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EAST HALF OF MONTBRAY TOWNSHIP, ROUYN-NORANDA COUNTY

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GEOLOGICAL REPORT 115

EAST HALF OF MONTBRAY TOWNSHIP

ROUYN-NORANDA COUNTY

by

W. A. Hogg and Jean Dugas

QUEBEC

1965

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EAST HALF OF MONTBRAY TOWNSHIP

Rouyn-Noranda County

by

W.A. Hogg and Jean Dugas

INTRODUCTION

General Statement

The present report follows the geological investigations carried out by Jean Dugas in the southeast quarter of Montbray township in 1954-55, and by W.A. Hogg in the northeast quarter in 1958. The area was mapped on a scale of 1,000 feet to the inch as part of a project to map the whole region on the same scale. The mapping of the adjacent townships of Duprat and Dasserat has been completed.

The area has attracted prospectors on account of widespread mineralized zones especially in the southeast corner where small but high grade copper-gold ore pods have been discovered. Other showings of zinc, copper and gold are known in the area. Most of the exploration work by mining companies and prospectors has been confined to the southern part of the map-area.

Location and Means of Access

The area described is in Rouyn-Noranda county, 5 miles east of the Quebec-Ontario provincial boundary and 18 miles northwest of the cities of Rouyn and Noranda. It comprises the east half of Montbray township and has a total of 50 square miles bounded by latitudes 48°17'42" and 48°25'51" and longitudes 79°18'03" and 79°24'32".

The north-flowing Kanasuta river traverses the west side of the map-area, which is thereby rendered accessible by small boat or large canoe. This river starts at Dasserat lake and empties into Duparquet lake, its course being broken by four rapids. The first rapid is encountered about 5 miles upstream and necessitates a 300-foot portage. The three other rapids, necessitating short portages, occur slightly more than one mile north of Dasserat lake.

Entry from the north can be made at Duparquet lake at a point one mile south of the town of Duparquet.

For water travel in the southeastern part of the map-area, entry can be made at Vert lake, one mile north of Highway 59, in Dasserat township. Chasseur (formerly, Hunter) creek can then be reached by way of Desvaux, Dasserat, Arnoux and Larochelle lakes.

This creek leads without portages to the road of the Inmont property on lot 54, range I, or by a north branch to Montbray lake. From Montbray lake access to Daudin lake is also possible with a small canoe.

Hydroplanes can land easily on Dasserat, Colnet, Montbray, Tarsac and Fabie lakes, but favourable winds are necessary to alight on the smaller lakes.

Previous Geological Investigations

The earliest geological information on this part of Western Quebec can be found in the reports prepared by the officers on the Geological Survey of Canada and the Quebec Bureau of Mines who carried out reconnaissance trips in the region between the years 1872 and 1907.

In 1906, Obalski canoed down Kanasuta river from Duparquet lake, which he called Agotavekami lake. He described some of the rocks along the portage in the northwest quarter of Montbray as being "quartzous diorite". Two miles beyond this portage he encountered a similar rock crossed by "a vein of pinkish white calcite containing some grains of chalcopyrite and green stains of carbonate of copper".

The first geological map (No. 93 A) was published at the scale of 1 inch equals 4 miles and accompanied Memoir 39 of the Geological Survey of Canada by M.E. Wilson (1913). This map shows few details since the report covers a large territory. No mention is made of the rocks found in Montbray township, save on the map which shows the area as underlain by the Abitibi volcanics composed of quartz porphyry, diorite, andesite, gabbro, basalt, chloritic rocks, amphibolite and hornblende schist.

Memoir 103 by M.E. Wilson (1918) is a general statement of the work carried out in Northwestern Quebec and contains special reference to the author's work of previous years. The accompanying map is at the scale of 1 inch equals 12 miles (No. 145 A).

In 1923, the Geological Survey of Canada published a geological report and map prepared by James (1922) on the Duparquet map-area. The map, published at the scale of 1 inch equals 1 mile, provides some additional geological information on the distribution of rocks in Montbray township.

The most recent map, prior to the one accompanying the present report, is drawn to the scale of 1 inch equals 1 mile and contains descriptive notes by W.F. James, D.S.W. Buffam and H.C. Cooke. This map (281A, "The Duparquet Sheet") was published in 1933 by the Geological Survey of Canada.

Field Work

The field work was carried out during the summers of 1954 (4 months), 1955 (a few weeks), and 1958 (3 months).

Outcrop patterns, structural details and other pertinent geological data were plotted in the field on overlays of aerial photographs taken in 1951 by Photographic Surveys Corp. of Toronto for the Quebec Department of Mines. After correction for distortion, the data were transferred to a base map prepared by the Draughting and Cartography Branch of the Quebec Department of Mines at the scale of 1 inch to 1,000 feet.

The area was covered by pace and compass traverses averaging about 600 feet apart. The location of the outcrops was ascertained by visual comparison of the ground features with those shown on photographs. Ground control was established using township range lines and lot posts whenever they could be located.

Navigation in the area was with a large freighter canoe equipped with an outboard motor. Range lines and a few trails facilitated travel in the bush. The Rouyn-based Gold Belt Airways serviced the party during its work in the east-central part of the map-area.

A petrographic study was made of more than 100 thin sections mostly from the north half of the map-area. Thirty rock samples, all from the south half, were assayed for metal content.

Acknowledgments

In 1954, Jean Dugas was assisted by L.R. Bienvenu, a graduate in geology from Tufts College, Mass., Claude Grenier, an undergraduate at Laval University, and Rosaire Cloutier from the village of Languedoc in Abitibi-West county.

In 1955, B.H. Kelly, a graduate student of McGill University, Montreal, acted as senior assistant. Jean Bédard and Richard A. Lighthall were the junior assistants. Jean Dessureault was the geological field party's cook.

In 1958, Pierre St-Julien, a graduate student of the University of Montreal, acted as senior assistant for W.A. Hogg. John E. Redmond of McGill University and André Champagne of Laval University were junior assistants. Eugène Chandonnet served as canoeman and G. Paré, as cook.

These men performed their respective duties in an efficient and highly satisfactory manner.

DESCRIPTION OF AREA

Topography and Drainage

The east Montbray map-area is located north of the height of land and is mainly one of low relief, with few hills rising more than 100 feet above the level of the surrounding area. The western side of Kanasuta river is partly covered with sand and clay. The eastern side has a surface topography broken by rounded, rocky knobs. The elevations are relatively higher than on the west side of the Kanasuta. The highest hills are in the east-central part, where a local relief of 300 to 400 feet is attained in places. These hills represent a westward extension of the Bourniot (Smoky) hills, in Duprat township, where the maximum elevation is 1,585 feet above sea level.

A system of pronounced valleys strikes approximately N. 45° E. and includes Chasseur Creek valley. A second system of valleys, with steeply scarped west walls, strikes N. 45° W. One of these valleys is the Mouilleuse (formerly, Smoky) Creek, and it is probable that most of them are the topographic expression of faults.

Rock outcrops are plentiful but mapping is rendered difficult by vegetation and dense second growth in the burnt areas.

Drainage in the area is largely toward Kanasuta river, except in the northwest corner where the surface run-off is northward in the direction of Magusi river. Both Magusi and Kanasuta rivers flow north into Duparquet lake. Save for a few rapids, the clear waters of the Kanasuta have a relatively low velocity.

Natural Resources

The mapped area is uninhabited and the nearest settlement is the town of Duparquet. In the northeast quarter, much of the timber has been cut, or it has been destroyed by forest fires in 1921. Some stands of poplar along the banks of Kanasuta river are suitable for low-grade plyboard, certain sections having been cut for that purpose in recent years. The southeast quarter is well wooded and contains a variety of trees such as white and black spruce, balsam fir, white, grey and red pine, tamarack, thuya (cedar), poplar and birch.

Black spruce grows thickly in places on the clay plains. A luxurious second growth of birch and poplar can be seen along the shores of lakes and rivers. Characteristic of the areas along the rivers are the tamaracks and the thuyas. The smaller streams have thickets of alder and hazel. The higher areas are covered with scrub maple, which makes travel difficult in many places. Jack pine grows extensively only in areas that have been overlain by glacial outwash material of a gravelly and sandy nature. Only one such area occurs in the map-area and it is located halfway between Kanasuta river and Fabie lake. The growth is new and the diameter of the trees approximates three inches. In the rocky areas a mixed growth occurs; poplar, birch, balsam, jack pine and black spruce grow side by side.

Moose is the largest variety of wild life. Many of these animals were observed during the summer months. Red deer are not so abundant as formerly. A few bears were seen and evidence of their presence can be found throughout the area. Wolf tracks were observed. Beaver, otter and muskrat are quite common in the rivers and lakes. Their furs are sought after by trappers who spend the winter months of each year on the trail. Rabbit, grouse, partridge and duck are quite plentiful.

All the lakes and rivers of the area abound with fishes, pike and pickerel being the most plentiful species.

GENERAL GEOLOGY

General Statement

Mapping in other areas of the region indicates the presence of two periods of volcanism represented by the Blake River and Malartic groups. Within the map-area no real evidence has been found to indicate separate periods of extrusion. A regional correlation based on the work done in this limited area would entail much uncertainty and confusion. It is probable, however, that the rocks belong to the Blake River group.

The volcanic rocks in the map-area have been tentatively assigned to the early Precambrian. No evidence has been uncovered to indicate a more definite age. The rocks are generally similar to the ones found in the adjacent east and south map-areas, where they are all classed as early Precambrian in age.

Andesite and dacite flows, either pillowed or brecciated, rhyolite flows, either massive or brecciated, and rocks related to these flows underlie most of the area. They make up belts trending east and northeast, except in the southeast corner where the trend is northwest. There is evidence of complex folding in the area. The volcanic rocks have been intruded by diorite, gabbro, granite, quartz porphyry, syenite porphyry and aplite. The most recent intrusive rock is diabase; it forms north- to northwest-trending dykes.

There is evidence that the diorite dykes were intruded prior to the folding and deformation of the volcanic rocks and, also, that the limbs of the folds were cross-folded.

There are no sedimentary rocks within the volcanic sequence that could suggest periods of erosion or unconformities within the mapped sequence.

Table of Formations

CENOZOIC	Recent and Pleistocene	Muskeg, forest loam, lake bottom clays, silt, sand, gravel Glacial stream deposits
Unconformity		
PROTEROZOIC	Keweenawan-type intrusive rocks	Diabase
ARCHEAN	Post-Keewatin intrusive rocks	Syenite Porphyritic syenite Aplite dykes Diorite Gabbro Quartz porphyry Granite
	Keewatin-type volcanic rocks	Agglomerate Porphyritic rhyolite Andesite-dacite flows and flow breccias Rhyolite flows and breccia chert

Volcanic Rocks

General Statement

The greater part of the east half of Montbray township is occupied by the volcanic rocks that occur as flows and flow breccias of andesite, dacite, rhyolite and basalt. Small discontinuous bands of one type may occur within larger bands of another. This is particularly true for rhyolite, which is found as discontinuous bands or lenses in dacite. Pillow structures occur in all volcanic rocks other than rhyolite. They are particularly abundant in the north section of the area.

The criteria used to classify the volcanic rocks in the field were texture, hardness, presence or absence of quartz, the variety of phenocryst feldspars and the colour of both the fresh and weathered surface. As a rule rhyolite is readily classified. The distinction between dacite and andesite is difficult and in some cases it is somewhat arbitrary. The rock mapped as basalt is easily distinguished but its distribution suggests that it could be an equivalent of altered andesite.

Some of the rocks are comparatively fresh-looking, whereas others are altered owing to low-grade metamorphism or hydrothermal alteration. The alteration minerals consist chiefly of epidote, chlorite, quartz, albite, calcite and sericite. Quartz, sericite and carbonates are more common in dacite and rhyolite, whereas chlorite and epidote appear predominantly in andesite.

The degree of alteration varies in the different rock types. In some, the original texture has been completely obliterated and the minerals have been changed to epidote, zoisite, chlorite and sericite, whereas, in others, the felted texture of the groundmass is retained and the alteration minerals may consist only of granoblastic calcite, quartz or epidote dispersed throughout the rock in rounded or irregularly shaped clusters.

Dacite

Dacite constitutes about one-third of the volcanic rocks in the area. It occurs as wide belts within the volcanic formations.

The rocks classed as dacites in the field are dense and fine grained. Their freshly broken surface is light green to grey and somewhat resembles andesite except for the lighter colour and greater hardness of the dacite. The dacites are softer than the rhyolites. The weathered layer of the dacite is commonly one-sixteenth to one-quarter of an inch thick and grades outwardly from a light green to a pale greyish green. Some specimens have a very thin reddish-brown film on the outside surface. Some flow breccias, consisting of a matrix of intermediate composition, and some acidic fragments have also been classified as dacites.

Thirty thin sections of the dacites were examined and over 80 per cent of them show a medium to fine-grained, felty texture. The feldspars occur as untwinned, lath-shaped microlites without any definite orientation. The feldspar microlites may be cloudy. At least one third of the thin sections examined have such clouded feldspars.

Quartz is encountered in all the specimens and occurs as threads filling tiny fractures or as fine grains scattered through the rock or, again, as fine granules bordering chlorite calcite and spherules of epidote. Nearly half of the sections show the quartz grains to be sub-rounded and to be made up of granules arranged in a mosaic fashion. These sub-rounded grains are contained in a mesh of lath-shaped feldspar microlites. Possibly these grains were originally amygdules and result from the filling of vesicles. They may be as large as 3mm. measured across the grain but are commonly much smaller. In some sections they may make up as much as 20 per cent of the rock. The granoblastic texture may be coarse but more commonly it is very fine.

All specimens show varying degrees of alteration. The alteration minerals include epidote, albite, zoisite, quartz, chlorite and carbonates. In the specimens where the alteration is more pronounced, the original composition of the rock has been changed to epidote, chlorite (pennine), calcite, sericite, and quartz.

Epidote constitutes between 5 and 40 per cent of the volume of the specimens. It occurs dispersed throughout the rock in the form of clusters or in the form of spherules, in which case it can be either mixed with quartz or bordered by a thin granular layer of the same mineral. Commonly, zoisite surrounds the epidote.

The green chlorite, pennine, observed in more than half of the specimens studied, occurs as small and disseminated grains making up from 5 to 20 per cent of the rock.

Calcite is not a prominent constituent; it occurs as amygdules, mosaic clusters and individual grains generally surrounded by quartz or pennine.

Dacite has been transformed into a flaser-type rock in several localities. Parallel lensoid shapes have been developed along with bands outlining tight cross-folded structures. The external appearance is that of a deformed rock. Thin sections show the lenses to be similar in composition to dacite, being made up of remnants of very fine, felted feldspar microlites with chlorite alteration in the centres. The lenticles are surrounded by bands of an unidentified, cloudy, integrated brown material. The rock has not been granulated even though the external appearance suggests a deformation structure.

Andesite

Andesite, the most abundant volcanic rock, occurs either as broad or narrow belts along the main folded structures. It is best exposed in a band measuring nearly one mile wide and trending northeasterly across the north half of the map-area. It underlies also about half of the area of ranges I to III. In places the andesite changes gradationally into dacite with increased silicification. Both rocks display massive and pillowed flow structures.

The massive variety of andesite is a relatively soft, compact and uniform rock without large variation in colour or other physical appearance. The fresh surface is green to dark green, whereas the rough weathered surface is grey to rusty brown.

Pillowed andesites are found in abundance in a well defined belt in the eastern part of range X. Many of the pillows have been deformed and, in some localities, have been cut by diorite dykes prior to their deformation. In the south part of the area, pillows, where present, are not well developed and cannot be used to determine the flow tops. Erosion on gently dipping flows may have

resulted in irregular outline of the pillow rims.

Rounded and ellipsoidal quartz amygdules, up to 3 inches in diameter, appear in the vesicular andesite. Usually quartz and epidote fill the vesicles along with sulphides in some cases. Epidote generally occurs in the form of radiating clusters. In lots 41 to 43, range I, the amygdules are particularly abundant.

Andesite flow breccias are found in many localities. They have ribbon-like flow structures with fragments which, in some cases, are elongated and contorted and, in other cases, are rounded or angular. Many of the fragments are much lighter in colour than the main mass and consist of altered rhyolite or chert. The flow breccia zones are generally irregular and do not constitute definite horizons.

Thin sections of the andesite reveal the predominance of a fine to very fine matrix of lath-shaped feldspars, which are found as untwinned microlites arranged so as to give a felted texture. Many of the feldspars are grey and have been altered to epidote, sericite, zoisite and chlorite.

Epidote is a common alteration mineral occurring as clusters or in some cases as irregular, interlocking grains. It makes up as much as 40 per cent of the rock.

Chlorite occurs as pennine and is usually fine grained. It is a common alteration mineral.

Magnetite occurs as fine, disseminated grains or as skeletal crystals.

Quartz is present in nearly half of the thin sections studied. In the rare instances of myrmekitic textures, quartz is found in the vermicular form. Otherwise, it is found as finely disseminated grains and makes up less than 5 per cent of the rock.

basalt

The rocks mapped as basalt occupy three main areas:

1) ranges I, II, III, around Colnet lake.
2) ranges IV, V, VI, around Tarsac lake.
3) range VIII, between lots 48 and 52.

The distribution of the so-called basalt on the periphery of intrusive bodies and the apparent non-alignment with the general strike suggest that these rocks are the result of a thermal metamorphic effect. A baking effect is observed around the Colnet Lake granite plug where a 1,500-foot halo of hard, black and fine-grained rock has been formed. The same observations were made around the syenite body west of Tarsac lake, where the halo measures a few thousand feet, and south of a gabbro body in range VIII.

In the northeast part of range X, some rhyolites have the appearance of basalt. These rocks are observed to grade directly into rhyolite without sharp contacts and are thus considered to be rhyolites that have been baked and darkened by the intrusive syenites. The syenite outcrops in the form of dykes.

Pillowed and flow structures occur in the basalts of the southwest corner of range VI and of the northwest corner of range IV.

The basalts are dark and aphanitic; their fresh surface is smooth and dull coloured. The weathered layer is usually thin and possesses a greenish-grey colour. The rock breaks with a conchoidal fracture.

The basalts are compact and brittle and it is possible to observe a distinct resiliency when they are struck with a hammer. The resulting sharp rebounds are in marked contrast with the dull ones observed in the andesites.

Thin-section examination shows the rock to consist essentially of lath-shaped microlites which may or may not be twinned. There is no glass and the lath-shaped microlites maintain a subparallel position in flow lines. Plagioclase and hornblende are the main constituents. The plagioclase has the composition of labradorite (An_{55}). Finely divided magnetite may make up between 5 and 10 per cent of the rock and scattered small grains of quartz, less than 3 per cent. Epidote occurs as radiating clusters and narrow stringers.

Some basalt specimens are brecciated. The angular fragments are contained in a light green matrix. Small, rounded clusters of epidote and quartz form a mosaic in both the groundmass and the angular fragments. Finely divided magnetite is distributed throughout this rock. Hornblende and augite are observed in some fresh-looking specimens but more commonly they are altered to chlorite.

Rhyolite

Rhyolite, being a resistant rock, is generally exposed on ridges. Four main zones are exposed in the map-area. In the extreme northwest corner a first zone of porphyritic rhyolite crops out. A second zone, about 3,000 feet wide and trending northeasterly, runs across ranges IX and X. A third zone, 4,000 to 5,000 feet wide and also trending northeasterly, traverses ranges IV, V, VI and VII. The last band, trending northwesterly, is exposed in the east part of ranges I, II and III. Many other lenses of rhyolite are found within the map-area.

There are three different types of rhyolite: porphyritic rhyolite, massive rhyolite and rhyolite flow breccia. All these various types have a light-coloured weathered surface. The weathered film ranges between one-sixty-fourth and one-eighth of an inch in thickness and has a white, pink or greenish grey colour. The rock is fine grained, hard and brittle and has a conchoidal fracture. It is grey to black on fresh surface.

Porphyritic rhyolite is found as an oval-shaped mass north of Fabie lake. The phenocrysts are composed of glassy quartz and feldspar. The groundmass is very fine. The rock weathers reddish or pink, somewhat like a red granite, and is massive throughout. The rock was mapped formerly on the Duparquet sheet (1933) as granite. It is possible that this rock is intrusive in origin, and in this case the terms quartz porphyry or quartz-feldspar porphyry would be more suitable. The shape of the body and the massive character of the rock are, however, the only evidence of an intrusive origin.

The 12 thin sections examined show that the porphyritic rhyolite of Fabie lake is made up of phenocrysts of quartz, potash feldspar and plagioclase feldspar with minor accessory minerals in a base of fine grains of quartz and feldspar. The quartz phenocrysts are rounded to sub-rounded and are usually clear and glassy. Some phenocrysts show a thin margin of secondary growth surrounding the original crystals. The Carlsbad-twinned potash feldspar phenocrysts have clear crystal outlines with a clouded interior. Albite occurs with polysynthetic twins and is altered to sericite around the grain borders.

The finer-grained groundmass is made up of equigranular grains of quartz and feldspar, which give it a mosaic-like texture. In some sections the matrix is composed of slightly clouded, sub-rounded spherulites consisting of radiating intergrowths of orthoclase and quartz needles. The accessory minerals include uralitized augite, sphene, magnetite and pyrite.

Some porphyritic rhyolite is found also in the central part of range V. The phenocrysts are composed exclusively of quartz. A flow brecciation can be observed in this porphyritic rhyolite.

The most widespread rhyolite is the massive variety. It is generally structureless except for a few flow lines. Generally, also, it is grey or black on fresh surface, but it may be pink coloured in a few localities such as lots 35 to 37, range IV, lots 53 and 54, across ranges IV and V, lots 46 and 47, between ranges II and III and also in the east part of ranges IX and X. On lot 54, range V, 1,000 feet north of the range line, large pink fragments up to six inches across are found in a grey matrix. The pink colouration is probably due to the specular hematite which can be found along joint planes. Quartz eyes are visible here and there in some of the massive rhyolites.

Rhyolite flow breccia is very common. It is particularly well exposed north and east of Sablonnière lake, in the northern part of range V and on the Inmont property in range II. Brecciated rhyolite occurs also as bands ranging between 1 foot and 15 feet in width. The fragments are angular to subangular, 2 to 3 inches across, and have a composition identical with that of the matrix. They may be more cherty in places and a few plain quartz fragments may be observed. It seems that the brecciation was caused by movement in a partially cooled flow. Some fragments have thin, lighter-coloured border zones that appear to be chilled margins.

Isolated lenses or bands of rhyolite, ranging between 6 and 30 feet in width, occur within the other volcanic lavas. Their strike is parallel with the other folded structures. Fine laminar flow structures appear in the rhyolites found along the northern border of the map-area.

Plate I – Large epidotized fragments in andesite, west of Riche lake.

Plate II – Rhyolitic breccia

As observed in other nearby areas, the rhyolite displays intrusive relationships. On lot 43, range IV, north of Sablonnière lake, a thin stringer of rhyolite cuts into diorite. However, a short distance away diorite, in turn, cuts into rhyolite.

In thin section, the more altered rhyolites show only remnant crystal outlines indicative of orthoclase feldspar. Epidote, mixed with quartz and zoisite, occurs as indistinct grains. The remainder of the section is cloudy, save for the pennine areas which border small porphyroblasts of quartz.

Agglomerate

Typical agglomerate is found only is one lens trending north to northeast across the demarcation line of ranges V and VI on lots 37 and 38. The agglomerate consists of rounded to subangular fragments of rhyolite and andesite lava in a tuffaceous matrix. These fragments may attain 5 cm. across. Measurements made across the smaller fragments making up the matrix range from 0.5 to 1 cm. The rhyolite fragments are more abundant than those of andesite. They are hard and siliceous.

The agglomerate is light grey to greenish grey on weathered surface. On fresh surface darker fragments contrast with the light grey matrix.

Most of the larger fragments are composed essentially of clear granular quartz and euhedral potash feldspar. Carlsbad twinning occurs in the feldspars which have fine, cloudy brown, indeterminate inclusions. Carbonates, mainly calcite, make up about 10 per cent of the rock and occur as small blebs surrounded by quartz which, in turn, has an outer border of chlorite. Many of the quartz grains are highly strained as indicated by the undulatory extinction under polarized light. The quartz content makes up about 20 per cent of the rock specimens and much of it occurs in patches and bands.

In the northern part of lots 43 to 48, range V, and in the area southwest of Sablonnière lake, range IV, the rocks with a dacitic matrix and abundant rhyolite or quartz fragments that were mapped as dacite breccias could as well have been mapped as pyroclastics.

Intrusive Rocks

General Statement

Exposures of intrusive rocks with an acidic to basic composition occur as either isolated or connected bodies and are fairly well distributed throughout the map-area. They are predominantly dioritic in nature. In some instances they form large stocks that break through the volcanic series, as can be seen around Remillac lake, range IV, south of Joequin lake, range VI, and on the north side of Kanasuta river, range IX. In some other instances the dioritic intrusives have formed numerous dykes and also somewhat larger bodies that are elongated, tabular and regionally conformable with the folded structures. Evidence exists to suggest that the diorites were intruded prior to or during the folding of the volcanic series.

A granite mass, nearly 5,000 feet in diameter, outcrops at Colnet lake.

Syenite porphyry forms irregular dyke-like masses and intrudes all the rocks in the area other than the north-trending diabase dykes.

Gabbro and quartz porphyry form smaller bodies.

The diabase or quartz diabase dykes have a prevailing northerly trend, normal to the folded volcanic rocks, and, being younger in age, they cut across the diorite and volcanic rocks. These dykes are believed to occupy tension fractures developed as a result of folding in the volcanic series.

Diorite

Diorite represents the most widespread intrusive rock in the area and occurs as stocks, elongated bodies and small dykes. The largest stock-like occurrence is on lots 47 to 53, in ranges III, IV and V. Another occurrence, somewhat elongated, occupies the northeast corner of range X. It extends for one mile on the west side of Kanasuta river.

Outcrops on lots 57 to 60, ranges I to IV, reveal a linear body, whereas the outcrops on lots 52 to 56, range II, do not suggest any particular shape. Other diorite bodies of some extent are found south and east of Joequin lake, range II, and west of Sablonnière lake, range IV. Smaller bodies and dykes are numerous. The smaller diorite dykes have variable widths ranging from less than 1 foot to 100 feet across, with the majority being between 15 and 35 feet in width.

The outline of the diorite bodies, especially in ranges III and V, is irregular. This may be due to the fact that the diorite is rather flat lying, possibly with a slight dip to the east. The diorite bodies may not be very thick. A flat contact with the rhyolite was observed west of Sablonnière lake.

The diorite, though it has a tendency to follow the strike of the rock formations, nevertheless cuts across them in many instances.

Variations in the texture, grain size and mineral composition occur from one locality to another and even in a single mass. The smaller, irregular bodies and the dykes generally have a more uniform texture and composition. The rock is particularly coarse grained in lots 48 to 51, range V.

The fresh rock is usually dark grey but locally it assumes a greenish colouration when the alteration to chlorite and epidote is further advanced.

The exposed surface of the rock is fairly well weathered to a depth of one-eighth to one-quarter of an inch. It is rough, uneven and dark green to rusty brown. However, some outcrops in range X have a weathered surface that is white to light grey.

Generally, the diorite contacts with the volcanic rocks are quite sharp. Where they are less clearly defined, as is the case between andesite and small bodies of fine-grained diorite, it may be difficult to distinguish the two rocks.

South of Remillac lake, the diorite is changeable in grain size, is locally very basic and shows what looks like flow structures. It is possible that this so-called diorite is a gabbro intrusion or a dioritized volcanic rock. A pronounced aeromagnetic anomaly is found in this general area.

Thin sections of the diorite show feldspar occurring as lath-shaped crystals having a cloudy, dull appearance and lacking the characteristic polysynthetic twinning of sodic plagioclase. Many of the feldspar laths have rough and irregular borders and are arranged into a divergent trachytoid texture.

The feldspar normally makes up between 45 and 50 per cent of the rock and the green hornblende, about 35 per cent.

Augite is observed in some sections. It is locally altered to hornblende and chlorite. Magnetite appears in most thin sections either as small, rounded and irregularly shaped grains or as octahedral, skeletal crystals. It commonly makes up from 2 to 5 per cent of the rock. Zoned ilmenite partially altered to leucoxene occurs in some specimens.

Under the microscope a number of specimens exhibit very advanced alteration. The original minerals have been changed to chlorite, epidote, calcite and sericite.

Quartz diorite crops out in a number of localities. It differs little from the rocks already described except that it contains from 3 to 5 per cent quartz. Locally it may contain as much as 10 per cent quartz.

The diorites have been invaded by younger rocks. On lot 32, range VIII, a massive diorite body is intruded by younger, fine-grained diorite dykes. On lot 55, range X, a large mass of diorite is intruded by 2- to 3-inch apophyses and dykes of syenite porphyry with inclusions of diorite in its matrix. The diorite is also observed to be cut by the north-trending diabase dykes in the north part of lot 59, range IX, and in the central part of lot 62, range I.

The diorite has been sheared in many localities. The shearing indicates that the rock was injected as dykes and sheets prior to the folding of the volcanic series. This is further substantiated from observations of deformed andesite pillows cut by diorite dykes prior to the deformation of these pillows.

Gabbro

Bodies of gabbro and quartz gabbro are small and rather scarce. They seem to be associated with certain phases of diorite, diabase and basalt. Hornblende gabbros occur along sections of the north-trending diabase dykes, whereas quartz gabbro, in the form of a dyke, outcrops next to basalt in lot 32, range VI. In lot 50, range IX, a basic rock contains a number of phases changing within a narrow zone from a fine-grained quartz diorite to a coarse-grained diabase or quartz gabbro and then to a partially serpentinized peridotite.

The gabbro in lots 49 and 50, range VIII, is brecciated near the contacts. The brecciated zones are cemented by coarse, granular quartz along with some pyrite. The breccia is probably the result of intrusion phenomena. Near the central part of the massive gabbro, milky quartz stringers and inclusions are present. They possibly represent phases of the porphyritic syenite that intrudes the mass in the guise of apophyses and dykes.

In the southern part of lot 52, range II, a gabbroic mass, about 2,000 feet long by 500 feet wide, crops out. The weathered surface, which is about one-sixteenth of an inch thick, is grey brown. This gabbro shows fine parallel lines that are probably due to the alignment of soft minerals in the rock. The fresh surface is uniformly black or dark green. Macroscopically, the rock is composed of augite, plagioclase and serpentine. It is slightly magnetic.

In the southwest corner of the area, a coarse-grained gabbro dyke extends across Dasserat lake. The rock is fresh and composed of more than 50 per cent ferromagnesian minerals.

Generally, the weathered surface of the gabbros is reddish brown to olive green. Among the hand specimens collected many appear fresh, but some have been almost completely altered to chlorite, sericite and epidote. Though the specimens show variable grain size, the gabbro, as a whole, is coarse grained. Variation in their composition is readily apparent.

Whenever an examination of specimens was possible, the plagioclase was found to have the composition of labradorite (An_{50}). Some of the feldspars are zoned and saussurite is common.

Olivine with vicinal twinning makes up as much as 20 per cent of some specimens. Other ferromagnesian minerals include hornblende and augite.

Ilmenite and magnetite are the common accessory minerals.

Granite

A circular plug of pinkish granite occupies a large part of Colnet lake in range II. The granite is massive and uniformly coarse grained and, according to Cooke, James and Mawdsley (1931), contains 30 per cent quartz, 65 per cent albite and 5 per cent chlorite. Magnetite, pyrite and apatite are the accessory minerals.

Quartz veins are common near the contact, in and outside the granite.

Quartz Porphyry

A band of rock about 500 feet wide trends south-easterly across lots 40 to 44, range I, and has been classified as quartz porphyry. A smaller band is found in range II at the south end of lots 43 and 44. The rock is light grey on weathered surface and grey to black on fresh surface. It is very fine grained, contains a few quartz phenocrysts ranging in size between 1 and 2 mm. and is composed mostly of feldspar and quartz and about 20 per cent ferromagnesian minerals altered to chlorite. It contains less quartz and more dark minerals than rhyolite. The quartz porphyry is cut by quartz veins and is mineralized with pyrite, especially on lots 40 and 41, range I. At this place, it has a faint pink colouring. The rock could be a massive volcanic, but it is not well enough exposed and the relationship with the adjacent formations is too obscure for a more definite classification. It is possible that the so-called porphyry is a finer-grained offshoot of the granite body.

A quartz-feldspar porphyry body, north of Fabie lake, has already been described in this report as porphyritic rhyolite and the possibility of its intrusive origin has been mentioned.

Syenite-porphyry and Aplite

Dykes of aplite and syenite-porphyry intrude basalts, gabbro, diorite and rhyolite. They are found north of Tarsac lake where they intrude basalts, in range VIII where they are associated with basalt, gabbro and diorite, and in the northeast corner of the same range where they cut small diorite and rhyolite bodies. The three localities of intrusive syenitic dykes are marked by magnetic anomalies on the G. S. C. magnetic survey map 38 G. These anomalies may be indicative of large syenitic masses at depth.

The rock is brownish, weathers white and has a porphyritic texture. The phenocrysts are orthoclase and zoned plagioclase feldspar varying in composition between An_6 and An_{10}. They range in size from 2 to 5 mm. and are imbedded in a groundmass composed principally of crystals of oligoclase (An_{30}), a few grains of quartz and shreds of biotite. The size of the groundmass components ranges between 0.1 and 0.5 mm.

The twin lamellae of the plagioclase crystals have been bent, fractured and displaced, thus suggesting deformation. The centres of the zoned feldspars have been partly altered to a finely divided sericite.

Syenite-porphyry dykes cut the diorite. However, inclusions of diorite are commonly found in the syenite. A similar syenite-porphyry occurs in other map-areas of the region.

Diabase

All diabase dykes have predominant north to northwest trends. The main dyke follows closely the eastern border of the map-area. It bends to the northwest in range VII. Smaller dykes occur parallel to, or as offshoots of, the main dyke. Offshoots are observed in ranges V and VII.

Other small dykes were traced in the north part of lot 39, range I, and in lot 38, range IV. The widths of the dykes were respectively 80 and 50 feet. Another dyke has been outlined on magnetic maps as striking northwesterly across lot 39, range VIII. These last three occurrences may be outcrops of the same dyke.

During the process of folding of the east-west-trending belts of volcanic rocks, tension would normally open up fissures nearly at right angles to the axis of the folds. Diabase is believed to have been emplaced in those fissures and is thus considered to be the youngest igneous intrusive rock in the Montbray map-area except, possibly, for the minor intrusions of aplite and syenite-porphyry.

Mapping in the north part of lot 58, range IX, has disclosed a narrow dyke of diorite cutting rhyolite, which dyke is in turn cut by a northwest-trending diabase dyke. Inclusions of rhyolite have been observed to occur in the diabase at several localities.

In many places, both the fresh and weathered surfaces of the dykes display a characteristic ophitic texture; in other places this ophitic texture is lacking. All the dykes are brown to reddish brown on their weathered surface and have a faint speckled appearance. The fresh broken surface of the diabase dykes exhibits chill zones near the outer margins and a texture that becomes coarser and coarser towards the centre. The rock consists chiefly of elongated to rectangular crystals of labradorite with augite filling the space between the labradorite, magnetite and ilmenite crystals. Ilmenite is commonly altered to grey, opaque leucoxene. The mineral composition changes in places along the strike of the diabase dykes. In the central part of lot 61, range VII, a section lacking the ophitic texture is made up essentially of olivine and hornblende in nearly equal amounts; quartz and leucoxene are minor constituents. Variations in the composition and texture have been noted for other areas.

Parallel vertical joints normal to the trend are a characteristic feature of the diabase dykes.

GLACIAL GEOLOGY

The mapped area was covered by Pleistocene ice sheets, which left erratic boulders on the slopes and tops of the highest hills. The boulders are mostly coarse-grained granite and gneiss. They are not of local origin and their source is unknown. An unusual glacial erratic of jasper breccia about 2 feet in diameter and with a matrix containing either magnetite or hematite was found in the southeast corner of the map-area. A boulder containing gold and copper mineralization is reported in the central part of lot 52, range III.

Boulder streams indicating the location of former glacial streams are observed in the east part of range IX but they cannot be traced for any great distance.

Many rock outcrops have been abraded and striated during the glacial periods. They have the typical form of roches moutonnées with gently sloping stoss sides and steeper lee sides. The direction of ice movement, as indicated by the glacial striae found on the highest hills and the roches moutonnées, is from N.10°W. to N.5°W.

In the low areas the ground is covered with lacustrine clays, silt and sand. No large gravel deposit was found. A level area of glacial outwash material composed of sand and fine gravel occurs in range VIII between Kanasuta river and Fabie lake.

STRUCTURAL GEOLOGY

Folds

The volcanic rocks in the mapped area have been folded along axes trending northeast to east. The structure of the area is extremely complex. Reliable determinations of top or dip of flows are scarce and render structural interpretation very difficult. Pillows, where they exist, generally have irregular outlines. Only two folds have been recognized with reasonable certainty. An anticline that has been traced along range VII of the adjacent Duprat township appears to extend southwesterly into the present map-area. The axis follows the main rhyolite belt in range V. The fold plunges south to southwest with a nose located in the vicinity of Sablonnière lake. On the crest of the anticline the formations may lie almost flat but on the limbs they have steep dips. This fold has been named the Duprat anticline because it is best defined in Duprat township. An anticline whose axis is shown near the boundary of Duprat township in range VIII probably plunges east. It has a north-dipping axial plane. The southern limb of the fold is steeply inclined with dips between 40 and 60 degrees to the south, whereas the northern limb has a more gentle attitude.

The few top determinations possibly indicate the presence of other folds. These folds are not shown on the map because evidence for their presence is too meagre. One such fold would be an east-trending anticline south of Colnet lake. The nose of this fold would include the rhyolites around Inmont Copper Mines Ltd. and would be cut off by the Hunter Creek fault.

Synclinal folds are also presumed between the three anticlines just described.

Cross-folds appear on the south limb of a main anticlinal fold in the eastern part of ranges VII and VIII. Bands of parallel, lenticular, augen-like structures outline the form of the cross folds and indicate that the rock has yielded by flowage in the course of subsequent movement. Those structures are on a small scale, are closely spaced, plunge steeply either to the south or to the southeast and maintain axial planes normal to the main fold.

Time of Folding

The shearing and faulting that accompanied the folding of the volcanic series have affected the diorites, whereas the syenite porphyries appear to have been left unaffected. The major folding probably took place between the periods of intrusion of the diorite and the syenite-porphyry.

Faults and Shears

There are at least two large breaks and a number of secondary faults and shears in the map-area. The major faults appear to strike northwest and northeast.

Smoky Creek Fault

The strong northwest-trending break in the north half of the map-area is believed to be the continuation of the Smoky Creek fault. This fault can be traced for at least 44 miles on the basis of topographic details. Trending southeasterly, it follows the courses of Mouilleuse river up to Flavrian lake in Duprat township and of Kinojevis river in Vaudray township.

In Montbray township it is marked by steep scarps, talus slopes and well developed alignment in the drainage system.

The apparent horizontal movement along this fault is not considerable. Right-hand displacement is indicated by rhyolite in range VII.

The Smoky Creek fault has been cut by diamond-drill holes in ranges VIII and IX of Beauchastel township. The intersections suggest that the fault dips to the west and is bordered by silicified zones.

Hunter Creek Fault

Conspicuous topographic features mark the northeasterly-trending Hunter Creek fault in the southeast corner of the map-area. This fault, which has an indicated left-hand displacement, extends into Duprat and Dasserat townships. Faulting is deduced from the presence of a rectilinear valley with scarps in places, the apparent displacement of formations, and the difference in strike on both sides of the valley. This fault is considered to be vertical on the basis of a vertical dip for the shear zone extension at Nora lake in Duprat township.

Other Faults

Faults that are more or less parallel to the Smoky Creek fault have displaced the volcanics. Their trace is marked by low linear depressions. The system of faults, including the Smoky Creek extension, appears to have displaced the north-trending diabase dykes. Consequently, at least some of them may be post-diabase in age. A northwest-trending fault, located in range III, has displaced a diorite dyke with an apparent left-hand displacement of about 1,500 feet.

In the south half of the map-area a series of faults parallel to the Hunter Creek fault is assumed on the basis of relevant topographic features.

Shearing occurs at various localities throughout the area. The strike is generally parallel to the fold axis of the structures. The shear zones are narrow and usually from 20 to 25 feet in width. Many shears occur in the intrusive masses or dykes of diorite, whereas others appear in intermediate to basic rocks which have been chloritized and mineralized with pyrite. The shear zones are indicated on the maps accompanying this report.

ECONOMIC GEOLOGY

Prospecting was carried out as early as 1906 when Obalski observed that the rocks bordering Kanasuta river contained scattered grains of chalcopyrite. Prospecting activity thereafter has been intermittent. The main discovery in the area is on lots 55 and 56, range II, where pods of ore grade and massive sulphides containing copper, gold and silver were found. Many other places within the map-area contain rocks that have been mineralized by sulphide solutions.

Description of Mining Properties and Showings

Inmont Copper Mines Ltd.

Ref.: Q.B.M. Min.Oper. 1925, p.122; 1927, p.111; 1928, p.85.
Ann.Rept. 1934, Pt A, p.86.

Q.D.M. P.R. No.390, p.53.
G.S.C. Mem. 166, pp. 224-7.

The property of Inmont Copper Mines consists of claims covering lots 55 to 62, the south three-quarters of lots 52 to 54, the south half of lots 48, 50, 51, and the south quarter of lot 49, all in range II.

Access to the property is by canoe via Chasseur creek. A 1 1/2-mile tractor road leads to the shaft.

Most of the property is underlain by rhyolite and rhyolite breccia striking northwesterly. East and west of the rhyolite are flows of andesite. The volcanic rocks are cut by diorite dykes and bodies, by a serpentinized gabbro and by a younger diabase dyke.

The property has been held by various companies since 1925. In 1927, a shaft was sunk to a depth of 540 feet and about 5,000 feet of drifting and cross-cutting were completed. During the period 1934-35, there was mined 1,500 tons of ore containing pyrite and chalcopyrite and grading 0.24 ounce of gold per ton, 0.5 ounce of silver per ton and 6.5 per cent copper. The ore came from a lens-shaped ore body extending from the surface to a depth of 150 feet and averaging 3 feet wide and 30 feet long. A raise in this ore shoot encountered a pocket of eleven pounds of massive gold and gold tellurides along a slip plane. Other small copper sulphide ore shoots were found in the upper levels.

The ore is associated with zones of rhyolite breccia almost completely replaced by chlorite. The chlorite zone strikes northwest and dips steeply northeast. The ore has about the same or a slightly flatter dip, and the chalcopyrite content seems to increase in the vicinity of the diorite rock.

Apart from the mineralized zones in the shaft area, known as No. 3, two other zones were found and explored by diamond drilling at various times. About 500 feet southeast of the shaft a mineralized zone in rhyolite breccia, known as No. 1, measures about 600 by 150 feet. An area of 100 by 20 feet within this zone was found to contain 2.2 per cent copper and $1.50 of gold per ton. The No.2 mineralized zone is situated about 1,000 feet north of zone No. 1. The best hole in this area returned 2 per cent copper and $1.20 of gold per ton over a length of 82 feet. The main sulphide is pyrrhotite. A small pear-shaped ore body was delimited.

The present company acquired the property in 1952 and since then carried out geophysical surveys and diamond drilling in 1952, 1955-56, 1957, 1958-59 and 1960.

In 1960, the shaft was de-watered and the underground workings reexamined. A program consisting of 10,090 feet of underground drilling and 10,527 feet of surface drilling was undertaken.

Barry Explorations Ltd.

Ref.: G.S.C. Mem. 166, p.227
Q.B.M. P.R. No.150, pp.38-39.
Q.D.M. P.R. No.297, pp.111-112.
Q.D.M. P.R. No.390, pp.62-63.

This company holds claims covering lots 51 and 52, range I, and some adjoining ground in Duprat, Beauchastel and Dasserat townships.

The property is accessible by Chasseur creek and a 2-mile-long tractor road or from Arntfield by a 7-mile winter road. It is underlain by rhyolite and andesite flows that strike northeasterly and are cut by diorite and a north-striking diabase dyke.

The property, known as the Four Corners property, was explored successively by Coniagas Mines Ltd., Cons. Mining and Smelting, Noranda Mines Ltd. and Barry Copper Mines Ltd.

The main showing in Montbray township is in the south part of lot 52. It consists of pyrite and chalcopyrite mineralization with some sphalerite and occurs along a shear zone striking N.35°W. The zone has a length of 150 feet and an average width of 10 feet.

About 1,000 feet northwest of the main showing, a quartz vein, 1 foot wide, occurs along a dacite-andesite contact. The walls are mineralized with magnetite, pyrite and chalcopyrite. A grab sample assayed 0.006 ounce of gold per ton, 0.350 ounce of silver per ton and 3.93 per cent copper.

Lot 39, Range I

Seven holes were drilled in 1947 to test quartz veins, 1,500 feet north of the township line. The veins cut altered andesite, have a low dip to the north and are slightly mineralized with pyrite. Gold was found in two holes. The best section was 2.5 feet of gold ore at $9.10 per ton or 5 feet at $7.00 per ton.

Lots 40 and 41, Range I

A number of trenches and test pits were opened on ground straddling the line between lots 40 and 41 about 700 feet south of the line between ranges I and II. The mineralized basic volcanic rock contains sphalerite, pyrite and some chalcopyrite and occurs in a zone striking slightly south of east. The zone is near the contact with a tongue of fine-grained quartz porphyry.

A grab sample taken by the writer from this zone assayed 0.004 ounce of gold per ton, 0.144 ounce of silver per ton, 1.20 per cent copper and 13.56 per cent zinc.

About 300 feet south of this zone, the porphyry is cut by mineralized quartz veins and is itself mineralized with pyrite. The same situation occurs again in the porphyry about 2,000 feet to the southeast, where the colouration of the rock is pink. A grab sample from this area assayed 0.023 ounce of gold per ton.

On lot 41, about 100 feet north of the range line, a quartz vein in a carbonated zone striking N.70°E. has been trenched. A grab sample of quartz mineralized with specular hematite and fine pyrite assayed 0.112 ounce of gold per ton. Veins of a similar nature, mineralized with some pyrite and chalcopyrite, are found 300 feet farther north.

Lot 35, Range I

A test pit has been found in a highly altered andesite cut by mineralized quartz veins, in the north part of lot 35, range I. A grab sample taken by the writer assayed only traces of gold.

Lot 36, Range II

Ref.: Q.D.M. P.R. No. 135, p.3.

The edge of the Colnet Lake granite body outcrops on an island located on the west shore of Colnet lake, 800 feet north of the demarcation line between range I and II on lot 36. A short adit has been driven into the granite, which is well mineralized with pyrite and is cut by a quartz vein. A few quartz veins about 1 foot wide strike north to northeast along a shear zone. The veins contain pyrite and some chalcopyrite. Two samples taken by the writer assayed respectively 0.001 and 0.014 ounce of gold per ton.

Lots 42, 43, Range II

Straddling the line between lots 42 and 43 in the centre of range II, a few quartz veins occur in the granite and the adjacent basic volcanic rocks. Some of the veins are slightly mineralized with pyrite.

Lot 52, Range II

A sheared mineralized zone, striking N.60°E. and dipping 80° to the northwest, has been uncovered by trenches and pits for a length of 160 feet and a maximum width of 20 feet.

Sampling from five trenches dug across the zone covered an average width of 7.9 feet and a length of 150 feet. The assay returns were 0.01 ounce of gold per ton, 0.45 ounce of silver per ton, 0.82 per cent copper and 1.70 per cent zinc. Previous diamond drilling in 1949 did not give encouraging results.

Lot 53, Range III, and Lot 54, Range IV

In the centre of lot 53, range III, a mineralized zone is found in dacite. The sulphide consists of cubic pyrite. The zone has a length of approximately 500 feet and a width of 200 feet. A sample taken by the writer assayed a trace of gold. Heavy pyrite is observed in the same type of rock in the southern part of lot 54, range IV.

Lot 40, Range V

Ref.: Q.B.M. Min.Oper. 1928, p.85.

Three to four hundred feet west of Kanasuta river in the north part of lot 40, range V, two short quartz veins, about 6 inches wide, are mineralized with chalcopyrite.

Lots 58 and 59, Ranges IV and V

A zone of sulphide mineralization striking northeasterly is observed on lots 58 and 59, ranges IV and V. The zone is exposed over a length of 450 feet and has a maximum width of about 10 feet. The sulphide mineralization is mainly pyrite. Two diamond-drill casings are found near the showing. No records of the drilling are available. A grab sample of almost massive pyrite assayed 0.002 ounce of gold per ton.

Lot 61, Range V

Ref.: G.S.C. Mem. 166, pp.227-8.
Q.B.M. Min. Oper. 1928, p.83.
Q.B.M. Min. Oper. 1927, pp. 108-9.

Pyrite, nickeliferous pyrrhotite and chalcopyrite occur in a diabase dyke, very close to the contact.

In 1927, an inclined shaft was sunk in the sulphide area by Eplett-Metcalfe Mining Co. Ltd. It reached a depth of 60 feet and followed the contact of the dyke. A discontinuous mineralized zone was observed at the surface by the writer. It covers a length of 100 feet and a maximum width of 20 feet. According to Dr. W.F. James, the sulphides replace a 10- by 40-foot volcanic inclusion in the diabase. A width of about 5 feet consists of massive sulphides.

Mineralized zones are found also at a few other places in the dyke and in the adjoining dacite. Fourteen holes, totalling 2,000 feet, were drilled in 1928. Geophysical surveys were carried out by Bouzan Mines Ltd. in 1949 and by Bachelor King Mines Ltd. in 1956.

Lot 41, Range VI

Chalcopyrite occurs in volcanic rocks located 1,200 feet south of the line between ranges VI and VII on the east bank of Kanasuta river. Scattered specks of chalcopyrite can be seen along narrow fractures in rhyolite and dacite that are filled with quartz and calcite. In 1955, Roche Long Lac Gold Mines Ltd. diamond-drilled a few holes for a total footage of 372 feet. The cores failed to show minerals of economic value.

Lot 32, Range VIII

Finely disseminated pyrrhotite, pyrite, and scattered chalcopyrite flakes occur on the north-south township centre line, 1,500 feet north of the line between ranges VII and VIII. The sulphide minerals are found along a vertically sheared section in a pillowed and fractured andesite adjacent to a diorite intrusion.

In 1960 the Southwest Potash Corporation put down a diamond-drill hole to explore this showing at depth but the drill did not encounter any significant mineralization. Two other diamond-drill holes were collared approximately 1,000 feet east of the showing, but the cores contained no sulphide mineralization.

Lot 32, Range X

For the purpose of exploration, The Mining Corporation of Canada Ltd., in 1956, put down three diamond-drill holes for a total footage of 995 feet in lot 32, range X. No economic minerals were found.

Generally speaking, pyrite is fairly common within the map-area. Much of the rock is stained rusty brown to black on the surface, owing to oxidation of the pyrite. The mineralized areas that are not described in this report are shown on the maps accompanying this report.

Addendum

Since this report was written, additional staking has been done in the area by the following companies:

Barry Copper Mines Ltd. holds lots 59 to 62 in range I. Lots 61 and 62 were previously held by Barry Explorations Ltd.

Barry Explorations Ltd. holds lot 62 in range IV, lots 32 to 39 in range IV and V, and lots 32 to 35 in range VI.

Bachelor King Mines Ltd. holds lots 55 to 61 in range IV and the south half of lots 55 to 62 in range V.

Noranda Exploration Co. Ltd. holds lots 40 to 44 in range IV, lots 40 to 44 and the north half of lots 45 to 52 in range V, and lots 38 to 58 in ranges VI, VII and VIII.

The Mining Corporation of Canada holds lots 47 to 51 in range X.

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G.S.C. Map 38 G, Aeromagnetic Series - Kanasuta River (1951)

ALPHABETICAL INDEX