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Preliminary report on part of western Duprat township, electoral district of Rouyn-Noranda

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PRELIMINARY REPORT

ON

PART OF WESTERN DUPRAT TOWNSHIP

ELECTORAL DISTRICT OF ROUYN-NORANDA

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QUEBEC

1958

PRELIMINARY REPORTONPART OF WESTERN DUPRAT TOWNSHIPELECTORAL DISTRICT OF ROUYN-NORANDAINTRODUCTIONLocation and Field Work

This report deals with the geology of the western half of ranges III to X, Duprat township. Duprat township is in northwestern Quebec and its centre is about 12 miles northwest of Noranda, a town located along the Senneterre-Taschereau branch line of the Canadian National Railways. The area was mapped during the field seasons of 1955, 1956 and 1957. In 1955, Jean Dugas studied the whole of ranges IX and X, and lots 6 to 23, 30 and 31, the northern half of lots 3 to 5 and the southern half of lots 23 to 30, range VIII. Lots 1 to 19, 27 to 31, range VI, and parts of the southern half of lots 1 to 25 and of the northern half of lots 21 to 25, range VII, were examined by Wallace B. Emo in 1956. In 1957, Simon H. Behr completed the north-west quarter of the township and covered the western half of ranges III, IV and V.

All the mapping was done on a scale of 1 inch to 1,000 feet with the aid of aerial photographs. Ground control was maintained by township range lines and lot posts, most of which are still in place.

Access

The northern part of the area is accessible by canoe from Duparquet, a town located 5 miles to the north, across Duparquet lake and through Smoky river. This stream is easily navigable, for most of the summer, from Duparquet lake to the northern part of range VII of Duprat township but, farther upstream, it becomes shallow and, except early in the spring, difficult to navigate.

A good means of access to the southern part of the township is provided by the road to Eldrich Mines Ltd. which is situated in the southern half of lot 29, range III.

Acknowledgements

A cabin belonging to Eldrich Mines Ltd. was used during part of the 1957 season by kind permission of Mr. E.P. Graham, mine manager.

DESCRIPTION OF THE AREAPhysiography

The area is included in the large belt of clay deposited in the Barlow-Ojibway glacial lake. Below the general level of that former lake, the ground is flat and rocky; usually bare ridges rise here and there above the plain. The main

ones are the Smoky hills, in the western part of ranges VI and VII, which reach an elevation of 400 to 500 feet above the level of the adjacent Smoky river. Other hills are also present north of Anne lake, in range VII. The topographical features of the area generally reflect the structure of the underlying rock formations. Most of the hills are slightly elongated in the direction of the regional trend and linear valleys are commonly the loci of faults and shear zones.

GENERAL GEOLOGY

All the rocks in the area are Precambrian in age. The oldest members are volcanic in origin and consist of basalt, andesite, dacite and rhyolite. The main structural character is a large eastward plunging anticlinal fold, the axis of which lies in the eastern part of range VII. Intruding the volcanic rocks are diorite, granite, syenite, a minor body of pyroxenite and more recent diabase dykes.

TABLE OF FORMATIONS

CENOZOIC	Recent and Pleistocene	Clay, silt, sand, gravel
LATE- PRECAMBRIAN	Keeweenawan-type intrusive rocks	Diabase
EARLY-PRECAMBRIAN	Post-Keewatin-type intrusive rocks	Pegmatite Syenite Granite Diorite, gabbro, pyroxenite
	Keewatin-type volcanic rocks	Andesite, rhyolite, dacite, basalt

Volcanic Rocks

The most important distinction to be made in the volcanic rocks is the one between rhyolite and the intermediate to basic types. The various terms dacite, andesite and basalt have been used in the mapping but such a classification is based on megascopic appearance only and rather represents a difference in colour from light grey or green for dacite to dark green in the case of basalt. It is quite possible that those difference in colour are due to alterations of a normal andesite which is still by far the most widespread variety of lava. The case is rather obvious for basalt which is found as a halo surrounding acidic intrusive bodies. At least some of the dacite could also be a silicified facies of andesite. In cases where even the distinction based on the colour is doubtful, symbols like V4-6 or V6-7 have been used on the accompanying map.

Andesite

Andesite is the most abundant rock of the area forming wide belts especially in ranges III, IV and IX and smaller zones in ranges IV, VI and VII.

The typical rock is a fine-grained, rather soft, green to dark green lava which weathers light brown to greenish and greyish brown. It may be massive but it also commonly displays primary structures such as pillows, amygdules, flow lines and flow breccia.

The pillows may be regular and constitute good horizon markers, such as in the northern part of range IX, or be quite irregular, as in the southern part of the area. They vary in length from about 6 inches to 10 feet as seen on lot 24, range V. They also commonly display concentric lamination. A zone of spherules up to 13 inches occurs in places in the interstices between the pillows. Pillowed lavas appear to be finer-grained than the rest of the andesite.

Amygdules are generally present. They may be as large as 6 inches across. They are generally filled with quartz, chlorite, carbonate, pyrite and epidote which commonly forms clusters of radiating crystals.

Flow breccia is very common in the area. The fragments, which range from less than one inch to a couple of feet across, are usually subrounded, commonly have silicified borders, and generally weather with a lighter colour than does the matrix. In places, the fragments are definitely more acidic than the matrix and are made up of a cherty rhyolite. This type of breccia is well exposed in the northern part of lots 8 and 9, range VIII.

An apparently different type of flow breccia was observed in the andesite of ranges III and IV, especially on an exposure along the eastern shore of Dunlop lake. Large fragments are there arranged in parallel rows. They are olive green in colour and average 6 to 9 inches across. Other exposures of the same kind can also be seen in the southern half of lot 16, range IV. The boundaries between the fragments and the matrix are gradational, and the fragments, which are equally spaced, are usually of a similar size and orientation.

Rhyolite

Rhyolite is also abundant in the area and it underlies most of range X, the eastern part of range IX and the western part of ranges VI and VII. Apart from

these main areas, a few lenses of it are interbedded with other types of volcanic rocks.

The rhyolite is a pale grey to almost black rock weathering white to reddish white or grey. In places, its fresh surface is pinkish. It is hard, resistant to weathering and fairly easy to distinguish from the other varieties of lavas.

The greater proportion of the rock is porphyritic. The phenocrysts are generally quartz eyes but varying amounts of stubby crystals of white feldspar are also present.

As is the case for andesite, flow breccia is very common throughout the various zones of rhyolite, and the fragments, which are annular and variously sized, have a composition similar to that of the matrix, except at a few places where they seem more siliceous or quartzose. A typical breccia with large fragments is exposed in the southern part of lots 19 and 20, range X.

In the northern part of lots 30 and 31, range VIII, patches of more basic rock are included in the rhyolite, where they locally make up as much as 50 per cent of the rock.

Dacite

A rock slightly lighter coloured than the andesite, occurring mostly in the western part of ranges V and VI and in the eastern half of ranges X and VI, has been mapped as dacite. It is pale grey to green rock and softer than the rhyolite. All its other features are similar to those of the andesite, with a brownish weathered surface and the common presence of pillows, amygdules and flow brecciation.

Basalt

Rocks definitely darker than the ordinary andesite, i.e. dark grey to black, have been mapped as basalts. It is, however, of interest to note that those rocks surround the syenite of range V and appear along the border of the granite in the southeastern corner of the map-area. The same relationships have been found outside the area, in Montbray township, where the so-called basalt surrounds the lake Colnet granite body and the Tarsac lake syenite body, in range V. These peculiarities suggest that the darker colour may be an exomorphic effect of the intrusive bodies on the surrounding volcanic rocks.

Intrusive rocks

Diorite

Diorite is fairly abundant throughout the area and occurs mainly as elongated bodies or dykes having a definite tendency to follow the structure, though cross-cutting relationships are present in places and some dykes intersect one another. These relationships are well visible in the large outcrops of the northern part of lots 27 to 31, range VIII, where dykes one to 10 feet wide cut each other at various angles.

The composition, texture and granularity of the diorite vary from one place to another. It contains quartz in places and its weathered surface is rough,

dark grey or of various shades of brown. The rock is massive and commonly has an ophitic texture.

The larger bodies of the rock are generally coarse grained and contain equal amounts of dark and light coloured minerals. In places, however, the rock is more mafic and it locally assumes a green colour. The dark or green diorite cuts the lighter variety in the western part of range VII on the northern lower flank of the Smoky hills.

The smaller dykes are generally fine grained and have been referred to by other writers as "andesite dykes". Where the grain is very fine, the symbol 2 instead of 2D has been used on the map.

The contacts between the diorite bodies and rhyolite are everywhere sharp but they are commonly gradational in the case of andesite and dacite, as can be seen in the northern part of lot 10, range VII.

There are definitely at least, and probably more than, two ages of diorite in the area as can be determined by field relationships with granitic bodies. Dykelets of granite cut diorite in the eastern part of the area, along the line between ranges V and VI, and large irregular bodies of quartz-bearing diorite cut the Flavrian granitic body in the eastern part of ranges III and IV.

Gabbro, Basic Dykes, Pyroxenite

As stated above, some facies of the diorite are more basic and the rock may be called a gabbro or a quartz gabbro, since quartz eyes are present even in some of the more basic facies. A plug of gabbro has been separately mapped on lot 8, range VI, and a few narrow basic dykes have been indicated by the symbol 3.

A small body of pyroxenite crops out in the centre of lot 17, range VIII.

Granite

Nearly three square miles of the southeastern corner of the map-area is underlain by the Flavrian granitic batholith. The rock of this batholith commonly weathers white to pinkish white with pink feldspar and glassy quartz well visible on the fresh surface. The texture and composition of the granite show considerable variations, with the main subdivision being an amphibolitic variety. There is no sharp boundary between each of the different facies but gradations from one into another are very easy to see in the field. Practically all the granite of range III is of the amphibolitic type. An increase of amphibole in the granite is also apparent near its contact with the adjacent volcanic rocks. Epidote forms nodules and veins of various sizes and is irregularly distributed throughout the rock. Some of the granite contains fragments ranging up to 5 feet across and usually subangular. In the central part of lots 27 and 28, range III, and on the township centre line, range V, good exposures of this igneous breccia are abundant. Also in the northern part of lot 30, range V, the granite contains fragments of diorite. It is believed that the roof of the granite batholith was not far above the present surface since most fragments are considered to be stoped off blocks of the roof.

Syenite

Between lots 16 and 26, range V, an area of approximately one square mile is underlain by a syenitic intrusive body. The main rock type of the body is coarse grained, equigranular to somewhat porphyritic and has a pink to reddish colour. The southern part of the mass is well exposed along the northwest flank of a northeasterly trending hill located in lots 21 to 23. Farther north, exposures are small and covered by vegetal material and glacial debris in low and poorly drained ground. The southwestern contact of the syenite with andesite forms a fairly straight line along a northwesterly direction, but the remainder of that contact which separates the syenite from other varieties of rock appears to be very irregular and numerous apophyses of the intrusive project to the northeast and northwest. Even along the more regular southern boundary of the syenite, numerous veins and dykelets cut the adjacent volcanic and dioritic rocks. In general, the contact is characterized by endomorphic effects similar to those that are present around the Flavrian granite which lies farther east.

Injection breccia is in places well exposed near the contact and a porphyritic facies of the syenite was observed on lot 23, range V. The rock is made up of crystals of pink feldspar measuring up to 5 or 6 inches in length by $1\frac{1}{2}$ inches in width and set up in a medium-to coarse-grained matrix of green amphibole. The phenocrysts add up to over 50 per cent of the rock. This giant or lathporphyry may be seen to intrude the main body of syenite. At the contact between the two varieties and for a distance of about 2 feet from this contact, the amphibolitic matrix usually increases, and in places the phenocrysts have their long axes at right-angles to the contact.

A small plug of porphyritic syenite was also found on lot 5, just north of the line between ranges V and VI. Pink to purplish dykes were found cutting diorite on lot 30, range VII, and granite on lot 31, range V. A large amount of biotite is present in those rocks.

Pegmatite

On lot 24, range VII, small irregular pegmatite dykes cut the diorite. The dykes are only a few inches wide and contain long slender crystals of amphibole in massive feldspar.

Diabase

A fresh diabase dyke strikes east-west in range VIII, on lots 26 and 27, and a larger dyke is also present on lots 21 and 22, range IV. In the western part of ranges VI and VII, a series of narrow, sinuous, erratic diabase dykes occurs, ranging in width from 10 to 30 feet. These dykes are very irregular and they pinch out very rapidly or branch off into many smaller dykes. The diabase is fine to medium grained rock possessing a typical ophitic textures better developed near the borders of the dykes.

STRUCTURAL GEOLOGY

The main structure of the map-area is a broad anticline plunging east, probably the eastern extension of a doubly plunging fold present to the southwest of the area. The trace of the axial plane of the fold passes in the northern part of

range VII. It is a few degrees north of west at the eastern boundary and it curves slightly south of west from lot 25 westward. It is probable that the fold extends southwesterly into Montbray township. The limbs of the fold dip steeply but, along the trace of the axial plane, the dips are very low. On lots 21 and 22 of range VII, the andesite flow breccia which overlies the rhyolite is seen to be dipping at possibly no more than 20° towards the north.

All the formations follow the general pattern of the fold except for two inclusions of volcanic rocks in diorite, on lots 14 to 18, range IX, which seem to have been tilted.

Faults

The northeasterly striking Hunter Creek fault and the northwesterly trending Smoky Creek fault meet in the southern part of lot 15, range IV. These faults have been recognized outside of the map-area and are marked by linear depressions, one of which is occupied by Smoky river. Shearing has been noted along the Hunter Creek fault near Nora lake and near the syenite body a little to the southwest. Both faults seem to be major structures extending for miles outside of the area. We have, however, very little information about them except from diamond drilling and underground workings.

A linear depression parallel to the Hunter Creek fault is present about 700 feet northwest of the fault. It extends in a southwesterly direction from Anne lake to the Smoky Creek fault. Minor faulting also occurs in the Eldrich mine, in the southeast corner of the map-area.

An east-west fault is also suggested in the northern half of range VII, close to the eastern boundary of the map-area, near the trace of the axial plane of the main fold of the area, as described above.

In ranges IX and X, a north-south fault is indicated by a right-hand displacement along Smoky river. A series of minor shears is also concentrated in the northern part of lots 16 to 19, range X.

ECONOMIC GEOLOGY

Gold has so far been the principal metal found in the area, but a few occurrences of base metals have likewise been noted. Iron pyrite is also fairly abundant in the area and the places where concentrations of it were seen are indicated on the accompanying map by the symbol p.

Eldrich Mines Ltd.

Eldrich Mines Limited, the only producing property of the area, holds 2,433 acres of ground covering parts of lots 26 to 28, the whole of lots 29 to 39, range II, and lots 26 to 36, range III. The mine's shaft is located about 1,000 feet north of the line between ranges II and III, on lot 29, near the western edge of the Flavrian granite.

In the vicinity of the mine and in the underground workings, the granite is commonly sheared, brecciated, amphibolitized and silicified, particularly near vein zones and faults. A diorite dyke passes through the property and is about 100

feet wide in the upper level of the mine but it widens to over 200 feet at depth. It strikes close to N. 30° E. and dips 50° to the east. The gold ore veins are present both in the granite and the diorite.

The quartz content of the veins may reach 50 per cent, but it is commonly lower. In places the ore seems to be associated with siliceous zones in the granite. The average width of the veins is about 7 feet, although locally it may reach 15 to 20 feet. Two sets of veins are present: a more siliceous type which trends N. 30° E. and dips 40° to the east and another which strikes N. 60° E., dips 60° to the south-east and is therefore approximately parallel to the Quesabe and Hunter Creek faults. Many small faults are visible in the mine, the most common striking N. 20° E. to N. 30° E. Exceptionally, these breaks displace the N. 60° E. veins by as much as 30 feet.

An estimated 650,000 tons grading 0.20 ounce of gold per ton and 67 per cent silica was indicated by surface drilling and that estimate holds approximately true after underground developments. The veins are not yet completely explored both in length and depth. This information is based on a report of the consulting geologist A. Matheson which was kindly made available to the writers by E.P. Graham, mine manager.

Range VII, Lot 25.

In the northern part of lot 25, range VII, a sulphide zone occurs in rhyolite and basic lava forming a projection in a large diorite body. In the northern outcrop, mainly pyrite and pyrrhotite are found replacing rhyolite near its contact with what can be described as a pillowed basalt. About 500 feet to the south, chalcopryite replaces a grey basaltic rock. The mineralized zones do not exceed a few feet in width and the sulphide usually occurs in blebs a few inches wide. A fault breccia is apparently associated with the mineralization of this showing, which may extend further south where there are no outcrops, i.e., to the small lake just south of the centre of the range.

Range VIII, Lot 10.

Another sulphide zone is shown on the map in the southern part of lot 10, range VIII, but only pyrite seems to be present. A grab sample gave negative results when assayed for gold.

Range X, Lot 20.

In the centre of lot 20, range X, a carbonate zone in altered diorite is slightly mineralized with pyrite. One sample yielded 0.006 ounce a ton in gold.

Range III, Lot 27.

On lot 27, about 500 feet north of the line between ranges II and III, chalcopryite was found in an approximately east-west shear. The shear is only a few inches wide and the content of copper sulphide is low.

Ranges IV, Lot 11.

Quartz veins cutting a diorite on lot 11 of range IV, south of Smoky river, carry minor amounts of galena.
