasserat lake and Kanasuta river. Its western part can be reached only by float planes landing on Clarice and Després lakes.

The area presents, in general, a rugged topography and its highest point, in the centre of range VII, attains an altitude of 1,700 feet, whereas the lowest parts are between 800 and 900 feet above sea-level.

The southwest part of the map-area drains into Dasserat lake through Clarice creek and its tributary, Delmas creek. The southeast part drains into Kanasuta river or, southward, into Dasserat lake. Després, Dumesnil and Fabie creeks flow from lakes of the same name respectively and run northeastward, draining all the waters of the northern section of the half-township.

The geological mapping, on a scale of 1,000 feet to one inch, was made through north-south traverses spaced at 400- to 500-foot intervals and tied to range lines. The accompanying map is on the scale of 2,000 feet to one inch, but geological compilation maps of the western two quarters of the township will be available in the near future on a scale of 1,000 feet to one inch.

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* Translated from the French.

GENERAL GEOLOGY

All consolidated rocks of the area are of Precambrian age. They include mostly Keewatin-type volcanic flows cut by granitic, monzonitic, dioritic, and gabbroic intrusions. Quartzofeldspathic, dioritic and gabbroic dykes have also been found.

A broad, open northeasterly trending syncline apparently occupies the northern two-thirds of the area, whereas in the southern third a northeasterly anticline seems to exist. In ranges IV and V, the structure is masked by an abundance of intrusions and by the development of metamorphic aureoles.

Very few non-consolidated glacial and post-glacial deposits were seen, the former constituting kames and other elongated masses generally made up of argillaceous gravel, whereas the latter consist of silty clay as can be seen in the valley of certain creeks, as well as locally, near the shore of Dasserat lake.

Table of Formations

CENOZOIC	Recent and Pleistocene	Clay, silt, sand, gravel
UPPER PRECAMBRIAN	Keewatin-type intrusive rocks	Gabbro dyke
LOWER PRECAMBRIAN	Post-Keewatin-type intrusives and associated metamorphic rocks	Monzonitic porphyry Monzonite, orthoamphibolite and associated hybrid rocks Quartzofeldspathic porphyry Granite Gabbro, diabase Diorite, quartz diorite
	Keewatin-type volcanic rocks	Rhyolite and rhyolitic conglomerate Dacite Andesite Basalt

Volcanic Rocks

Basalt

Basalt forms numerous outcrops in the centre of ranges II and III, in the eastern central part of the map-area. Around Clarice and Floyd lakes, in the western part of ranges IV and V, basaltic lenses have been seen within a diorite-gabbro-granite intrusive complex. In accordance with the classification adopted by various geologists in the mapping of adjacent areas, all dark-coloured to black volcanic rocks that apparently are not rhyolite have been considered as being basalt. But the presence of basalt haloes at the contact of intrusions, already noted in other areas*, suggests that they are contact metamorphism aureoles.

Two facies can be distinguished in these rocks: one, of high density and medium to fine grain, is highly altered with a dark colour; the other, lighter and apparently more acidic, is more or less aphanitic. No flow structure can be seen in the facies of the second type, whereas in the dense, coarser-grained facies, amygdules, flow lines, pillows, breccia and a porphyritic texture are locally found. A gradual passage from andesite and dacite to this basalt can be locally seen. This gradation probably resulted from a low density thermal metamorphism of andesite and dacite, possibly accompanied by metasomatism.

Andesite

Andesite covers the southeast quarter of the south half, and the northwest quarter of the north half of the map-area, as well as parts of the lots 23 to 31, ranges VI, VII, VIII and IX. Moreover, a few limited areas of andesite are found in the central and west central parts of the area.

This rock, which is fine grained and soft, is green or dark green; in places, it is dark grey on fresh surfaces, and greenish brown, greyish brown or light brown on altered surfaces. Alteration is deeper than in the more acidic lavas, being from 1/8 to 1/4 of an inch in depth. In general, the andesite of the map-area is rarely porphyritic or brecciated. Much of it is somewhat pillowed, but a massive facies is also abundant. The fact that amygdules are present

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*Behr, S.H.; Dugas, J.; Emo, W.B. (1958):

Preliminary Report on Part of Western Duprat Township, Rouyn-Noranda Electoral District. Que. Dept. of Mines, P.R. No. 368.

Hogg, W.A. (1959):

Preliminary Report on Northeast Quarter of Montbray Township, Rouyn-Noranda Electoral District. Que. Dept. of Mines, P.R. No. 389.

in many outcrops, if not in most of them, is worth mentioning. These amygdules are rarely more than a quarter of an inch in diameter and are composed of quartz, felsic material or carbonate. Pyrite and epidote are also found.

Pillows range from one foot to four feet in length. Whether they are slightly deformed or intact, these pillow structures, when sufficiently exposed, allow the determination of the direction and dip, as well as of the tops, of the flows.

A large portion of the andesite apparently contains very fine-grained quartz grains, and numerous fractured outcrops are cut in every direction by quartz veinlets. In fracture and shear zones, as well as close to certain intrusives, the andesite is discoloured by silicification and epidotization and rather resembles a light green or pale yellow rhyolite.

Pyrite occurs almost everywhere, but rarely exceeds one per cent in quantity.

Dacite

Concentrated mainly in the southwest corner and in the central part of the map-area, these intermediate volcanic rocks form wide bands that generally show more relief than the andesite. Dacite differs notably from the latter by its lighter grey or green coloration; it is rather hard and weathers to orange-coloured hues. Here, the uniformity of character noted in the andesite disappears; dacite is either aphanitic, with a sub-conchoidal break, fine or even medium grained, and can be confused with diorite. Moreover, pillow structures are commonly absent or are only a few inches in diameter.

Carbonate is a very widespread alteration mineral in dacite and in places constitutes an important portion of the rock, which probably explains its orange hues on altered surfaces. Pyrite seems to be less abundant than in andesite. On the other hand, the presence of fine- or medium-grained pyrrhotite, more or less homogeneously distributed throughout the rock in certain outcrops, has been noted but only in traces that do not count as a general rule, even locally, for 1 per cent of the rock. Chlorite, in laths or in grains 1/16 to 3/8th of an inch in diameter, is generally present in dacite, giving it a peppered appearance. The prophyritic facies is widespread, consisting of white automorphic or xenomorphic feldspar grains, greyish or greenish in colour, in a finely-grained matrix and also containing elongated grains of chlorite. Small quartz grains probably of primary origin can be seen on altered surfaces. Amygdaloidal structure is widespread and, in a few places, amygdules are concentrated in well-defined bands parallel to the direction of flows. The large outcrop at the southern limit of the area, on lots 7 and 8, range I, clearly illustrates this relation. Amygdules consist of calcite, quartz or felsic material.

Rhyolite

Five different types of acidic volcanic rocks can be distinguished: massive rhyolite, rhyolite containing quartz eyes, porphyritic rhyolite, rhyolitic agglomerate and metasomatic alteration rhyolite. With the exception of the last type, the comparatively narrow lenses and bands of rhyolite follow the general trend of flows. They have been noted almost everywhere in the area, except in the southeast and northwest corners, as well as in the western central part of the map-area.

Massive rhyolite outcrops mainly on lots 14 to 17, range I, as well as in the eastern parts of ranges VII and VIII. This rock, locally glassy, is dominantly light green on fresh surface, and it is slightly tinted with grey, pink, purple or black colours. The altered surface is generally slightly coloured or colourless.

Rhyolite containing quartz eyes is abundant only in the extreme northern part of lot 27, range III, and in lots 13 and 14, range I. On fresh surface, this rock is generally light grey or black, but dark grey and light green colours have also been noted. It is very fine grained or glassy. The porphyritic facies is abundant and consists of small grains of light-coloured feldspar in a darker-coloured matrix. Weathering is superficial only and of a whitish colour.

Abundant porphyritic rhyolite occurs in lots 1 to 3, range III, and covers a still greater area at the eastern end of ranges IX and X. At the former locality, it is a hard, fine- or very fine-grained, black, dark brown or dark green rock, in which 5 per cent or less of whitish feldspath phenocrysts can be seen. These are generally xenomorphic, but many take the shape of stubby laths. In both cases, their dimensions do not exceed 1/16th of an inch.

The rather superficial weathering gives the rock a light grey or whitish colour. This type of porphyritic rhyolite grades eastward into a similarly textured but softer light green dacite, a few crystals of which being apparently constituted of hornblende.

The porphyritic rhyolite east of ranges IX and X is very different. The matrix is highly acidic, hard and glassy; its dominant colour is green or grey, and, in places, pink. The well-formed fresh-appearing white feldspar crystals, 1/32th to 1/8th of an inch across, constitute up 10 per cent of the whole mass. Moreover, grains of clear quartz of the same size, rounded and coalescent in many places, constitute another 5 per cent of the rock. Weathering gives the rock a superficial whitish colour. The persistence of the characteristics of this rhyolite is noteworthy.

The rhyolitic agglomerate consists mainly of acidic, aphanitic, angular or rounded fragments, generally 1 to 6 inches, but exceptionally 20 inches, across. Most of these fragments are light green, a few are black, and others are grey or almost colourless. By weathering, their surface becomes white, in places rusty. The

matrix constitutes about 10 per cent of the rock and is generally dark green and locally rather soft. It apparently contains chlorite and sericite and is slightly tuffaceous.

Many lenses of acidic rocks mapped as rhyolite might in fact be only andesite or silicified dacite. This would explain their erratic occurrence commonly close to large exposures of intrusive rock, their graded passage to more basic types and also the fact that these rhyolites are the only ones containing pillows. These doubtful rhyolites occur in the western parts of ranges III, VII and VIII, near the centre of ranges V, VII and IX and in the eastern part of range VII.

Intrusive Rocks

Diorite

Numerous sills and irregular masses of diorite are found in dacite and andesite flows. The diorite is particularly abundant in the northwest half of the area. In numerous outcrops, a gradational passage of diorite to dacite and in some places to andesite was observed. This suggests that at least part of the diorite is contemporaneous with the lavas, thus possibly representing the core of thick flows or channels for volcanic rocks. It is also possible that the diorite came immediately after the extrusion of lavas at a time when the latter were not yet completely cooled.

On the other hand, volcanic wall-rocks are cut by dykes and offshoots of this same diorite, which, in many places, is in generally sinuous, but clearly intrusive, contact with the volcanics. Moreover, silicification is seen to be generally more marked, and free quartz (grains, nodules, veinlets) is more abundant in lavas bordering areas where diorite outcrops abundantly. In many places in these lavas, traces of pyrite and pyrrhotite were noted, and some silicification is accompanied by epidotization. A decrease in the size of diorite grains was noted at the margins of the masses.

These facts suggest that diorite belongs to at least two different ages and that the more abundant variety is the younger of the two.

The grain size, the texture and the mineralogical composition of the diorite vary greatly from one place to another, and this variation can sometimes be seen on one individual outcrop. However, the consistency of certain characteristics enables us to consider all these varieties as belonging essentially to the same rock. These characteristics are:

(1) The presence of stubby amphibole grains, irregularly outlined, with a very visible cleavage, a sometimes resinous lustre, dark-coloured or rather light brown, and constituting up to 10 or 20 per cent of the rock.

2) The presence of fine grains of an opaque and dull material forming light grey, whitish or purplish spots with very irregular outlines. The proportion of these spots is low and locally attains about 5 per cent of the rock. They are probably made up of leucoxene.

3) A peculiar texture consisting of white, light grey or light green feldspar, in generally well-formed crystals clustered and enclosed in a green, transparent material. The proportion of this material in relation to the feldspar varies greatly and, when crystallized, crystals are lath shaped, of a darker green colour than could be seen in the hyaline material.

One the whole, the diorite shows a generally massive texture, with a fresh surface of a more or less dark grey or green colour and a buff- orange- or grey- coloured altered surface.

Quartz diorite

The quartz diorite cropping out in lots 25 to 27 of range II is very different from the diorite just described. It is a massive, fine- to medium-grained rock, dark grey to green-black, with a brown or green alteration surface; it contains an almost equal quantity of dark minerals and feldspar and could easily be classified as a gabbro.

The one in lots 20 to 23 is more basic and, through an increase in the production of mafic elements, it grades southward into gabbro. Since the latter grades into basalt, these rocks could be considered as being contemporaneous, but it is equally possible that the contacts between the two have been destroyed by recrystallization and metasomatism.

Ferromagnesian minerals in this diorite are better formed than white interstitial feldspar. The rock contains about 5 per cent quartz and an iron oxide. Close to its contact with granite to the west, the diorite is cut by quartz stringers, and traces of chalcopyrite have been noted at one point.

Around Clarice and Delmas lakes, within the intrusive complex, quartz diorite, probably younger than normal diorite and possibly altered by a later granitic intrusion, can be found. Inclusions of altered basic volcanic rocks can also be seen. Moreover, a few small isolated masses of quartz diorite can also be noted elsewhere in the area.

Thus, south of Tarsac lake, along the central line of the township, two small dark, fine-grained diorite outcrops are cut by quartz and orthoclase veinlets. But this diorite could possibly be only a recrystallized basic lava.

Gabbro

Part of the gabbro of the area is in gradational contact

with the enclosing basic volcanic rock. Such is the case for the gabbro that outcrops at the eastern end of range VI, south of Pérès lake, as well as for the one occurring in lots 20 and 21, range II. Here, outcrops show a gradual passage of gabbro to basalt through a slow decrease in grain size, without any dividing line between the two. However, the volcanic rock is fractured, whereas the gabbro is massive.

On the other hand, a gabbroic mass cuts the dioritic complex of Clarice and Delmas lakes and apparently contains diorite xenoliths.

In lots 17 to 23, range IV, and lots 19 and 20, range V, an irregularly outlined gabbro mass covers the upper part of an area higher than the surrounding terrain. This gabbro apparently cuts the volcanic rocks impregnated with monzonitic material and comes into contact with the monzonite mass. Moreover, the monzonite, as well as the surrounding lavas, is fractured and cut by abundant quartz and granitic material, whereas the adjacent gabbro is practically not fractured, contains very few stringers of quartz and is nowhere cut by granitic material, suggesting that the monzonite is older than the gabbro.

The gabbro of the area shows many variations in its mineralogical composition, its texture and the size of its grain, but it is everywhere dark coloured or black on fresh surface, slightly magnetic, and mainly composed of mafic minerals. It is generally medium or fine grained and its structure is usually massive. Epidote is generally found in variable amounts, as well as traces of very fine-grained quartz. The altered surface of the rock is rough, black or brown and, in places, brick red or rusty.

Some dioritic facies containing more feldspar, but of little importance, were also seen.

A few other small plugs of gabbro appear locally through lavas.

Diabase

A few small masses of diabase cutting lavas have been mapped in lots 11 and 28, range II, lot 13, range III, lot 27, ranges III and IV, lots 3 to 5, 26 and 27 of range V, and in lots 24 to 27, range VI.

This rock is massive and black, medium grained and cannot be directly connected with gabbro masses. Flow structures can be noted locally.

Granite

The granite of lot 20, range II, is medium or fine grained, grey or grey-green, with a grey and rough altered surface. Quartz and feldspar are in virtually equal quantities and constitute about

80 per cent of the rock, the remainder being made up of irregular grains of chloritic-looking material. The feldspar alone is well crystallized. Pyrite locally forms up to 7 per cent of this granite. Along its contact with the quartz diorite, the proportion of quartz decreases in the granite and the presence of a greater amount of mafic minerals is noted.

The granite of lot 27, in the same range, is hornblendic and contains pyrite near its contact with andesite.

The granite of lot 2, range V, is composed of quartz, feldspar and hornblende in almost equal proportions. Hornblende alone in a few places occurs in fairly well-formed crystals. On fresh surface, the rock shows pink and dark green spots; on altered surfaces, it is light pink.

Granite is the least abundant intrusive rock of the map-area, but the fact that it everywhere outcrops in low ground, that all other rocks contain stringers or masses of quartz and that much silicification occurs, particularly where the rock is fractured, suggests that granite occupies an important part of the bedrock at depth.

Quartzofeldspathic porphyry dykes

One of the two porphyry dykes indicated on the accompanying map follows the main shear zone along most of its length in the southern part of range I. It outcrops in lots 11, 14, 18, and 26. This dyke, of a maximum width of 12 feet, is composed of white feldspar crystals 1/2 inch long, forming from 10 to 25 per cent of the mass, as well as from 5 to 10 per cent of quartz in lenses or in rarely well-formed crystals. Both minerals are in a very fine-grained felsic groundmass, light grey-green or pink in colour.

The other dyke cuts the diorite of lots 20 and 21, range IX. Its composition is similar to that of the first dyke but it contains, in addition, minor brittle, green mica and a very small quantity of pyrite and hornblende. It is only two feet wide.

Monzonite

Monzonite outcrops over an important area of the eastern part of ranges IV and V. It is a medium-grained, generally well crystallized, slightly magnetic rock in which dark green or black grains stand out sharply against a pink background. Its altered surface is pink- and green-coloured, in places brownish. Its mineralogical composition is fairly homogeneous, the proportion of dark minerals varying from 15 to 30 per cent. These are automorphic in some places, xenomorphic in others, and include mainly hornblende, rare chlorite and, possibly, minor augite. Where feldspar (orthoclase) is well crystallized and lath-shaped, its structure is interstitial; elsewhere it is massive.

Close to its contacts, as well as in its southward, offshoots,the monzonitic mass contains numerous more or less digested inclusions of what seems to have been andesite or basalt. At these same localities, monzonite becomes quartzose and contains up to 5 per cent or more of quartz visible to the naked eye. Some contacts are well defined; others are gradational. In the latter case, heat from the intrusion caused a recrystallization of the basic volcanic rock, which suffered at the same time a strong metasomatism, as shown by monzonitic and quartzose stringers cutting it. Even where contact is sharp, the enclosing volcanic rock is more or less recrystallized, fractured, silicified, and epidotized. The presence on a porphyritic facies in the andesite, along its contact with the monzonite, has also been noted.

Quartz stringers, lenses and masses, with minor granitic material, are abundant in numerous monzonite outcrops.

In the northeast quarter of Montbray township, Hogg* observed monzonite cutting diorite and containing inclusions of the latter.

Amphibolite

This rock is exposed south of the monzonite in lots 28 to 31 of range IV and in lot 30, range V. A few outcrops can also be seen within a diorite mass in lots 2 and 3 of range VI. This massive medium- or fine-grained amphibolite is formed almost entirely of black and shiny mafic minerals, mostly hornblende, with minor white feldspar and quartz. It is strongly magnetic and it weathers locally to a dark brown colour.

A gradational passage of the volcanic rock to amphibolite on one hand, and from amphibolite to monzonite on the other, is noted on exposures of the rock. As it is the case in the enclosing volcanic rock, and locally in the syenite, the amphibolite is cut by sinuous dykes and offshoots of a more recent, more acidic monzonite, some of which are even granitic, with local development of a porphyritic facies. These more recent injections commonly contain inclusions of original amphibolite and monzonite.

Hybrid rocks

The monzonite has assimilated and brought about the recrystallization of basic lavas at its contact, thus forming hybrid rocks composed mainly of well-crystallized, fresh, and shiny mafic minerals and feldspar, locally with minor quartz, biotite and epidote. The main mineral associated with amphibolitization is magnetite, which is omnipresent and generally distributed in fine grains

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* Hogg, Wm. A. (1959): op. cit. page 3.

within the rock, but also occurring as veinlets. Pyrite (up to 2 per cent of the rock) is also present. The mineralogical composition of the rock varies from monzonitic to amphibolitic. It is generally dark coloured.

Monzonitic Porphyry

Along the small creek that drains St-Martin lake into Tarsac lake, monzonitic porphyry occurs as what seems to be an 80 - foot northwest-trending dyke. The rock is constitued of 70 per cent of randomly oriented salmon-coloured orthoclase laths 3/16 to 1/2 inch long and of 30 per cent interstitial, smaller and less well crystallized mafic minerals, mainly hornblende.

The rock contains monzonite inclusions with clearly outlined contacts.

Another exposure of a similar porphyry occurs in lot 27 of range V, west of St-Martin lake. Here, the feldspar is very light grey, pink or green and occurs as lamellae or cubes. Minor interstitial quartz and chlorite(?) are likewise present in the rock.

Keweenawan-type Intrusive Rocks

Gabbro Dyke

A gabbro dyke, 60 feet wide, has been followed intermittently over a distance of 2½ miles, from lot 21, range III, to lots 24 and 25, range V. Grey-black in colour, massive and rather fine grained, this rock apparently contains from 30 to 40 per cent feldspar in a groundmass of dark minerals. It is slightly magnetic and traces of quartz and minor pyrite can be seen. Its contacts with the enclosing rock are sharp and marked by a very fine-grained margin.

The dyke cuts volcanic rocks, gabbro and monzonite.

Pleistocene and Recent

Clay covers most of range X, a good portion of the wide valley of Després and Dumesnil creeks on range IX and of the south-east corner of the map-area. As elevation here does not attain the highest level of waters of former Barlow-Ojibway* lake, that is to say 1,000 feet above sea level, this clay has possibly been deposited in the great post-glacial lake.

An elongated esker, more than one mile long, can be seen east and north of Delmas lake, in range V. A few deposits of generally silty sand and gravel, mostly in the southern part of the area, have also been mapped.

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* Coleman, A.P. : Lake Ojibway; Last of the Great Glacial Lakes (190
Ont. Bur. of Mines, Vol. XVIII, Part I, pp. 284-293.

Glacial striae show a general southward movement of the last ice sheet.

STRUCTURAL GEOLOGY

Folds

In the southeastern part of the area, volcanic flows form an asymetric open anticline, plunging about 20°W. and trending about N.75°W. Its axial plane apparently crosses obliquely ranges II and III. In the vicinity of the complex formed by the intrusive masses of Tarsac lake and of the eastern part of range II, the fold apparently plunges at 45°. This sharp plunge is thought to be a local phenomenon brought about by the thrust created by intrusions.

On the other hand, in the northern half of the map-area, a wide-open, northeasterly trending syncline, the axis of which is apparently crossing, in an oblique direction, ranges VI, VII, and VIII, appears to be present.

There is consequently a lack of structural homogeneity probably brought about by the action of intrusions and by abundant faulting. A more detailed mapping would possibly yield new data on the structural geology of the area.

Faults

A shear zone more or less closely follows the southern limit of the map-area. Its intensity decreases westward, whereas to the east it widens and branches out. It generally dips sharply southward or vertically. All outcrops within this zone are sheared, silicified, and carbonated, and many are discoloured, except rhyolite, in which the only secondary mineral is hematite deposited along fracture planes. On the other hand, pyrite, magnetite and hematite, as well as traces of chalcopyrite and other sulphides, are found where shearing crosses andesite, in the eastern part of the zone. Displacement seems small everywhere. Where there are no outcrops, the various branches of the shear zone are marked by elongated marshy depressions clearly visible on aerial maps.

A quartzofeldspathic porphyry dyke accompanies this fault locally. It is slightly fractured and seems to be localized where the fault is cut by other more recent breaks showing sharp slip planes.

The second fault type is characterized by sharp slip planes on which short striae can be seen. The trend of these planes, which dip very steeply or, vertically, is generally northwest or northeast. The movement, where determined, has almost everywhere a weak vertical component and an apparently small amplitude. South of Després lake, in ranges VII and VIII, these faults seem to cut one another. Little or no mineralization is found associated with them, but more or less important silicification and carbonatization, as well as pyrite, have been noted.

Després lake and the valley of the creek of the same name probably occupy the site of a major fault which would trend southwestward into Ontario, as suggested by the few outcrops bordering them.

ECONOMIC GEOLOGY

During 1959 and 1960, numerous geological and geophysical surveys, as well as diamond drilling, were carried out on a few mining properties of the area. Southwest Potash Corporation, which holds an option on lots 25 to 31, inclusive, ranges VII and VIII, completed a detailed geophysical and geological survey during 1959 and 1960 and drilled two holes, 760 and 763 feet deep, respectively, in the south half of lot 31, range VIII. Here, a thin northeast trending shear zone more than 100 feet long is slightly mineralized with chalcopyrite.

No important economic concentrations of minerals have as yet been found in the area, but traces of mineralization have been noted in numerous localities. These are mainly pyrite, but pyrrhotite and, less commonly, hematite and chalcopyrite have also been noted. Pyrite and pyrrhotite are also commonly found in volcanic rocks. Pyrite is, however, more abundant in lavas bordering intrusions, as well as in shear zones.

Lots 15 to 27, Range I

Minor quantities of sulphides are found along the shear zone cutting across the andesite. Magnetite also occurs in many localities. The possibility of higher concentrations where the fault is marked solely by marshy depressions should be considered. In the adjacent townships to the north and northeast, Graham* has noted that gold mineralization is everywhere localized along shear zones in porphyries or closely adjacent to the latter, and that it is associated with zones of siliceous alteration. Such alteration is intensely developed where shearing follows the shore in lots 24, 25 and 26. However, assays of a sample of discoloured and pyritized andesite gave negative results.

Lots 4 and 5, Range V

Numerous prospecting pits were sunk on a weak pyrite mineralization in considerably fractured, sheared diabase and basalt enclosed in quartz diorite. These pits were put down in 1927 and 1928 by Oriole Mines, Ltd.** In addition to trenching and geological

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* Graham, R. Bruce (1954): Parts of Hébécourt, Duparquet and Destor Townships, Abitibi-West County. Que. Dept. of Mines, G.R. No. 61.

** Report on Mining Operations in the Province of Quebec during the Year 1928; Que. Dep't. of Highways and Mines, p.83.

and geophysical surveying, this company is said to have drilled 11 holes for a total length of 2,000 feet. Chalcopyrite and pyrrhotite mineralization has been reported.* The property is presently held by O'Leary Mines Ltd.

Lots 9 and 10, Range II; Lots 9, 11, 12, Range III

In the above-mentioned lots, a fine-grained, generally massive and slightly fractured dacite is mineralized with pyrrhotite, pyrite and chalcopyrite. These sulphides (rarely more than one per cent of the rock) occur as fairly well distributed grains 1/64 to 1/8 of an inch across. Traces of pyrrhotite also occur in the diorite immediately to the south and west.

Lots 23 and 24, Range V

On the line separating lots 23 and 24, a quartz vein trending N.30°W., at least 6 feet wide and 180 feet long, is locally visible in a series of 6 trenches. Pyrite, galena and chalcopyrite mineralizations have been reported and assays, according to reports, have revealed interesting values in gold. Some of these assays yielding more than one ounce of gold per ton.

Numerous quartz veins, of which a few extend into enclosing lavas, cut across monzonite outcrops.

The neighbouring ground is presently held by Barry Explorations Ltd.

Lot 3, Range VIII

North of lot 3, near Després lake, a nickel and copper mineralization was found in 1957 at the contact between andesite and diorite. Trenches were dug and 880 feet of diamond drilling completed with a portable drilling equipment. According to reports, the mineralized zone is 40 feet wide and is limited to the contact. Assays generally gave less than 0.5 per cent of combined nickel and copper.**

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* Report on Mining Operations in the Province of Quebec during the Year 1927; Que. Dept. of Colonization, Mines and Fisheries, pp. 109, 111.

** Dugas, Jean, et al. 1957 : Description of Mining Properties Examined in 1956 and 1957; Que. Dept. of Mines, P.R. No. 390, pp. 75,76.